American International University-Bangladesh (AIUB)

SDG Activity Report on

SDG 9:

Industry, Innovation and Infrastructure

SDG Activity Report on

SDG 9: Industry, Innovation and Infrastructure

Contents

University Activities

Lecture Series on “Second-order nonlinear optical observation of photocatalysts and other functional materials”

As a part of the "Dr. Anwarul Abedin Lecture Series", a regular development initiative of the American International University-Bangladesh (AIUB), the Faculty of Engineering (FE) at AIUB organized a webinar titled "Second-order nonlinear optical observation of photocatalysts and other functional materials" on Saturday, October 09, 2021, in Dhaka from 10:30 AM to 12:00 PM. The event was moderated by Dr. Md. Ehasanul Haque (Senior Assistant Professor, Dept. of IPE, FE). The webinar was held on Zoom online platform and also live-streamed on the AIUB's Facebook page.

The webinar was inaugurated with a welcome address by Dr. ABM Siddique Hossain (Professor and Dean, Faculty of Engineering, AIUB). He started by paying gratitude to Dr Anwarul Abedin, AIUB's Founder-Chairman, who contributed significantly to the university's development. He then presented a quick overview of the history of AIUB's journey for excellence in outcome-based education and applauded the progress done by Japanese researchers in various research fields. The esteemed guest speaker of this webinar was prominent researcher Dr. Goro Mizutani (Professor & Director of Library, JAIST). The speaker explained the concept of second-order nonlinear optical phenomena and listed the main points of the talk. After a brief review of basic optics related definitions such as EM waves, Maxwell's equation, Snell's law of reflection, dielectric constant and constant refractive index, he moved on to basic nonlinear optics. Next, he discussed the nonlinear optical study of a photocatalyst by discussing the SHG spectroscopy of TiO_2 and the broken symmetry of the stable 110 surfaces of the rutile TiO2 crystal structure. In the following section, Prof. Mizutani described the SHG microscopy process using their work involving spider silk where SHG of the orbweb and the dragline exhibited an SHG enhancement effect with the elongation of the silk thread. Lastly, he discussed the applications of SFG spectroscopy and microscopy performed at their lab, the former being studied in an alignment film of LCD that is rubbed and the latter in a Chara Fibrosa plant sample. Once the talk ended, the moderator announced the start of a question-answer session where Prof. Mizutani enthusiastically responded to the queries raised by the audience. Dr. Md. Abdur Rahman (Professor and Associate Dean, Faculty of Engineering) provided the closing remarks by thanking Prof. Mizutani for the informative session and for explaining a heavily scientific topic in a simple manner. After offering a digital Certificate of Appreciation as a token of gratitude for sharing his valuable time and insight, Prof. Rahman extended an invitation to Prof. Mizutani for future events organized by AIUB. Mr. Nafiz Ahmed Chisty (Associate Professor and Head In-Charge, Dept. of EEE) co-hosted the event. The event was graced by the presence of Dr. Mohammad Abdul Mannan (Professor and Director, Faculty of Engineering), Mr. Md. Saniat Rahman Zishan (Associate Professor and Head, Dept. of CoE) along with other faculty members and students from the Faculty of Engineering.

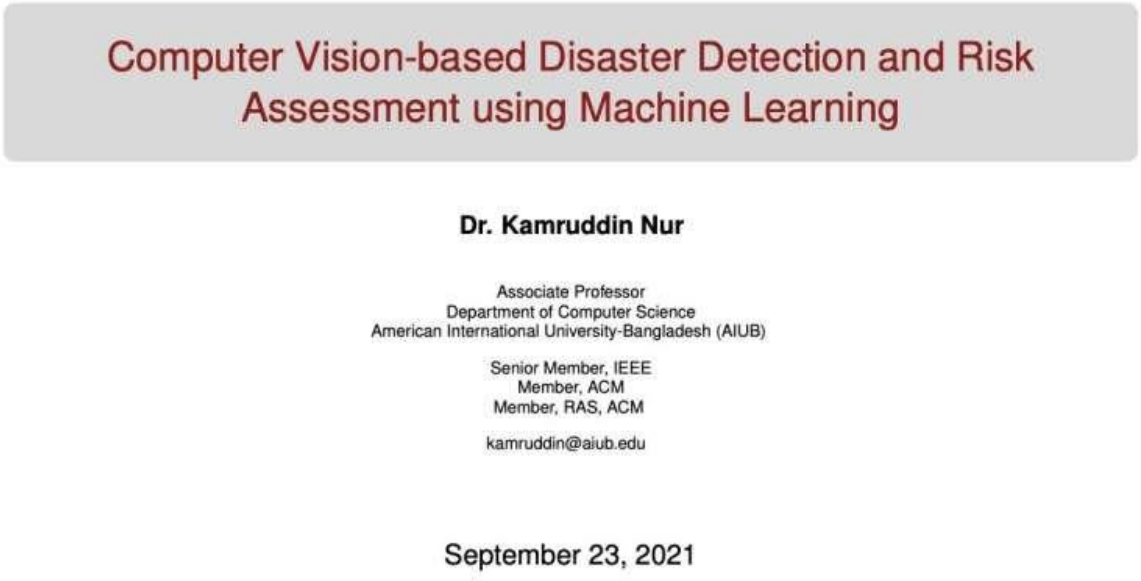
Lecture on Computer Vision-based Disaster Detection and Risk Assessment

On September 23, 2021, the Department of Computer Science, AIUB organized its 2nd session of Computing Lecture Series. The session began at 1:00PM at online platform MS Teams. The purpose of this lecture series is to share and highlight research and development work of faculty members of computer science within the department. The young faculty members of the department can be benefitted most from this type of event by engaging themselves with senior faculty members to develop and promote their research skills.

The speaker of the 2nd session of Computing Lecture Series was Dr Kamruddin Md Nur who is an Associate Professor in the department of Computer Science. Dr. Nur presented his research talk on "Computer Vision-based Disaster Detection and Risk Assessment using Machine Learning". During the presentation, Dr. Nur mainly focused on how to detect disaster and assess risk using Machine Learning approaches. In support of this research talk, Dr Nur showed and shared research findings on the presented topic.

Besides, there was a discussion session after the presentation where interested faculty members actively participated with their thoughts and views on Computer Vison-based disaster and risk assessment, particularly in the direction of machine learning approaches.

The event was graced by the presence of Associate Professor Mr. Mashiour Rahman (Associate Dean, FST) and Prof. Dr Dip Nandi (Director, FST). Dr Md Mahbub Chowdhury Mishu (Head of Computer Science) moderated the session.

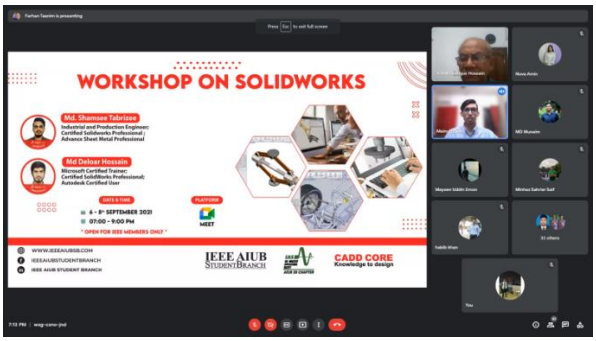


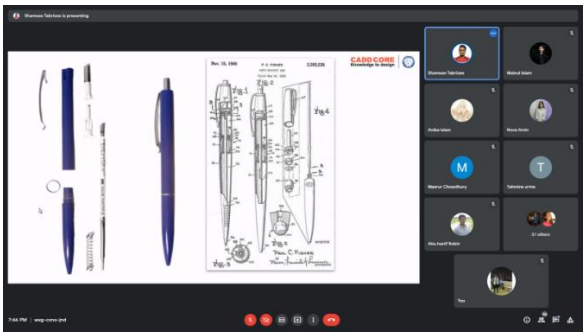
IEEE AIUB Student Branch Successfully Organized a Workshop Series on SOLIDWORKS

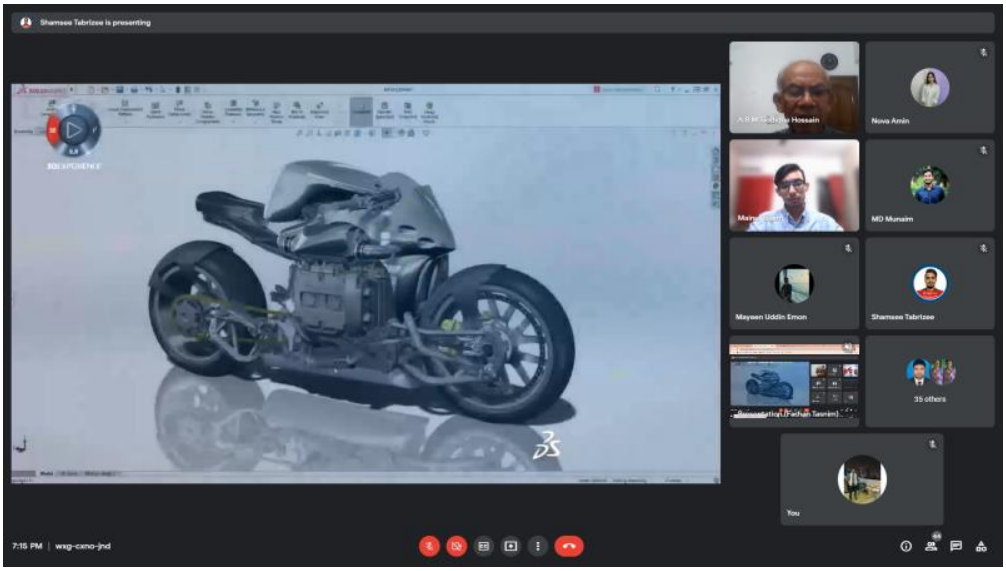
The IEEE AIUB Student Branch in collaboration with the IEEE IAS AIUB SB Chapter and CADD Core Training Institute has successfully organized a three-day-long workshop series from 6th - 8th September 2021, titled "Workshop on SOLIDWORKS". IEEE AIUB Student Branch organized this workshop session through the virtual platform Google Meet. The main aim of this session was to provide fundamental and brief notions about SolidWorks and some software drawings. The session was inaugurated by Prof. Dr. ABM Siddique Hossain, *Dean, Faculty of Engineering, AIUB; Advisor, IEEE AIUB Student Branch,* who addressed the relevance of SolidWorks in the fields of electrical engineering, mechanical engineering, software engineering, and 3D MODEL in the contemporary times' industry. He then thanked the honorable speakers for their time and the participants for their enthusiastic participation in the SolidWorks workshop series.

The very 1st day of the workshop series was successfully led by Md. Shamsee Tabrizee, *Mechanical CAD Designer; SolidWorks Certified Professional; CADD CORE Training Institute.* Mr. Tabrizee began the session by going through Models, Features, the distinctions between AutoCAD and SolidWorks, and a comprehensive explanation of sketching and drawing. The first day of the workshop finished with an interactive question-and-answer session in which Mr. Tabrizee answered all of the participants' questions and administered a quiz to assess the participants' learning process. The second day of the workshop series was conducted successfully by Md Deloar Hossain, *Certified CAD Designer and Trainer; Microsoft Certified Trainer; CADD CORE Training Institute*. He began the presentation by discussing SolidWorks' popularity and applications. He also discussed various features of SolidWorks and how to generate multiple versions in a single file. After that, there was an interactive Question/Answer session and quiz that marked the finish. On the third and last day of the series, Md. Tabrizee conducted the workshop effectively once more. He started the session by demonstrating terminal support assembly and part modeling. Later in the session, an interactive Question/Answer session and the final exam session took place, signaling the completion of the workshop series.

The three-day-long workshops were brought to an end by Dr. Mohammad Hasan Imam, *Counselor, IEEE AIUB Student Branch; Advisor, IEEE AIUB Student Branch EMBS Chapter; Secretary, IEEE Bangladesh Section EMBS Chapter; Associate Professor, Faculty of Engineering, AIUB* who conveyed the virtual Token of Appreciation to the honorable speakers as well as delivered the concluding speech where he expressed his heartfelt gratitude towards the honorable speakers and all participants for their valuable participation in the workshop series. The session was graced by the presence of Mr. Kawshik Shikder, *Motivator, IEEE AIUB SB, Asst. Professor, Faculty of Engineering, AIUB,* as well as 50+ registered participants, executive branch members, and volunteers.


WORKSHOP ON SOLIDWORKS
Md. Shamsee Tabrizee
Md Delaar Hossain
IEEE AIUB
CADD CORE

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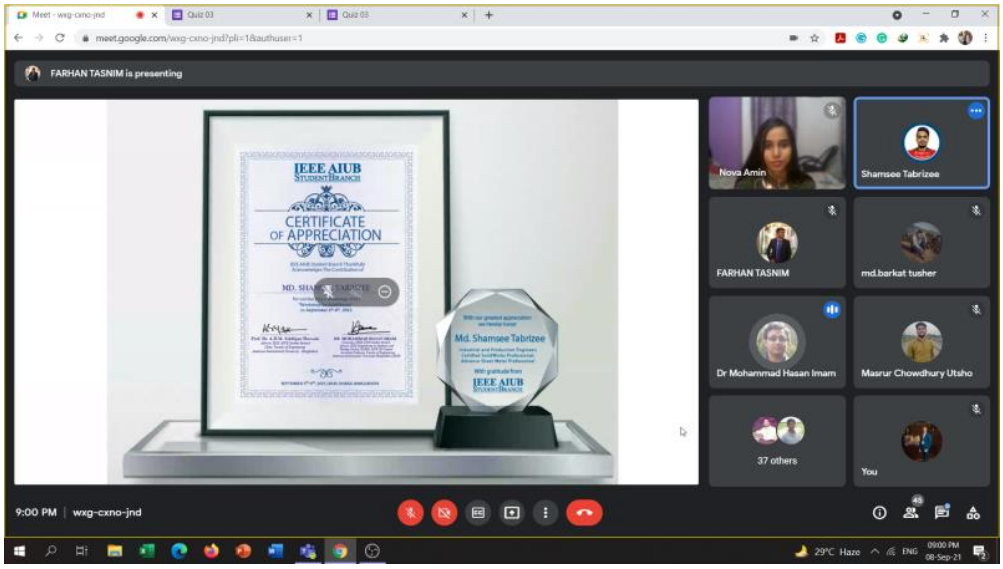
FARHAN TASNIM is presenting
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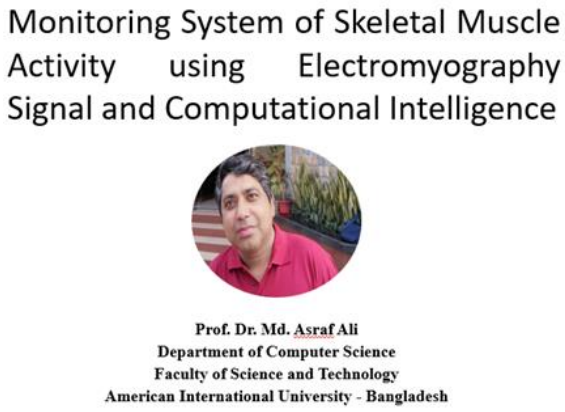
The department of Computer Science, AIUB organized its Inaugural Computing Lecture Series on 04 September 2021

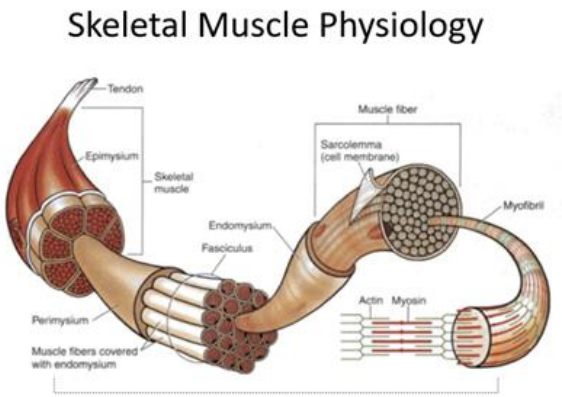
The department of Computer Science, AIUB organized its Inaugural Computing Lecture Series on 04 September 2021. The primary objective of this lecture series is to highlight research and development work of faculty members within the department. With the help of this type of event, young faculty members can develop their research skills by engaging themselves with senior faculty members.

The speaker for the Inaugural Computing Lecture Series was Prof. Dr Asraf Ali who is a senior faculty member in the computer science department, AIUB. Prof. Ali showed his current research and share the findings with other faculty members. The topic of Prof. Ali's discussion was titled as "*Monitoring System of Skeletal Muscle Activity using Electromyography Signal and Computational Intelligence*". During the presentation, Prof. Ali focused on how Computational Intelligence can be used on muscle function in human body.

After the presentation, there was a discussion session where several faculty members actively participated by sharing their views on Computational Intelligence.

Associate Professor Mashiour Rahman (Associate Dean, FST) and Prof. Dr Dip Nandi (Director, FST) inaugurated the lecture series by providing an inspirational message at the beginning. Dr Md Mahbub Chowdhury Mishu (Head of Computer Science) moderated the session



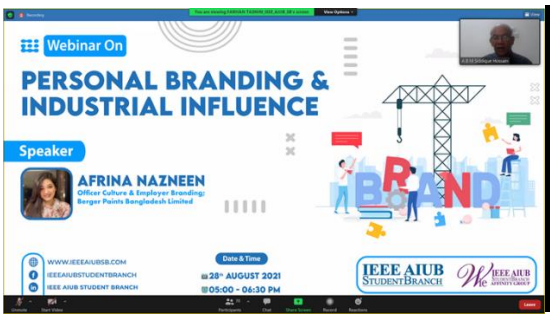


IEEE AIUB Student Branch Women in Engineering (WIE) Affinity Group successfully organized a webinar on "Personal Branding and Industrial Influence"

On 28th August 2021, the IEEE AIUB Student Branch Women in Engineering (WIE) Affinity Group successfully organized the webinar session titled "Personal Branding and Industrial Influence" in collaboration with the IEEE AIUB Student Branch through the ZOOM Meeting platform. The major focus of this webinar was on the key and concise ideas of corporate cultures, personal skill development, and leadership development. The webinar session was inaugurated by Prof. Dr. ABM Siddique Hossain; *Dean, Faculty of Engineering, AIUB; Advisor, IEEE AIUB Student Branch;* who welcomed the honorable Speaker Afrina Nazneen and also the participants. Prof. Hossain talked about personal branding and influences in short. He also discussed how personal branding can be useful to represent individuals in any new work environment. Then he thanked the honorable speaker for joining this event and also thanked the organizing team for taking this bold initiative of organizing such an informative session.

The session was started with the opening remarks from the speaker Afrina Nazneen; *Officer Culture and Employer Branding; Berger Paints Bangladesh Ltd*. The honorable speaker started the session by showing her gratitude towards Prof. Hossain, the organizing team, and the participants. The speaker started her presentation by introducing herself and Berger Paint Bangladesh Limited and some of their products. With examples, she discussed personal branding and why it is important based on her personal experience. She also added how personal branding is done and how to brand oneself in a new environment or in a job interview. Later, she discussed self-development, different types of communication and demonstrated the important things to incorporate to build a good resume. She shared some of her experience with verbal and non-verbal communication too and discussed how a proper LinkedIn Profile can enhance one's job opportunity. Finally, Afrina Nazneen concluded her speech by providing some job interview tips and a universal competency framework. Afterward, there was an interactive question-and-answer session, during which the speaker effectively addressed all the questions asked by the participants.

Later, Prof. Dr. Md. Abdur Rahman, *Associate Dean, Faculty of Engineering, AIUB; Advisor, IEEE AIUB Student Branch;* took the platform and presented the token of appreciation to the honorable speaker. And then he gave the concluding speech where he appreciated the initiative taken by the student branch to organize this webinar session and thanked the honorable speaker. The webinar session was graced by the presence of honorable Dr. Mohammad Nasir Uddin, *P.Eng*., *Head of EEE Dept. (Graduate Program) and Sr. Associate Professor*; Mr. Kawshik Shikder, *Assistant Professor*; Mr. Mohammad Khurshed Alam, *Assistant Professor;* Mr. Md Ashif Islam Oni, Lecturer; Md. Shahariar Parvez*, Lecturer, Faculty of Engineering, AIUB along with* executives and volunteers of IEEE AIUB Student Branch, and other registered participants of AIUB and other universities.



FACULTY OF ENGINEERING ORGANIZED A TECHNICAL SESSION TITLED "REPORTING PROCESS FOR ENGINEERS"

On August 29, 2021, Faculty of Engineering organized a technical session titled "Reporting Process for Engineers" for the EEE interns of "Physical Plant and Infrastructure (Electrical) Division, AIUB". The program began at 07:30 PM at online platform Google Meet. The purpose of this session was to familiarize the interns about the various categories and the writing process of a technical report. Mr. Biswajit Banik Pathik *(Assistant Professor, Faculty of Engineering, AIUB)* inaugurated the session by welcoming the speaker and the interns.

Mr. Iqbal Saadat Sajib *(Cost and Progress Analyst, Nokia Bangladesh)* started his alluring speech with the company profile of Nokia, Bangladesh. Then Mr. Sajib started explaining about the different types of report an engineer needs to work with in an international organization. He emphasized on specific format of report for dedicated tasks. He mentioned the necessity of preciseness when one is writing a report with obtained data.

Afterwards, Dr. M. Tanseer Ali (Senior *Assistant Professor*, *Faculty of Engineering, AIUB) continued the session along with Mr. Sajib with an interactive session with the interns regarding report writing procedures and necessity.*

Finally, Mr. Rethwan Faiz *(Assistant Professor, Faculty of Engineering, AIUB)* expressed his gratitude towards the speaker in his closing remarks. Mr. Abir Ahmed *(Lecturer, Faculty of Engineering, AIUB)* acted as the moderator for this session.

The webinar was graced by the presence of Abul Hasnat *(Assistant Professor, Faculty of Engineering, AIUB)*.

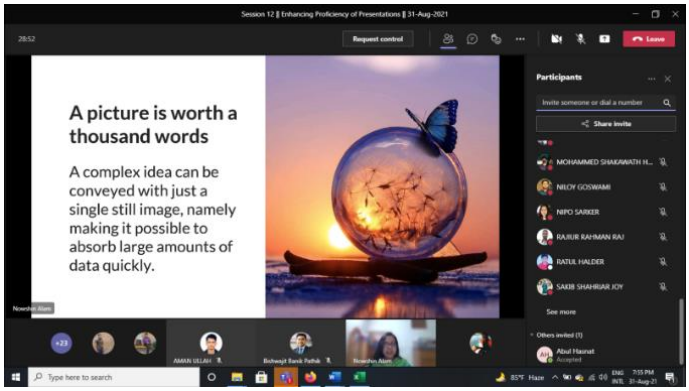
FACULTY OF ENGINEERING ORGANIZED A TECHNICAL SESSION TITLED "ENHANCING PROFICIENCY OF PRESENTATIONS"

On August 31, 2021, Internship Committee of Faculty of Engineering organized a technical session titled "Enhancing Proficiency of Presentations" for the EEE interns of "Physical Plant and Infrastructure (Electrical) Division, AIUB". The program began at 07:30 PM at online platform Microsoft Teams. The purpose of this session was to introduce interns with knowledge required for making professional presentations. Mr. Biswajit Banik Pathik *(Assistant Professor, Faculty of Engineering, AIUB)* inaugurated the session by welcoming the speaker and the interns.

Afterwards, Ms. Nowshin Alam *(Lecturer, Faculty of Engineering, AIUB)* started her speech with a brief introduction of herself and told the interns about the necessity of having the skills to make professional presentations. Then Ms. Alam gave an extensive explanation with step-by-step approach in making a presentation slide. She described the major aspects on how a presentation can me made interesting rather than monotonous.

Finally, Mr. Rethwan Faiz *(Assistant Professor, Faculty of Engineering, AIUB)* expressed his gratitude towards the speaker in his closing remarks. Mr. Abir Ahmed *(Lecturer, Faculty of Engineering, AIUB)* acted as the moderator for this session.

The webinar was graced by the presence of Mr. Kawshik Shikder (Assistant Professor, Faculty of Engineering, AIUB).



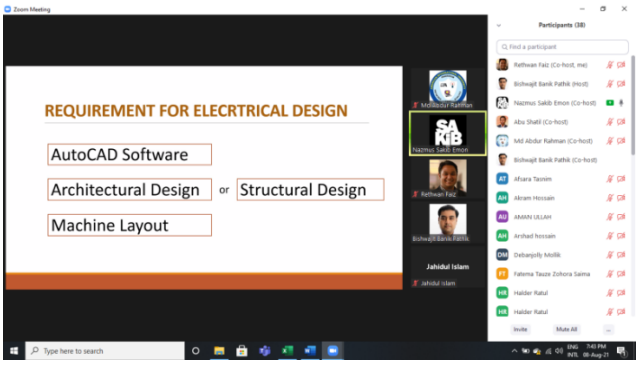
FACULTY OF ENGINEERING ORGANIZED A TECHNICAL SESSION TITLED "ELECTRICAL DESIGNING AND DRAFTING"

On August 8, 2021, Faculty of Engineering organized a technical session titled "Electrical Designing and Drafting" for the newly joined EEE interns of "Physical Plant and Infrastructure (Electrical) Division, AIUB". The program began at 07:30 PM at online platform Zoom. The purpose of this session was to introduce interns with practical images of electrical design drafted in AutoCAD. Mr. Biswajit Banik Pathik *(Assistant Professor, Faculty of Engineering, AIUB)* inaugurated the session by welcoming the speaker and the interns.

Afterwards, Mr. Md Nazmus Sakib Emon *(Assistant Manager, Edison Power Bangladesh Ltd.)* started his speech with the company profile of Edison Power Bangladesh Ltd. Then Mr. Emon started explaining about the different types of electrical drawing required for a factory. He emphasized on optimized designs based on client's requirement and explained the importance and different aspects of an electrical design. He specifically talked about the different electrical safety equipment and components used based on Bangladesh National Building Code.

Finally, Prof. Dr. Md. Abdur Rahman *(Associate Dean, Faculty of Engineering, AIUB)* expressed his gratitude towards the speaker in his closing remarks. Mr. Rethwan Faiz *(Assistant Professor, Faculty of Engineering, AIUB)* acted as the moderator for this session.

The webinar was graced by the presence of Mr. Md. Saniat Rahman Zishan *(Associate Professor and Head, Dept. of CoE, AIUB)* Mr. Chowdhury Akram Hossain (Senior Assistant Professor and Special Assistant of OSA, Faculty of Engineering, AIUB), Mr. Abu Hena Shatil *(Assistant Professor, Faculty of Engineering, AIUB),* Mr. Abul Hasnat *(Assistant Professor, Faculty of Engineering, AIUB)* and Mr. Abir Ahmed *(Lecturer, Faculty of Engineering, AIUB)*.



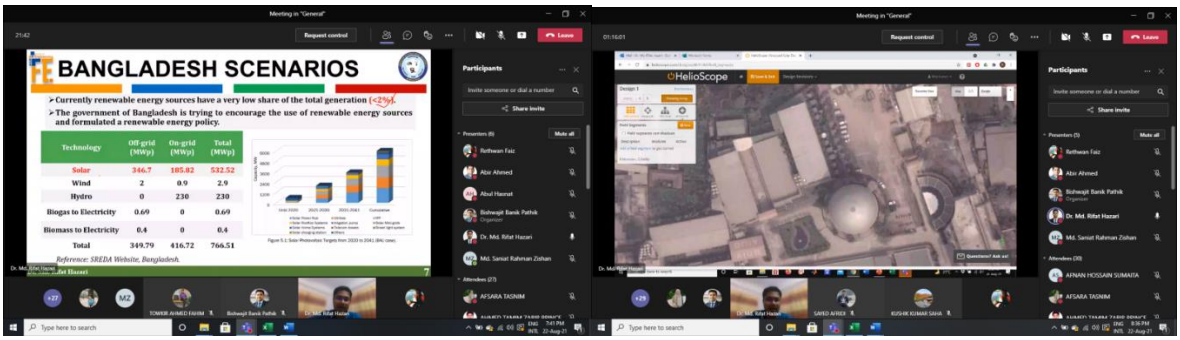
FACULTY OF ENGINEERING ORGANIZED A TECHNICAL SESSION TITLED "DESIGN AND INSTALLATION OF ROOF-TOP SOLAR PV SYSTEM"

On August 22, 2021, Faculty of Engineering organized a technical session titled "Electrical Designing and Drafting" for the newly joined EEE interns of "Physical Plant and Infrastructure (Electrical) Division, AIUB". The program began at 07:30 PM at online platform Microsoft Teams. The purpose of this session was to introduce interns with practical knowledge on how roof top solar PV system can be installed. Mr. Biswajit Banik Pathik *(Assistant Professor, Faculty of Engineering, AIUB)* inaugurated the session by welcoming the speaker and the interns.

Afterwards, Dr. Md Rifat Hazari *(Assistant Professor, Faculty of Engineering, AIUB)* started his speech with a brief introduction of renewable energy currently used in Bangladesh for power generation. Then Dr. Hazari vividly described the different components of a solar PV system which are installed on roof tops based on Bangladesh's law. He showed the interns on how to use the software HelioScope, which is a recognized software among PV system designers.

Finally, Mr. Md. Saniat Rahman Zishan *(Associate Professor and Head, Dept. of CoE, AIUB)* expressed his gratitude towards the speaker in his closing remarks. Mr. Rethwan Faiz *(Assistant Professor, Faculty of Engineering, AIUB)* acted as the moderator for this session.

The webinar was graced by the presence of Abul Hasnat *(Assistant Professor, Faculty of Engineering, AIUB)* and Mr. Abir Ahmed *(Lecturer, Faculty of Engineering, AIUB)*.



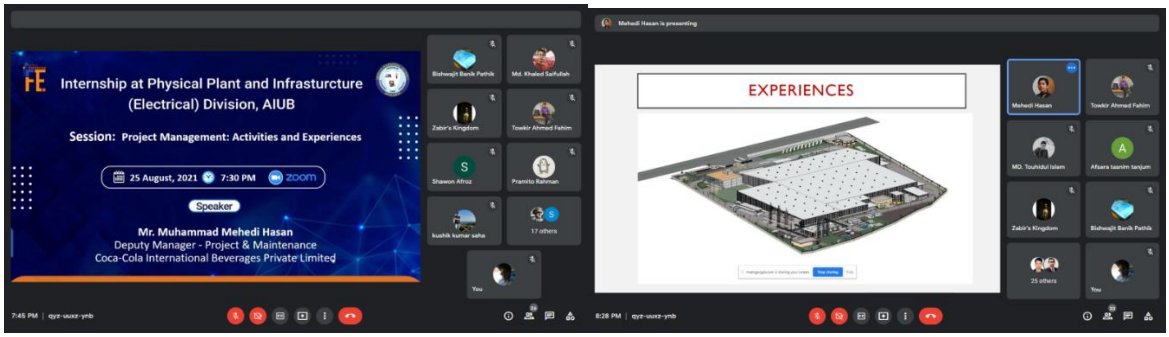
FACULTY OF ENGINEERING ORGANIZED A TECHNICAL SESSION TITLED "PROJECT MANAGEMENT: ACTIVITIES AND EXPERIENCES"

On August 25, 2021, Faculty of Engineering organized a technical session titled "Project Management: Activities and Experiences" for the newly joined EEE interns of "Physical Plant and Infrastructure (Electrical) Division, AIUB". The program began at 07:30 PM at online platform Google Meet. The purpose of this session was to introduce interns with activities and experiences of a project manager. Mr. Biswajit Banik Pathik *(Assistant Professor, Faculty of Engineering, AIUB)* inaugurated the session by welcoming the speaker and the interns.

Afterwards, Mr. Muhammad Mehedi Hasan (*Deputy Manager*, *Project & Maintenance Coca-Cola International Beverages Private Limited*) started his speech with a brief introduction of Coca-Cola, Bangladesh. Then Mr. Hasan vividly described his experiences and role as a Deputy Manger at Coca-Cola. He showed the interns projects images and explained details on handling projects at field.

Finally, Mr. Md. Saniat Rahman Zishan *(Associate Professor and Head, Dept. of CoE, AIUB)* expressed his gratitude towards the speaker in his closing remarks. Mr. Abir Ahmed *(Lecturer, Faculty of Engineering, AIUB)* acted as the moderator for this session.

The webinar was graced by the presence of Mr. Rethwan Faiz *(Assistant Professor, Faculty of Engineering, AIUB)* Mr. Kawshik Shikder (Assistant Professor, Faculty of Engineering, AIUB) Abul Hasnat *(Assistant Professor, Faculty of Engineering, AIUB).*



An Informative Webinar titled as "Advances of Computer Networking Technologies"

As a part of the "Dr. Anwarul Abedin Lecture Series", a regular initiative of the American International University-Bangladesh (AIUB), an informative webinar titled as "Advances of Computer Networking Technologies" was held on 26 August 2021.The webinar was organized by the Faculty of Science and Technology in the honor of AIUB's visionary Founder Chairman Dr. Anwarul Abedin who catalyzed substantial transformation in the educational sector of the country.

Prof. Dr. R. Badlishah Ahmad, Ex-Vice Chancellor and Professor at Universiti Malaysia Perlis, was the esteemed guest speaker for the occasion. In his presentation, Prof. Ahmad illustrated his knowledge and experience on current and future trends in computer networking technologies. He highlighted the areas where networking can play a vital role for the world. He also discussed numerous valuable ideologies with the audience on related topics.

Associate Professor Mashiour Rahman (Associate Dean, Faculty of Science and Technology, AIUB) delivered welcome messages to the audience. They emphasized on AIUB's stand on prioritizing the advancement of computer networking for tomorrow's world. After the keynote session, Professor Dr A B M Siddique Hossain, DEAN, Faculty of Engineering of AIUB presented digital certificate of appreciation to the keynote speaker and thanked him for his valuable speech.

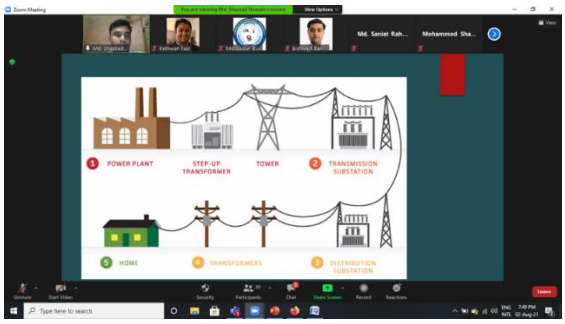
Dr Dip Nandi (Associate Professor and Director, Faculty of Science and Technology), acted as the moderator for the webinar. Dr Md Mahbub Chowdhury Mishu (Assistant Professor and Head, Department of Computer Science), Faculty members, officials, students, alumni of AIUB and professionals from industry were present. With over 500 participants on the Zoom platform and more than 3000 views in Facebook, the webinar was indeed a success.

FACULTY OF ENGINEERING ORGANIZED A TECHNICAL SESSION TITLED "PROJECT MANAGEMENT AND DOCUMENTATION

On 2nd August 2021, Faculty of Engineering organized a technical session titled "Project Management and Documentation" for the interns of "Physical Plant and Infrastructure (Electrical) Division, AIUB". The program began at 07:30 PM at online platform Zoom. The purpose of this session was to familiarize interns with technical documentations required for any engineering project.

Mr. Biswajit Banik Pathik (Assistant Professor, Faculty of Engineering, AIUB) inaugurated the session with his introductory speech to the audience and relayed the session to conducting speakers. Engr. MD. Shazzad Hossain (Project Manager, Senior Engineer, Reverie Power and Automation Engineering Ltd.) initiated his informative speech by highlighting the company's profile of Reverie Power and Automation Engineering Ltd. Mr. Hossain described the project cycle under which he has to act and emphasized on the key factors of documenting every aspect of project's purchase, procure and development. Finally, Prof. Dr. Md. Abdur Rahman *(Associate Dean, Faculty of Engineering, AIUB)* expressed his gratitude towards the speakers in his closing remarks. Mr. Rethwan Faiz (Assistant Professor, Faculty of Engineering, AIUB), acted as the moderator for this session.

The webinar was graced by the presence of Mr. Saniat Rahman Zishan (Associate Professor and Head, Dept. of CoE, AIUB), Mr. Chowdhury Akram Hossain (Senior Assistant Professor and Special Assistant of OSA, Faculty of Engineering, AIUB), Mr. Kawshik Shikder (Assistant Professor, Faculty of Engineering, AIUB) and Mr. Abir Ahmed (Lecturer, Faculty of Engineering, AIUB).

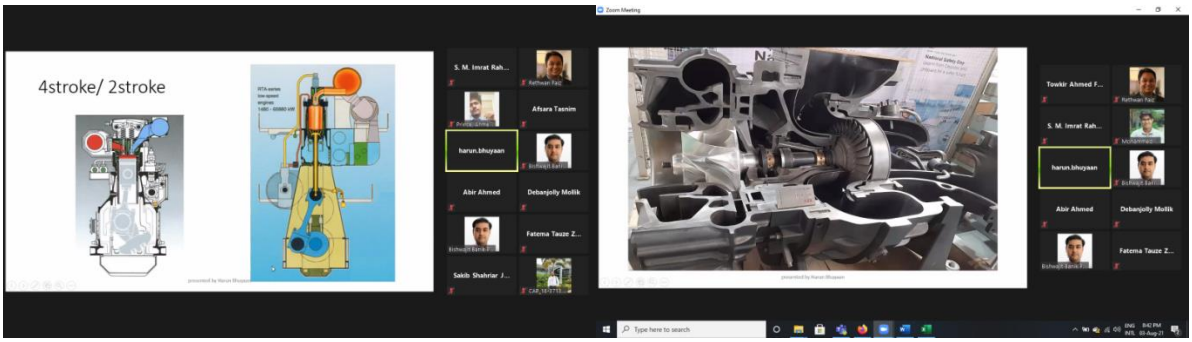


FACULTY OF ENGINEERING ORGANIZED A TECHNICAL SESSION TITLED "SITE VISIT FOR ELECTRICAL ENGINEERS

On August 3, 2021, Faculty of Engineering organized a technical session titled "Site Visit for Electrical Engineers" for the newly joined EEE interns of "Physical Plant and Infrastructure (Electrical) Division, AIUB". The program began at 07:30 PM at online platform Zoom. The purpose of this session was to introduce interns with practical images of HFO based power plant and its operation.

Mr. Biswajit Banik Pathik *(Assistant Professor, Faculty of Engineering, AIUB)* inaugurated the session by welcoming the speaker and the interns. Afterwards, Mr. Mohammad Harun Or Rashid Bhuyaan *(General Manager, United Engineering and Power Services Ltd.)* started his speech with the company profile of United Engineering and Power Services Ltd. Then Mr. Bhuyaan started explaining about the different parts and mechanism of HFO based power station, currently located in Jamalpur, Bangladesh. He emphasized on the design of the structure and elaborated different sections of the power plant vividly with actual images and videos from the site location. Finally, Mr. Md. Saniat Rahman Zishan *(Associate Professor and Head, Dept. of CoE, AIUB)* expressed his gratitude towards the speaker in his closing remarks. Mr. Rethwan Faiz *(Assistant Professor, Faculty of Engineering, AIUB)* acted as the moderator for this session.

The webinar was graced by the presence of Prof. Dr. Md. Abdur Rahman *(Associate Dean, Faculty of Engineering, AIUB)*, S. M. Imrat Rahman *(Senior Lecturer, Faculty of Engineering, AIUB)*, and Mr. Abir Ahmed *(Lecturer, Faculty of Engineering, AIUB)*.



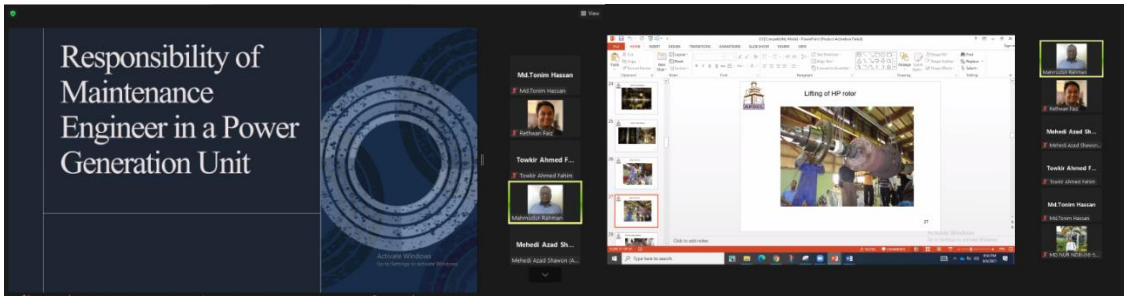
FACULTY OF ENGINEERING ORGANIZED A TECHNICAL SESSION TITLED "RESPONSIBILITES OF MAINTENANCE AND OPERATIONS ENGINEERS AT POWER PLANT"

On August 6, 2021, Faculty of Engineering organized a technical session titled "Responsibilities of Maintenance and Operations Engineers at Power Plant" for the newly joined EEE interns of "Physical Plant and Infrastructure (Electrical) Division, AIUB". The program began at 07:30 PM at online platform Zoom. The purpose of this session was to familiarize the interns about the responsibilities of maintenance engineers at a power station.

Mr. Biswajit Banik Pathik *(Assistant Professor, Faculty of Engineering, AIUB)* inaugurated the session by welcoming the speaker and the interns. Mr. Mahmudur Rahman *(Executive Engineer, Operation, 450MW CCPP North Ashuganj Power Station Co. Ltd.)* started his alluring speech with the responsibilities of maintenance Engineer working in a power plant. Then Mr. Rahman started explaining about the different scenario of errors and solutions that an engineer must face in Ashuganj Power Station, Bangladesh. He emphasized on the reporting procedure of all the task carried out for maintenance with various images and documents and mentioned the importance of safety in a power plant. Prof. Dr. Md. Abdur Rahman *(Associate Dean, Faculty of Engineering, AIUB)* expressed his gratitude towards the speaker with a token of appreciation.

Afterwards, Mr. Mehedi Azad Shawon (*Assistant Professor*, *Faculty of Engineering, AIUB) continued the session with his speech on the key responsibilities of Operation Engineer in a power plant. He shared his experience as an operation engineer of a power plant located in Narayanganj, Bangladesh. He emphasized on safety protocols followed by engineers based on international standards and day to day reporting of tasks completed.* Finally, Mr. Md. Saniat Rahman Zishan *(Associate Professor and Head, Dept. of CoE, AIUB)* expressed his gratitude towards the speaker in his closing remarks. Mr. Rethwan Faiz *(Assistant Professor, Faculty of Engineering, AIUB)* acted as the moderator for this session.

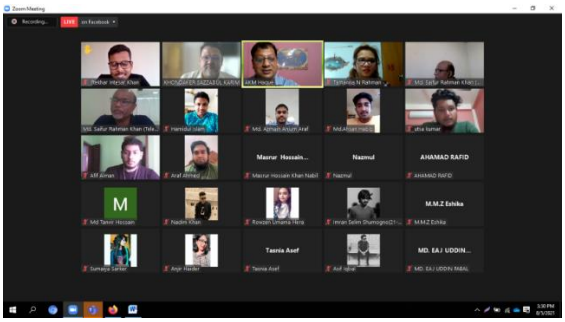
The webinar was graced by the presence of Abul Hasnat *(Assistant Professor, Faculty of Engineering, AIUB)*, and Mr. Abir Ahmed *(Lecturer, Faculty of Engineering, AIUB)*.



Webinar on "The Territorial impact of Covid-19: Managing the Crisis and Recovery of Internet service in Bangladesh"

Mr. Saifur Rahman Khan, Deputy General Manager, Teletalk Bangladesh Limited, conducted a webinar as the Resource Speaker on "The Territorial impact of Covid-19: Managing the Crisis and Recovery of Internet service in Bangladesh" on August 05, 2021, at 2:00 pm. The speaker shared his valuable experience on the comparison between supply of internet service and customer demand in the current context of Bangladesh. The respected speaker stated that, a good number of investors started business in a small scale by taking advantages of the E-commerce and F-commerce concept during the covid-19 pandemic situation. There are more than a thousand of E-commerce sites and 8,000 E-commerce pages on Facebook at present and it is increasing day by day. He also highlighted that about 55% of the students have devices to attend online classes and whereas only 45 percent of them have access to the internet facilities. Hence, there is a huge gap yet to be met in this arena. Eventually, ISPs would have to dig trenches and lay cable lines throughout the country to enable students to be connected to the online classes. The speaker portrayed a clear picture for students to understand the method of achieving a win/win situation for both - internet users and ISPs.

Mr. Obaidul Islam Sr., Associate Professor, Mr. Hamidul Islam, Senior Assistant Professor and Ms. Tamanna Nazneen, Lecturer of the Faculty of Business Administration were present in the webinar along with the students of their respective classes. Dr. Khandoker Sazzadul Karim, Head of the Marketing Department delivered a vote of thanks and presented a digital certificate of appreciation to the speaker for an insightful webinar. The webinar was organized and moderated by Mr. AKM Kamrul Haque, Senior Assistant Professor, Department of Marketing FBA AUB.



Webinar on Endpoint Security Solutions mitigating cyber threats to Business Enterprise

We persistently communicate information via online platforms in this era of information technology, which finally increases the fear of security breaches, both for individuals and businesses. Cyber Security is the buzzword that business students must be aware of. To enlighten students on this topic of immense importance, the Department of Management Information System organized a webinar titled "Webinar on Endpoint Security Solutions mitigating cyber threats to Business Enterprise" on Sunday, August 03, 2021. The webinar was held on the Microsoft Teams platform from 11:00 a.m. to 12:30 p.m. The Resource Person for the webinar was Mr. Tushar Srivastava, Chief Technology Officer, REVE Systems. Mr. Srivastava has 15 years of experience in the Technology, Telecommunications, and Security industry. His competence specializes in the development and leadership of technology teams to create and produce medium to large-scale products. The webinar was prepared for FBA students and included students from the courses Internet Security and Computing & Business Applications. Mr. Md. Mehzabul Hoque Nahid (Assistant Professor, Department of MIS, AIUB) organized and moderated the webinar.

Mr. Tushar Srivastava provided instances of typical cyber risks and mitigation methods for businesses. He provided suggestions and tactics for avoiding cybercrime. Throughout the webinar, the audience also learnt about cybersecurity issues and the best technique for preparing for this particular sector. The webinar became livelier with the industry experiences from Mr. Jianul Hossain Chowdhury (GM, REVE Systems), Azmir Hossain (Head of Marketing, REVE Systems Prince Al Mamun (Manager -Tech Support, REVE Systems), Mr. Raihan Kibria (Lecturer, Department of MIS). The program culminated with an interactive question-and-answer session involving audience faculty and students, the organizers, and the Resource Person. Dr. Nisar Ahmed (Professor & Director, MBA program, Faculty of Business administration, AIUB) provided the closing remarks by thanking Mr. Tushar Srivastava for the informative session. Ms. Nazia Farhana (Assistant Professor, Department of MIS, AIUB) and Mr. Jubayer Suhan (Assistant Professor, Department of MIS, AIUB) were also present in the webinar.

Dr. Anwarul Abedin Lecture Series “Breaking the Mold: Using SiGe Technology in Ways That Were Never Envisioned”

As a part of the "Dr. Anwarul Abedin Lecture Series", a regular development initiative of the American International University-Bangladesh (AIUB), the Faculty of Engineering (FE) at AIUB organized a webinar titled "Breaking the Mold: Using SiGe Technology in Ways That Were Never Envisioned" on Wednesday, August 04, 2021 in Dhaka from 07:00 PM to 08:30 PM.

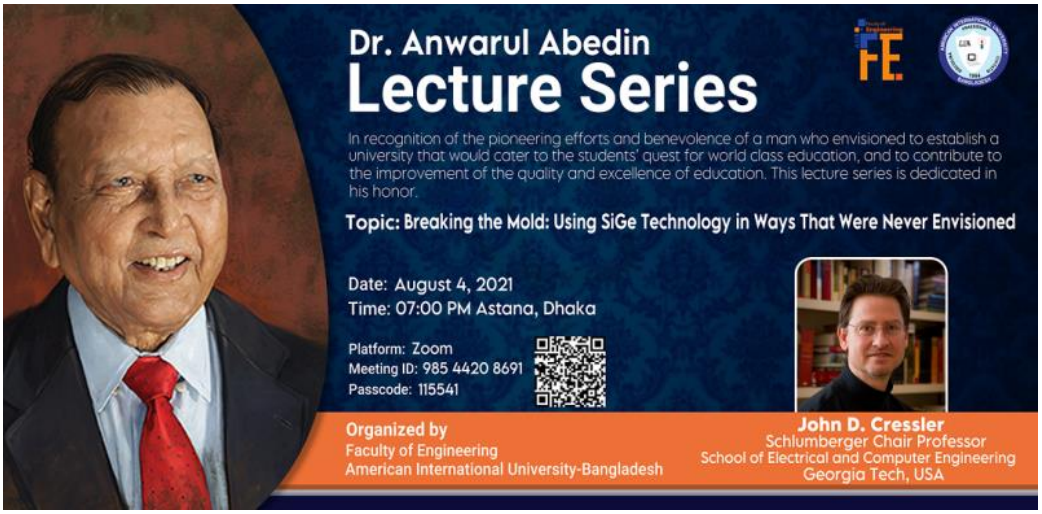
Dr. ABM Siddique Hossain (Professor and Dean, Faculty of Engineering, AIUB) inaugurated the webinar with a welcome speech. He began by paying tribute to AIUB's Founder-Chairman, Dr. Anwarul Abedin, who made significant contributions to the university's development. He then gave a brief overview of semiconductor technology's history and immense potential in the modern era.

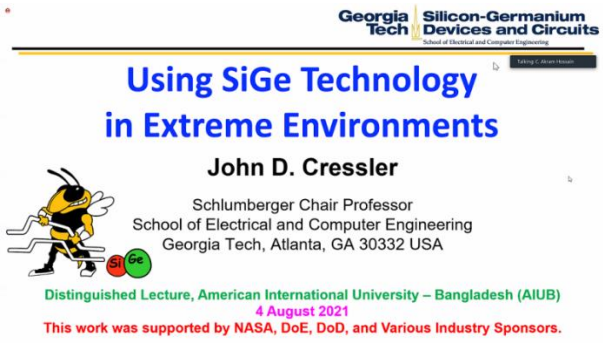
The esteemed guest speaker of this webinar was prominent researcher Dr. John D. Cressler (Schlumberger Chair Professor, School of Electrical and Computer Engineering, Georgia Tech., USA). During the webinar, Prof. Cressler shared his valuable teaching and research experience of 30 years in academia. As part of his self-introduction, he presented his team's research involving state-of-the-art Silicon-Germanium (SiGe) technology advancements. The motivation behind the development of Silicon-Germanium Heterojunction Bipolar Transistor (SiGe HBT), the first practical bandgap-engineered device to be successfully implemented in Silicon, was the improvement of transistor performance while maintaining the maturity, yield, reliability, and availability of Si. After discussing the history of defect-free growth of strained SiGe on Si and generation of a bandgap offset, he first explained the creation of SiGe HBT by introducing graded Ge Layer into the base of a Si BJT. Next, he recognized SiGe BiCMOS technology as an ideal fit for Performance-Constrained Analog/RF/mmW ICs and expressed great hopes for its growth in the field of 5G/6G, predicting THz level speeds even at very conservative lithographic feature sizes. Prof. Cressler believed SiGe HBT to be a possible candidate for a technology that would operate satisfactorily across an extensive range of temperatures, starting from mK levels to a few hundred Celsius. He described the operative mechanism behind SiGe HBT and its good performance in cryogenic temperatures needed for quantum computing. The speaker also described the SiGe device's immunity to intense radiation environments (mainly in space) and the origin of such radiation and its effects. Out of the different effects, Prof. Cressler's team focused on the single event transient (SET) phenomena and developed radiation-hardened SiGe circuits and systems by integrating device level TCAD and circuit level design. Lastly, he discussed the possibilities of deploying SiGe as a photosensitive element for integrated silicon-based photonic systems and the challenges associated with the endeavor.

Following the end of the talk, the moderator, Mr. Chowdhury Akram Hossain (Senior Assistant Professor and Special Assistant of OSA, Faculty of Engineering, AIUB), announced the opening of a Q&A session, in which Prof. Cressler responded with enthusiasm to the questions raised by

faculty members and guests in the audience. Dr. Md. Abdur Rahman (Professor and Associate Dean, Faculty of Engineering, AIUB) provided the closing remarks by thanking Prof. Cressler for the informative session and explaining a heavily scientific topic simply. After offering a digital token of Appreciation as a token of gratitude for sharing his valuable time and insight, Prof. Rahman extended an invitation to Prof. Cressler for future events organized by AIUB.

The webinar was held on Zoom online platform and was attended by about 107 local and foreign participants. Additionally, the video was also live-streamed on the AIUB Facebook page. Dr. Md. Abdul Mannan (Professor and Director, Faculty of Engineering, AIUB), Mr. Nafiz Ahmed Chisty (Associate Professor and Head In-Charge, Dept. of EEE, AIUB), and Mr. Md. Saniat Rahman Zishan (Associate Professor and Head, Dept. of CoE, AIUB) co-hosted the event.





ESAB AIUB Unit Face Organized a Webinar Titled “Gas Sensing and Capturing Based on Two-Dimensional Layered Materials”

ESAB AIUB Unit Face organized a webinar titled "Gas Sensing and Capturing Based on Two-Dimensional Layered Materials" on Saturday, 5th June 2021. The purpose of this webinar was to spread the concept of nanotechnology and it’s various research areas. Gas Sensing and Capture based on 2-D layered materials, was the topic of discussion. The webinar commenced at 08:00 PM with around 80 participants attending via the virtual platform, Google Meet.

National anthem of Bangladesh followed by a brief promo video focusing on ESAB's mission, vision and activities were displayed at the beginning of the event. Prof. Dr. ABM Siddique Hossain (Dean, Faculty of Engineering, AIUB) inaugurated the webinar by praising nanotechnology innovation's and it’s sudden burst in the research scenario and growing prevalence throughout the world. Dr. Hossain emphasized that research in these fields would certainly be the next big impact in the advancement of technology and ended his speech by urging the students to do study and use the wide field of nanotechnology for the greater good of the planet.

Then the event commenced with the speaker Dr. Kazi Hanium Maria (Associate Professor, Department of Physics, University of Dhaka) started with the basic overview of Nanotechnology at around. She briefly explained the Gas Sensing and Capture based layered materials, how research has unfolded over the years and the scope of her findings for the gas sensing and capturing technology using layered 2-D materials, explaining in detail explaining its full use and its effectiveness and limitations. Afterward, Dr. Sajid Muhaimin Choudhury (Assistant Professor, Dept. of EEE, BUET), Dr Mainul Hossain (Assistant Professor, Dept. of EEE, University of Dhaka) and Dr. Md. Mahbub Rabbani (Associate Professor, Dept. of Chemistry, AIUB) also took part in the discussion session with Dr. Maria, and answered question in Q/A session, where the questions were asked from the participants.

Finally, the webinar ended with a closing remark from Mr. Tawsif Ibne Alam (Assistant Professor, Dept. of EEE, AIUB) thanking everyone for their participation, the organizing team of ESAB AIUB Unit Face for their continuous effort in organizing informative seminars and also thanked the speakers for their time and effort in dissemination of research information and a lively question and answer session.

A WEBINAR TITLED "LET THERE BE IOT"

Faculty of Engineering organized a webinar titled "Let there be IoT" on 4th June 2021 (Friday) which was supported by AIUB Community of Engineering Students (ACES). The program began at 03:30 PM with around 200 participants attending via online platform Zoom. The purpose of this webinar was to spread the concept of IoT and its distinctive applications in various sectors. Prof. Dr. A.B.M. Siddique Hossain (*Dean, Faculty of Engineering, AIUB; Advisor, ACES*) inaugurated the webinar by applauding the functionality and developing ubiquity of IoT innovation around the globe. He concluded by encouraging the students to do research and utilize the vast concept of IoT for the betterment of the world.

Afterwards, Mr. Zafir Shafiee Chowdhury (*Director & CIO, Bondstein Technologies*) started his speech by underlining the significance of examining the forthcoming technologies that work indistinguishably with IoT. After that, he highlighted the mission, vision and accomplishments of Bondstein. Followed by, Mr. T M Moniruzzaman Sunny (*Director, Bondstein Technologies*) began his speech by pointing out the change required to make in the perspective of viewing IoT as a thing to analyse and use in a productive manner. He further emphasized on the advantages and applications of TinyML through many demonstrations, videos, and devices. Finally, he showed several AI applications and advised all the students to explore these technologies. Thereafter, Mr. Zafir Shafiee Chowdhury *(Director & CIO, Bondstein Technologies*) continued his speech exemplifying Lorawan technology and Nvidia as the IoT application. In conclusion, he inspired everyone to research more about IoT to apply them in future initiatives to make an impact on the world. Lastly, Mr. Abir Ahmed (*Lecturer, Faculty of Engineering, AIUB; Motivator, ACES*) presented the virtual crest of appreciation to both the honourable speakers.

Finally, the webinar was concluded at 5:00 PM with a group snapshot with the presence of Prof. Dr. A.B.M. Siddique Hossain (*Dean, Faculty of Engineering, AIUB; Advisor, ACES*), Prof. Dr. Md. Abdul Mannan (*Director, Faculty of Engineering, AIUB*), Mr. Nafiz Ahmed Chisty (*Associate Professor & Head In-Charge (UG), Department of EEE, AIUB),* Mr. Nirjhor Tahmidur Rouf (*Lecturer, Faculty of Engineering, AIUB),* Mr. Abir Ahmed (*Lecturer, Faculty of Engineering, AIUB; Motivator, ACES*), Mr. A N M Shahebul Hasan (*Lecturer, Faculty of Engineering, AIUB*) and the participants along with the organizing team of AIUB Community of Engineering Students (ACES).

FACULTY OF ENGINEERING, ORGANIZED A WEBINAR TITLED "RE-SKILLING REVOLUTION"

Faculty of Engineering organized a webinar titled "Re-skilling Revolution" which was supported by AIUB Community of Engineering Students (ACES) on 29th May, 2021(Saturday). The program started at 3:30 PM with the participation of about 180 students using the online platform Zoom.

The webinar was commenced by Prof. Dr. A.B.M. Siddique Hossain (*Dean, Faculty of Engineering, AIUB; Advisor, ACES*), who applauded the world's progress in reskilling revolution. He urged the students to use critical thinking to prepare themselves for potential challenges. Mr. Sarker Sohel Ahmed (*Executive Vice President, Robi Axiata Limited*), conducted a thought-provoking speech on "Re-skilling revolution". He began his speech by emphasizing the importance of the re-skilling revolution. Eventually, he pointed out several high-profile industries as pioneers of contemporary technical innovation and data analysis. He further recommended students to improve their soft skills as well as skills in other fields of research including the ones which are not part of the curriculum, in order to keep pace with the advanced world. Finally, Q&A session was held where the speaker answered to the queries of the participants. Following that Prof. Dr. Md. Abdur Rahman (*Associate Dean, Faculty of Engineering, AIUB; Advisor, ACES*) thanked the guest speaker for such an insightful speech. He mentioned that AIUB has been focusing on Outcome Based Education to help students develop their critical thinking and execution skills. He concluded his speech by presenting the virtual token of appreciation to the honourable speaker.

Finally the webinar was concluded at 5:00 PM by thanking everyone for their participation and taking a group snapshot with the presence of Prof. Dr. A.B.M. Siddique Hossain (*Dean, Faculty of Engineering, AIUB; Advisor, ACES*) , Prof. Dr. Md. Abdur Rahman (*Professor, Associate Dean, Faculty of Engineering, AIUB; Advisor, ACES*) , Dr. Md. Abdul Mannan (*Director, Faculty of Engineering, AIUB*), Mr. Sarker Sohel Ahmed (*Executive Vice President, Robi Axiata Limited*), Md. Saniat Rahman Zishan (*Head, Department of CoE & Associate Professor, Faculty of Engineering, AIUB; Mentor, ACES*) , Dr. Md. Rifat Hazari (*Assistant Professor ,Department of EEE, AIUB*), Abir Ahmed (*Lecturer, Faculty of Engineering, AIUB; Motivator, ACES*) and the participants along with the organizing team of AIUB Community of Engineering Students (ACES).

Dr. Anwarul Abedin Lecture Series Insights on 5G from a Research Experience

On the 06th day of May 2021, an informative webinar titled as 'Insights on 5G from a research experience' was held as a part of "Dr. Anwarul Abedin Lecture Series" at American International University-Bangladesh (AIUB). The webinar was organized by the Faculty of Science and Technology in the honor of AIUB's visionary Founder Chairman Dr. Anwarul Abedin who catalyzed substantial transformation in the educational sector of the country.

Dr Andres Gonzalez, Scientist, Telenor Group, Norway, was the esteemed guest speaker for the occasion. In his presentation, Dr Gonzalez illustrated his knowledge and experience on 5G research. He highlighted the demand and future of 5G technology. During the question-answer session, Dr. Gonzalez addressed numerous queries from the audience, elaborating on his valuable ideas.

Prof. Dr. ABM Siddique Hossain, Dean, Faculty of Engineering, AIUB delivered an inspirational welcome message. In his speech, Professor Siddique focused on the significance of 5G technology in today's world for re-shaping people's lives. After the keynote session, Prof. Dr. Md Abdur Rahman, Associate Dean, Faculty of Engineering, AIUB, concluded the event by delivering vote of thanks towards the distinguished speaker and handed him a digital certificate of appreciation. Dr. Dip Nandi, Director, Faculty of Science and Technology introduced the guest speaker and moderated the webinar.

Dr. Md Mahbub Chowdhury Mishu, Head, Computer Science, faculty members, officials, students, alumni of AIUB and professionals from industry were present.

With almost 500 participants on the Zoom platform, the webinar was indeed a success.

IEEE AIUB Student Branch Organized a Workshop Series on " Web Design from Scratch: 'HTML, CSS & Bootstrap "

IEEE AIUB Student Branch in collaboration with IEEE AIUB Student Branch WIE Affinity Group has successfully organized a two-day long workshop series titled "Web Design from Scratch: 'HTML, CSS & Bootstrap". The event was inaugurated by Ms. Tasnuva Tasneem, *Motivator & WIE Coordinator, IEEE AIUB Student Branch; Assistant Professor, Faculty of Engineering, AIUB,* who talked about the significance of learning web designing in modern times. She also expressed her gratitude towards the speakers for their valuable time and the participants for their participation in the workshop series.

The first day of the workshop series titled "Workshop Day 01: Learning HTML" was successfully conducted by Mr. Victor Stany Rozario, *Assistant Professor, Faculty of Science & Information Technology, AIUB*. He started the session by discussing different parts and types of the website and how web development has turned over into a high-end job sector. He gave a detailed theoretical idea regarding the basic building blocks of a website. Afterward, he elaborately discussed the career guidelines for the enthusiasts to get started with front-end web development. The workshop was concluded with an interactive question-answer session where Mr. Rozario answered the questions from the participants.

The second day of the workshop series titled, "Workshop Day 02: CSS & Bootstrap" was successfully conducted by Mr. Md. Tariqul Islam Manon, *Mentor, Responsive Web Design; Senior Web Developer, Coders Trust Bangladesh.* He started his session with the theoretical concepts of CSS (Cascading Styling Sheets) and various taglines of CSS including its most popular icon set and toolkit. He also spoke briefly about the usage and properties of each tag and classes of CSS along with their importance. Mr. Manon also emphasized on the wide range of web applications of Front-End Web Development in today's technology. Following that, an interactive question-answer session took place which marked the end of the session.

The two-day long workshop series ended with the closing speech from Dr. Md. Hasan Imam, *Counselor, IEEE AIUB Student Branch; Advisor, IEEE EMBS AIUB SB Chapter; Senior Assistant Professor, Faculty of Engineering, AIUB,* who expressed his wholehearted gratitude towards the honorable speakers and all participants for their valuable participation in the workshop series. The event was graced by the presence of 90+ participants.

A Front-End Web Design Contest was also organized where participants were given a task which can be carried out using the knowledge they gained from the workshops. 55+ national as well as international contestants participated in the contest and three of them earned the "Best Web Designer" award. The top three Web Designs were published on the official website of the IEEE AIUB Student Branch.

IEEE AIUB Student Branch successfully organized a webinar titled ' Machine Learning for Human Gait Estimations '

On 8th November 2020, the IEEE AIUB Student Branch, in collaboration with the IEEE EMBS AIUB SB Chapter, successfully organized a webinar titled 'Machine Learning for Human Gait Estimations' through the online platform Google Meet. The webinar was conducted by Dr. Saaveethya Sivakumar, *Student Representative, IEEE Region 10 (Asia Pacific Region),* who mainly focused on the performance and collaboration of machine learning in the resolution of Human Gait.

The session was inaugurated by the opening remarks from Prof. Dr. A.B.M. Siddique Hossain, *Advisor, IEEE AIUB Student Branch; Dean, Faculty of Engineering, AIUB,* who talked about how technologies have developed from time to time and the ways they are easing off human efforts to a significant extent. He also highlighted the importance of artificial intelligence, machine learning, and python language in a wide range of Biomedical Engineering applications. He concluded by encouraging the participants to focus on developing their skills instead of running after grades only for being able to compete in the current job market.

After that, Dr. Saaveethya Sivakumar started her session by briefly introducing herself and sharing her educational and professional background. She gave an elaborate explanation on gait and gait analysis along with the areas of its use and explained the different gait parameters and gait analysis methodologies using both laboratory and wearable systems. Then, she explained the working procedures of laboratory systems for gait measurement including its limitations and displayed a representation of the wearable model system showing how the data is collected and used from it. Besides, she also described different machine learning parts which are used in wearable systems for gait analysis.

Following that, Dr. Sivakumar talked about the significance of Artificial Neural Networks (ANN) including its basic functionality and the working process of the Artificial Neural Networks (ANN) training algorithm. Afterward, she talked about the ANN-based gait estimations, its current trends, and the potential future direction for the ANN-based gait estimations. She concluded by highlighting some limitations and challenges of these research works which include limited data, generalization, and change management. Then, an interactive question-answer session took place where the speaker answered the questions asked by the participants.

Then, Dr. Md. Hasan Imam, *Counselor, IEEE AIUB Student Branch; Advisor, IEEE EMBS AIUB SB Chapter; Senior Assistant Professor, Faculty of Engineering, AIUB* delivered the concluding speech where he emphasized on the importance of machine learning in current times due to its wide range of applications. He motivated the participants to focus on different languages like Machine Language and Python. *The session was graced by the presence of 95+ registered participants.*

ACES Organized a Webinar on "EMERGING UAV INDUSTRY AND IT'S DEVELOPMENT TREND IN BANGLADESH "

AIUB Community of Engineering Students (ACES) organized a webinar titled "Emerging UAV Industry and its Development Trend in Bangladesh" on Saturday (November 14, 2020). The program started at 7:00 pm with the participation of about 45 students using the online platform Google Meet.

Prof. Dr. A.B.M. Siddique Hossain (*Dean, Faculty of Engineering, AIUB*) inaugurated the webinar by acknowledging Unmanned Arial Vehicle (UAV) as an emerging sector. He contemplated that the best application of UAV in Bangladesh scenario will be in engineering, agricultural and industrial sectors. He concluded his speech by encouraging the students to make plans for their upcoming career goals on UAV sector. Followed by, Ruhul Amin Rana *(CEO- Avion Aerospace, Country Representative -Liaoning General Aviation Development Co Ltd)* was invited to begin his speech. He started his speech with an introduction on Avion Aerospace and explained briefly about Unmanned Arial Vehicle (UAV). Then he exhibited detailed classification of UAV with photos and diagrams and presented the uses of UAV. He also added that during the Covid-19 pandemic situation, monitoring using UAV is safer than physical patrolling. He discussed how Europe and Western countries are using UAV technology avidly but in Asia the UAV market is yet to develop. He also demonstrated the steps to become a licensed UAV pilot. He concluded his speech by thanking everyone for their patience and acknowledging the emerging possibilities of the UAV industry.

Afterwards, Prof. Dr. Md. Abdur Rahman *(Associate Dean, Faculty of Engineering, AIUB)* was invited to give his speech. He started off his speech by thanking the speaker, host and everyone who have joined the webinar. He mentioned that the students of AIUB are also working on different projects on robotics and drones. He concluded his speech by mentioning that UAV industry is a multidisciplinary sector. *Finally the webinar was concluded at 8:30pm by thanking everyone for their participation and taking a group snapshot with the presence of* Prof. Dr. A.B.M. Siddique Hossain (*Dean, Faculty of Engineering, AIUB*)), Prof. Dr. Md. Abdur Rahman (Associate Dean, Faculty of Engineering, AIUB), Abir Ahmed (*Lecturer, Faculty of Engineering, AIUB; Motivator, ACES*), Ruhul Amin Rana *(CEO- Avion Aerospace Country Representative Liaoning General Aviation Development Co Ltd),*Md. Shahariar Parvez*(Lecturer, Faculty of Engineering)* and the participants along with the organizing team of AIUB Community of Engineering Students(ACES).

Faculty of Engineering of AIUB Organized the Second International Conference on Robotics, Electrical and Signal Processing Techniques-2021 (ICREST'21)

The Faculty of Engineering of American International University-Bangladesh (AIUB) has successfully organized the Second *International Conference on Robotics, Electrical and Signal Processing Techniques-2021 (ICREST'21)* virtually from the 5th to 7th of January 2021. The 3-day long conference sessions hosted exchange of knowledge, learning and potential ideas with an aim to encourage and interact young researchers with the academic and industrial leaders which was technically co-sponsored by IEEE Bangladesh Section. The conference offered the participants a dynamic approach, looking for innovative research and ideas on the emerging developments in Computer, Electrical and Electronics, Quantum Computing, Big-Data, Cloud Computing, Machine Learning, Deep Learning, Artificial Intelligence, Internet of Things (IoT) and Robotic Technologies. A total of 154 papers have been accepted and presented during the 3-day long conference where 1054 Authors from 15 countries across the globe have contributed. The submitted papers were reviewed by 156 renowned researchers and academicians from home and abroad. The conference had its vibrancy elevated by the presentation on contemporary research topics from 11 Keynote Speakers along with 19 Invited Speakers across the globe. Moreover, the Digital Poster Competition was organized for young researchers from universities, and for college students to motivate them in Engineering.

Honorable Prof. Dr. ABM Siddique Hossain, *Dean, Faculty of Engineering, AIUB; General Chair, ICREST'21* addressed welcome to all the speakers, authors and guests. The ceremony was later enlightened by Technical Co-Sponsor's Speech delivered by Honorable Prof. Dr. Celia Shahnaz, *EEE Department, BUET; Chair, IEEE Bangladesh Section; TPC Chair, ICREST'21* and Opening Speech delivered by Honorable Dr. Carmen Z. Lamagna, *Vice Chancellor, AIUB; Chief Patron, ICREST'21.* Followed by the enlightening speeches the Honorable Chief Guest of ICREST'21, Prof. Dr. Mesbahuddin Ahmed, *Chairman, Bangladesh Accreditation Council (BAC)* delivered the Inauguration Speech, officially commencing the Conference.

On the last day, on behalf of Ms. Nadia Anwar*, Founder Member, Board of Trustees, AIUB,* Mr. Manzur H. Khan, *Associate Professor, Dept. of Computer Science; Director,* Office of Student Affairs (OSA)*, AIUB declared* Dr. Anwarul Abedin and Mrs. Hasna Abedin Scholar Grants*. The Scholar Grants were delivered* to the best paper, the best paper presenter, and winning groups of Digital Poster Competition. Honorable Prof. Dr. ABM Siddique Hossain delivered the closing remarks and Honorable Prof. Dr. Shaikh Anwarul Fattah, *TPC Chair ICREST'21* delivered the Speech as the TPC Chair. Later, Honorable Dr. Hasanul A Hasan*, Chairman, Board of Trustees; Founder Member, AIUB; Advisor, ICREST'21* delivered speech as a Chief Guest of the closing ceremony. Lastly, Honorable, Prof. Dr. Md. Abdur Rahman, *Associate Dean, Faculty of Engineering, AIUB; Organizing Chair, ICREST'21* expressed his immense gratitude to the committee of ICREST'21 along with all the crucial members, authors, participants, guests, sponsors, partners, and supporters who took part in the conference.

Emerging Nanotech Applications" Webinar by AIUB Center for Nanotechnology Research (CNR)

On the 7th of November 2020, the American International University-Bangladesh (AIUB) Center for Nanotechnology Research (CNR) has successfully organized its first webinar on "Photosensors for Emerging Nanotech Applications". The virtual seminar was conducted using the Zoom online platform, and subsequently broadcasted live through the verified Facebook Page of AIUB.

The webinar began with a welcome address from Prof. Dr. S. Mosaddeq Ahmed, the Head of the Department of Chemistry at AIUB, who emphasized on the scope and prospects of research at CNR. Prof. Dr. ABM Siddique Hossain, the Dean of the Faculty of Engineering at AIUB inaugurated the webinar with a brief about the recent research on nanotechnology and its importance in our world today. Dr. Wayesh Qarony, a Postdoctoral Scientist in the Department of Electrical & Computer Engineering at the University of California, Davis, USA, who is also an AIUB Alumnus and a former faculty member in the Department of Electrical & Electronic Engineering, graced the occasion as the guest speaker for the event. He discussed the process of designing and fabricating photosensors with smart nanomaterials like perovskite materials in order to achieve improved sensing capabilities and multispectral images from the devices Dr. Mainul Hossain, an Assistant Professor in the Department of Electrical and Electronic Engineering at University of Dhaka, was also present in the event as a speaker, who elaborated on the applications of nanotechnology. Dr. Mohammad Mahbub Rabbani, an Associate Professor in the Department of Chemistry at AIUB chaired the webinar, highlighting the significance of pursuing research on nanotechnology to enable the next generation for the fourth industrial revolution (4IR) and beyond.

Mr. Md. Masud Parvez, an Assistant Professor in the Department of Physics at AIUB also provided his insights on nanotech applications during the open discussion session. The program was attended by students, teachers, and researchers from various institutions, national and international. The program was brought to a close with concluding remarks and a vote of thanks by Prof. Dr. Md Abdur Rahman, the Associate Dean of the Faculty of Engineering at AIUB, who encouraged continued research on modern technologies to pave the way into the future.

IEEE AIUB Student Branch WIE Affinity Group Organized a Webinar on 'Importance of Information Security in Today's Technology'

IEEE AIUB Student Branch WIE Affinity Group successfully organized a webinar titled "The Importance of Information Security in Today's Technology". The webinar was hosted on the online platform Google Meets. The event mainly focused on cyber security threats and concern and the approach to mitigate the threats. The webinar was inaugurated by Ms. Tasnuva Tasneem, *Motivator & WIE Coordinator, IEEE AIUB Student Branch; Assistant Professor, Faculty of Engineering, AIUB.* She expressed her gratitude towards the speaker, the participants, and the organizing committee.

After that, the speaker of the webinar, Dr. Abu Sayed Md. Mostafizur Rahaman, *Professor, Department of CSE, Jahangirnagar University,* took the platform. He talked about the evolution and advantages of the cybersecurity sector. He explained the motives behind cyber-crime and talked about different types of hackers. He also pointed out the differences in activities of these hackers and showed ten common types of cyber-attacks. He talked about the necessary procedures to avoid phishing, a method by which hackers get access into our computers and personal data. He also talked about the safety features like antivirus, firewall, maintaining backup etc. as security measures against cyber-crime. Afterwards, Dr. Rahaman talked about how to become an expert in the field of cyber security and emphasized on having solid knowledge in IT and Networking Fundamentals. He then explained the activities of different professionals like, Penetration Tester, IT Security Engineer, Security and System Administrator, Security Architect, IT Security Consultant and Forensic Computer Analyst. Afterwards, he talked about the importance of a strong password and 2 factor authentications. Near the end of his speech, the speaker mentioned other categories of hacking like antivirus, malware, and unreliable employees. After that, there was a question-answer session where the speaker answered the questions asked by the participants.

The closing speech was delivered by Dr. Mohammad Hasan Imam, *Counselor, IEEE AIUB Student Branch; Advisor, IEEE EMBS AIUB SB Chapter; Senior Assistant Professor, Faculty of Engineering, AIUB,* who thanked the speaker for his valuable time and the participants for their participation in this webinar. He also thanked the organizing committee for organizing this successful event.

IEEE AIUB Student Branch Successfully Organized a Webinar on Application of Wireless Sensor Networks (WSN) in Precision Agriculture: Issues and Challenges

On 9th October 2020, IEEE AIUB Student Branch in collaboration with IEEE Computer Society AIUB Student Branch Chapter successfully organized a webinar titled Application of Wireless Sensor Networks (WSN) in Precision Agriculture: Issues and Challenges through the CISCO WEBEX MEETING platform. The webinar mainly focused on wireless sensor networks in precision agriculture and the ways of implementing these technologies in this promising field. The session was conducted by Mr. Mohamed Rawidean Mohd Kassim, *Asia Pacific (Region 10) Regional Coordinator, IEEE Computer Society; Research & Development Manager, Technology Deployment Department, Malaysian Institute of Microelectronic Systems, Ministry of Science, Technology and Innovation Malaysia; Distinguished Speaker, IEEE Computer Society.* The seminar was inaugurated by the opening remarks from Prof. Dr. A.B.M Siddique Hossain, *Advisor, IEEE AIUB Student Branch; Dean, Faculty of Engineering, AIUB,* who talked about the importance of modern technologies in agriculture. He highlighted the fact that as the food demand has increased in the world due to increased population, usage of technology in agriculture is a must for better production. He concluded by encouraging the participants to engage themselves in research works.

After that, Mr. Mohamed Rawidean Mohd Kassim started his session by introducing himself. Then he talked about the significance of IoT in agriculture and the advancement of agricultural technologies from manual to automation. He also showed future models of agricultural farms which will use advanced technologies to meet up the world food demand. Mr. Kassim elaborately explained the architecture of the Wireless Sensor Networks and IoT sensors, including the working principles along with their numerous advantages. The speaker mentioned about oil palm breeding and smart mushroom cultivation systems where WSN and IoT sensors can be used for monitoring and controlling. Afterwards, Mr. Kassim gave an overview of the steps of smart agriculture that farmers should follow to obtain the maximum possible productivity. He talked about the challenges which can be faced by the farmers in smart cultivation farms. He also shared knowledge with the help of which farmers can deploy smart agriculture in rural areas. He talked about the importance of boosting crop production and explained how WSN, AI, Big Data, Robotics, Drones, Machine vision, and Cognitive technologies can play a big role in achieving that goal. The session ended with a question-answer session where the speaker answered all the questions asked by the participants. Afterwards, Dr. Mohammad Hasan Imam, *Counselor, IEEE AIUB Student Branch; Advisor, IEEE EMBS AIUB SB Chapter; Senior Assistant Professor, Faculty of Engineering, AIUB,* took the platform and gave the concluding speech where he appreciated the initiatives taken by the student branch to organize this webinar and showed gratitude to the speaker for conducting the session. He also talked about the ongoing research works on Wireless Sensor Networks and encouraged the participants to be involved in this field considering its current demand and healthy prospects. The event was graced by the presence of 75+ participants. A group photo session took place which marked the end of the session.

AIUB Institute of Continuing Education organized a webinar on "Career Development with Fortinet"

AIUB Institute of Continuing Education organized a Webinar on 'Career Development with Fortinet' held on Monday, 12 October 2020. The virtual event was hosted in Zoom and broadcasted live on the verified Facebook page of American International University-Bangladesh.

Dr. Carmen Z. Lamagna, honorable Vice-Chancellor, American International University-Bangladesh (AIUB) was present in this program as a guest of honor and delivered the welcome address. She emphasized the importance of cybersecurity education and professional development in today's connected world and officially inaugurated the partnership between AIUB and Fortinet.

Mr. Rob Rashotte, Vice-President, Global Training & Field Enablement, Fortinet joined the event from Canada and delivered the keynote speech on the event. During his speech Mr. Rob reinforced the importance of cybersecurity education and introduced different certification programs namely NSE (Network Security Expert) certification offered by Fortinet. Mr. Md. Manirul Islam, Director, Institute of Continuing Education, AIUB coordinated the webinar where more than 300 participants joined this virtual event. The webinar came to its end with a question and answer session where the participants presented their queries. Mr Rob. attended to the queries of the participants.

WEBINAR ON "HUMAN COMPUTER INTERACTION & ITS APPLICATION"- ORGANIZED BY ACES

AIUB Community of Engineering Students (ACES) organized a webinar titled "Human Computer Interaction & its Application" on 27th of August, 2020 (Thursday). The program started at 7:30 PM with the participation of about 58 students using the online platform Google Meet.

Prof. Dr. A.B.M. Siddique Hossain (*Dean, Faculty of Engineering, AIUB*) inaugurated the webinar by acknowledging the importance of Information and Communication Technology in helping to cope up with the situation due to the pandemic COVID-19. He mentioned that the virtual classes and webinars are fine examples of Human Computer Interactions and also said that HCI implies a possible future of Human Brain Activity Interfaces interconnecting with Computers. Followed by, our honorable speaker Ms. Ambreen Zaman (*Senior Lecturer, Computer Science and Engineering Department, Stamford University, Bangladesh*) began her speech where she explained HCI and Embodied Interactions with the possible future technologies of touchless modalities of controller free exploration of medical-image data, voice control, proposed prototypes of foot-based interactions in medical surgeries. She continued by highlighting the Virtual Reality Environment of Operation Theatres (OT) where there is minimal patient and doctor hazard with harmless experiment system for complex environments. She concluded her speech by acknowledging the immerging possibilities the HCI implies for the future generation of Medical Surgeries where the Surgeons will experience comfortable, precise, independent and Sterile Interaction Techniques. The webinar came to its end with a short question answer session where the participants presented their queries.

Lastly, Dr. Khandaker Tabin Hasan (*Associate Professor, Head [Graduate Program, CS & Dept. of MIS], AIUB*) conveyed his closing speech where he distinctively stated the effectiveness and importance of Human Computer Interaction by giving examples of the first inventions of mouse, keyboard, the sketchpad of 1963, their principle of operations and improved performance over time. He put end to his speech by illustrating Mark Weiser's vision on how people will be unaware about the vast processing, memory, internet speed that their computers will have rather they will wonder about the interaction with their computers, which is the primary basis of Human Computer Interaction. The webinar was graced with the presence of *Mr.* Abir Ahmed (*Lecturer, Faculty of Engineering, AIUB; Motivator, ACES*). Finally, the conclusion of the webinar was commenced by a group picture with all the participants.

AIUB Computer Club (ACC) Organized virtual workshop on "Getting Started with Git"

On 5th September 2020, AIUB Computer Club (ACC) organized a virtual workshop on 'Getting Started with Git' using the online platform Jitsi Meet. The workshop was conducted by Md Hasibul Huq Rafi, *Former President*, *ACC*. The purpose of the workshop was to cover the basic concepts of Git, which is an open-source distributed version control system.

The host of the session was Abrar Rafid, *General Secretary*, *ACC,* who inaugurated the workshop at 7:00 PM. Mr. Rafid welcomed everyone to the session and introduced the speaker Md Hasibul Huq Rafi among the participants. Mr. Rafi started his speech by thanking everyone and expressed his grief for the death anniversary of Dr. Anwarul Abedin, *Founder Chairman, Board of Trustees, AIUB*. A minute of silence was upheld to convey respect for his departed soul. Afterward, Mr. Rafi briefly discussed Git while mentioning it's uses and importance in today's world. Then, he talked about the definition of Git, its history, applications and explained different related terms like DVCS, git repository, commit, GitHub, and git workflow. Next, he presented a video containing the practical aspect of different terms. Later, he demonstrated the installation of git and graphically represented how to clone, pull, change, commit, and push a project on Git. Later, there was a question-answer session, where the speaker answered different queries of the participants in detail. The workshop was graced by the presence of Abhijit Bhowmik, *Associate Professor and Special Assistant of OSA*, *AIUB* and Rashidul Hasan Nabil, *Lecturer, AIUB*. They thanked the speaker for taking such an informative session and encouraged the participants to participate in future events.

Raihan Gafur, *President*, *ACC* concluded the workshop by expressing his gratitude towards the speaker and thanked the participants for joining the session. Around 40 participants joined the session.

Webinar on 'Old and New Media: Transformation of Journalism'

The Department of Media and Mass Communication, AIUB organized a webinar on 'Old and New Media: Transformation of Journalism' on 25th August 2020, Tuesday at 5:30 pm. Sabir Mustafa, Editor, BBC News Bangla, addressed the audience as the keynote speaker.

Mr. Mustafa in his speech said that digital technology affected journalism profoundly all over the world. He mentioned that new media has been shaping the entire journalism industry and traditional linear media are getting replaced by non-linear integrated media.

He told that the BBC News Bangla's emphasis has been shifted away from radio towards digital – online operations were expanded, social media platforms launched and increasing importance given to video.

He also mentioned that 'as radio listening continued to decline in Bangladesh, BBC Bangla's morning radio programmes were closed and digital output strengthened'.

The speech was followed by a question-answer session where students asked about recent trends of the media industry and also sought suggestions about their career planning.

Mr. Mustafa suggested media students who in future will be working in the industry to learn new skills and prepare themselves to remain viable in the industry.

Sabir Mustafa joined the BBC World Service in 1999 as a Producer in the Bengali service. In June 2001 Sabir was appointed the Editor of the Bengali service. In the course of his career at the BBC, Sabir also undertook attachments as Managing Editor, South Asia in 2003 and Executive Editor, Asia-Pacific Region from 2004-06.

The program started with a lively welcome speech by Dr. AJM Shafiul Alam Bhuiyan, Advisor of the Department of Media and Mass Communication.

The webinar ended with the vote of thanks by Dr. Tazul Islam, Dean of Faculty of Arts and Social Sciences.

Afroja Shoma, Assistant Professor of the MMC Department coordinated and hosted the program.

IEEE AIUB Student Branch Successfully Organized a Webinar on "ENGINEERING IN AGRICULTURAL INDUSTRY: EXPLORING THE UNTAPPED POTENTIALS"

On 9th May 2020, IEEE AIUB Student Branch in collaboration with IEEE Industry Application Society AIUB Student Branch Chapter successfully organized a webinar titled Engineering in Agricultural Industry: Exploring the Untapped Potentials. Amid the ongoing COVID-19 crisis, when everyone is staying at home, the IEEE AIUB Student Branch organized this webinar through the CISCO WEBEX MEETING platform. The webinar was conducted by Mr. Mashrur H. Shurid, *Co-founder & CEO, IPAGE Bangladesh Ltd,* who mainly talked about the modern agricultural industry, the ways of introducing our farmers to precision agriculture technologies and helping them to achieve sustainability through climate-smart approaches. The webinar was inaugurated by Mr. Mashrur Sakib Choyon, *Vice-Chairperson (Technical), IEEE AIUB Student Branch,* who welcomed the participants and guests. He thanked the participants for participating in such informative event organized by IEEE AIUB Student Branch. He then talked about the rules, regulations and etiquettes which should be followed by the participants throughout the webinar.

After that, Mr. Mashrur H. Shurid started his session by sharing his educational and professional background. He talked about agriculture, its origin and different aspects. Mr. Shurid also talked about different areas of agriculture and how it affects the GDP of any country. He gave insight on vertical farming and talked about Data Science along with how it is useful in agriculture. He described about various techniques and distinct types of crop management as well as different automation operations. He also talked about different agricultural processes which can have positive impact on the environment and elaborately compared traditional agriculture with the modern one. After that, Mr. Shurid briefly discussed about some of the myths about agriculture and efficiently gave answers to the questions from participants. He concluded his speech by encouraging the participants to apply Engineering knowledge on modern agriculture.

The concluding speech was delivered by Mr. Shahriar Aqib Khan*, Vice-Chairperson (Activity), IEEE AIUB Student Branch; Chairperson, IEEE Industry Application Society AIUB Student Branch Chapter,* who expressed his wholehearted gratitude towards the honorable speaker and all the participants for their valuable participation in the webinar. He concluded by informing the participants about the feedback form consisted of certain questions which were needed to be answered by the participants to be able to receive their certificate of participation. By filling up the feedback form, the participants also pointed out the factors where IEEE AIUB Student Branch can ameliorate in organizing such events in the future. The event was graced by the presence of 88 participants including participants from two foreign countries.

AIUB organizes webinar on the Topic: "Post-Pandemic Preparedness: Competencies Needed for Tomorrow's Job Market": An informative session with Ms. Monzula Morshed, CHRO, Banglalink

American International University Bangladesh (AIUB), on Thursday, May 7, 2020, hosted a webinar entitled "Post-Pandemic Preparedness: Competencies Needed for Tomorrow's Job Market". The guest speaker at the webinar was Ms. Monzula Morshed, Chief Human Resources and Administration Officer, Banglalink and the session was moderated by the Director of the Office of Placement and Alumni, AIUB, Mr. RoomeeTarequeMoudud. Vice-Chancellor Dr. Carmen C.Lamagna presided over the event while the welcome address was delivered by Dr. Charles C Villanueva, Vice-President Academics and Dean, Faculty of Business Administration. A total of approximately 80 attendees including faculty members and interns participated in the discussion.

Ms. Monzula delivered an elaborate and informative presentation on the measures Banglalink, in particular, had taken ahead of the lockdown in order to prepare employees for the transition to remote working. She elaborated on the necessary precautions and awareness required by all organizations in order to gradually resume daily operations during post lockdown. The second part of the discussion focused mainly on the competencies needed for graduates to equip in a post-pandemic job market. Ms. Monzula reiterated that future university graduates must be able to demonstrate critical thinking, creativity in problem solving, big data analysis skills, cultural intelligence and people skills in order to enhance their employability in an increasingly competitive market. Lastly, she stressed on the need for organizations to display utmost empathy and avoid adding to the global problem in the form of layoffs especially during such trying times. The discussion was followed by a brief question and answer session where the speaker addressed specific queries from teachers and students.

The webinar was a joint initiative by Mr. Tareque Moudud and Ms. Kishwar M Chowdhury, Assistant Professor, Department of Management and HRM, and was widely appreciated by faculty members who are especially concerned about the changing needs and requirements of the labor market. Further, Ms. Monzula underscored that the best way to groom university students for them to excel on skills relevant and useful in a post-pandemic Bangladesh so that they can contribute to the recovery of our economy.

IEEE AIUB Student Branch successfully organized a webinar on 'Getting Started with Image Processing using Python'

On 24th April 2020, IEEE AIUB Student Branch in collaboration with IEEE Computer Society AIUB Student Branch Chapter and Pondits successfully organized a webinar titled 'Getting Started with Image Processing using Python'. Amid the ongoing COVID-19 crisis, when everyone is locked down in their homes, the IEEE AIUB Student Branch in celebration of 'PES Day 2020' organized the webinar through the CISCO WEBEX MEETING platform. The seminar was conducted by Mr. Saddam Hossain, C*EO, Centureon IT; Co-Founder, Edwin* who mainly focused on the importance of digital image processing and how Python Language can be used in this sector. The webinar was inaugurated by Mr. Mashrur Sakib Choyon, *Vice-Chairperson (Technical), IEEE AIUB Student Branch* who welcomed the participants and guests. He talked about the rules and regulations along with the etiquettes those should be followed by the participants throughout the webinar.

After that, Mr. Saddam Hossain started the session by sharing his educational and professional background along with his experience in the field of Image Processing with the participants. He discussed the computer vision and face recognition process as well as the ways which computers follow for understanding the images and videos. He also gave a detailed theoretical idea regarding Python Language along with its importance in science and also talked about some of its commonly used library tools. Later, he discussed the usage and necessity of single-shot detection & deep learning technology which is commonly used in modern image processing. Afterward, he elaborately discussed the algorithm modules of OpenCV which is a cross-platform library and with the help of which real-time computer vision applications can be developed.

Apart from these, he talked about various levels of Image Processing including their input and output levels. He also spoke briefly about the classification of Computer Vision Tasks and Machine Learning along with their importance. Mr. Hossain emphasized the wide range of applications of Image Processing Techniques in Biotechnology sectors, Traffic Monitoring systems, and many more including their operations. Later, he motivated the participants for considering this sector while choosing career due to its gradual advancements from time to time. Mr. Saddam Hossain concluded his presentation with an interactive Question-Answer session where he efficiently answered all the questions from the participants.

The concluding speech was delivered by Mr. Mashrur Sakib Choyon who expressed his wholehearted gratitude towards the honorable speaker and all the participants for their valuable participation in the webinar. Lastly, he concluded by urging the participants for filling-up the feedback form to point out the factors where IEEE AIUB Student Branch can ameliorate in organizing such events in the future. The event was graced by the presence of total 96 participants and everyone was provided with the Certificate of Participation for their enthusiastic engagement in the webinar.

Webinar on 'Role of Mobile Telecommunication Industry during the COVID-19 Crisis' at AIUB

A webinar titled 'Role of Mobile Telecommunication Industry during the COVID-19 Crisis' was held for the faculty members and students of AIUB on Saturday, May 2, 2020 at 11 AM in the Microsoft Teams online platform. Mr. Mahtab Uddin Ahmed, CEO, Robi Axiata Ltd. was present as the resource person. Dr. Carmen Z Lamgana, Vice Chancellor of AIUB presided over and inaugurated the session with her speech. Ms. Yesmin Sultana, Senior Assistant Professor, Faculty of Business Administration, AIUB and Mr. Shahed Alam, the Chief Corporate and Regulatory Affairs of Robi Axiata Limited organized the webinar. Ms. Yesmin moderated the webinar.

Around 100 participants comprising of faculty members and students along with the faculty deans were present during the webinar.

Mr. Mahtab, in his presentation, highlighted the impacts of COVID-19 on consumers and the role of Robi in response. He spoke on the telecom network usage & resiliency, changes of customer behavior, challenges for the Mobile Telecom Industry in Bangladesh, how crisis can bring opportunity, use of Data Analytics to fight COVID-19, Robi's services to support government in fighting the crisis, CSR initiatives to fight COVID-19 in Bangladesh. Mr. Mahtab finished his talk highlighting the possible changes in career and jobs caused by this pandemic in the upcoming days.

A question and answer session was held at the end, where the attendees of the webinar raised their concern relating to governance of telecom industry in Bangladesh, support for university students by telecoms and preparedness of the industry for future changes. Mr. Mahtab addressed the queries in the most befitting manner.

AIUB Organized a Successful International Symposium on Nanotechnology (ISN 2020)

On 12th March 2020, Center for Nanotechnology Research (CNR) of American International University-Bangladesh (AIUB), organized the first International Symposium on NANOTECHNOLOGY 2020, in it's campus in Kuril, Dhaka, Bangladesh. International and local technical speakers shared their research findings with professionals and students along with representatives from industries who are directly involved with nanotechnology. The symposium provided as a great platform for exchanging theoretical and practical experience among researchers from academia and industries.

Prof. Dr. ABM Siddique Hossain (Dean, Faculty of Engineering, AIUB), welcomed the speakers and participants and thanked them for making this event a successful one. Afterwards, Prof. Dr. Tafazzal Hossain (Pro Vice Chancellor, AIUB) greeted the audience and shared his experience and highlighted the importance of Nanotechnology for the ground breaking discoveries that are taking place around the world. Dr. Carmen Z. Lamagna (Vice Chancellor, AIUB), inaugurated the symposium. In her inauguration speech she highlighted the importance of nanotechnology and it's advancement and thanked the speakers, participants, organizers and sponsors for making the event a successful one. A memorandum of understanding was signed between American International University-Bangladesh (AIUB) and Coppin State University USA, in presence of the Vice Chancellor, of AIUB, signed by Prof. Dr. ABM Siddique Hossain (Dean, Faculty of Engineering, AIUB) on behalf of AIUB and Dr. Jamal Uddin *(Professor and Founding Director, Center for Nanotechnology, Department of Natural Sciences Coppin State University)* on behalf of Coppin State University, USA. Mr. Mohammed Yousuf (Managing Director, Lub-rref Bangladesh Ltd.) was then invited to share his experience. He thanked AIUB and CNR for organizing a productive symposium. After that Dr. Khandaker Jakir Hossan (General Manager, Laboratory and R&D, Lub-rref(Bangladesh) Ltd.) presented a speech where he informed that they have introduced nanotechnology in their lubricant industries for the first time Bangladesh and explained benefits of using nanoparticles in fuel consumption.

The Keynote sessions commenced afterwards, where speakers from around the globe shared their insight on how nanotechnology is evolving and having an impact on a global scale. Keynote speakers Dr. Jamal Uddin *(Professor and Founding Director, Center for Nanotechnology, Department of Natural Sciences Coppin State University)* presented a talk on *Nanotechnology is the Future| A Growing STEM Field* and *Dr. Jagotamoy Das (Department of Pharmaceutical Sciences, Leslie Dan Faculty of Pharmacy, University of Toronto)* presented a Talk on *Analysis of circulating nucleic acids with nanostructured microsensors.* Invited speakers of the symposium Prof. Dr. Mohammed Abdul Basith *(Nanotechnology Research Laboratory, Department of Physics, Bangladesh University of Engineering and Technology)* delivered a speech on *Locally Synthesized Nano-structured Materials for Energy Harvesting,* Dr. A. J. Saleh

Ahammad *(Department of Chemistry, Jagannath University)* delivered a talk on *Nanomaterials based electrochemical sensors for environmental and biomedical applications,* Dr. Shaikh M. Mobin *(Discipline of Chemistry, Discipline of Metallurgy Engineering and Materials Science (MEMS) and Discipline of Biosciences and Biomedical Engineering, Indian Institute of Technology Indore)* delivered a talk on *Design and synthesis of MOF and MOF/rGO hybrid materials for the electrochemical energy storage* and the host speaker Dr. Mohammad Mahbub Rabbani *(Department of Chemistry, AIUB) presented a talk on Multifunctional polymer composite nanofibers prepared by electrospinning.*

The panel discussion on "Nanotechnology in Bangladesh: Challenges and Prospects", which commenced afterwards focused on the sharing resources to address the challenges of nanotechnology in Bangladesh. The panel discussion was moderated by, Prof. Dr. Md. Abdur *Rahman (Associate Dean, Faculty of Engineering, AIUB)* and Prof. Dr. Al-Nakib Chowdhury *(Department of Chemistry, BUET),* Dr. Engr. Sheikh Manjura Hoque *(Head and Chief Scientific Officer, Materials Science Division, Atomic Energy Centre)* Dr. Mohammad Mahbub Rabbani *(Department of Chemistry, AIUB),* Dr. Khandaker Jakir Hossan *(General Manager (Laboratory and R&D), Lub-rref(Bangladesh) Ltd.) and* Dr. Jamal Uddin *(Professor and Founding Director, Center for Nanotechnology, Department of Natural Sciences Coppin State University) joined as panel discussants*. *After the panel discussion* Prof. Dr. Tafazzal Hossain (Pro Vice Chancellor, AIUB), Prof. Dr. Charles C. Villanueva (Vice President Academics and Dean, Faculty of Business Administration, AIUB), Prof. Dr. ABM Siddique Hossain (Dean, Faculty of Engineering, AIUB) and Prof. Dr. Tazul Islam *(Dean, Faculty of Arts and Social Science, AIUB)* handed over token of appreciation to each speakers, panel discussants and organizers.

The program ended with a vote of thanks from organizing chair Prof. Dr. Md. Abdur *Rahman (Associate Dean, Faculty of Engineering, AIUB)* to the speakers, sponsor, partners, participants, organizers and volunteers. Lub-rref Bangladesh Ltd. participated as the gold sponsor of the entire event.

The Department of Computer Science of AIUB Organized A Three Day Long- International Conference on Computing Advancements (ICCA)

The Department of Computer Science of American International University-Bangladesh (AIUB) organized the International Conference on Computing Advancements, ICCA-2020, starting from January 10 to 12 at AIUB campus, with cooperation of ACM SIGAPP. The goal of the ICCA-2020 conference was to bring together a convergence between academics and industry researchers from different domains of computers science. In this conference, many distinguished academics and researchers of computer science from home and abroad participated. In the inaugural ceremony on the 10th January, Prof. Dr. Sazzad Hossain, the honorable member of the UGC was present as Chief Guest. Among other distinguished guests, Ms. Nadia Anwar, Chairman of AIUB Broad of Trustees, Dr. Hasanul A. Hasan, Founder Member, AIUB, Prof. Dr. Tafazzal Hossain, Pro-Vice Chancellor, AIUB, Prof. Dr. A. B. M. Siddique Hossain, Dean, Faculty of Engineering, AIUB, were present in the conference. Prof. Dr. H. M. Jahirul Haque, the Vice Chancellor of the University of Liberal Arts Bangladesh, and Prof. Dr. Anwar Hossain, the Vice Chancellor of Northern University Bangladesh, also joined in the event. Prof. Dr. Ng Giap Weng, Associate Professor of the Faculty of Computing and Informatics from the Universiti Malaysia Sabah and Prof. Dr. Md. Saiful Islam, Director, IICT, BUET delivered their keynote speeches focusing on different aspects of computer science. The Gala Dinner was arranged in Dhaka Regency Hotel and Resort Ltd. In the gala dinner, the honorable state minister for ICT, Bangladesh Mr. Zunaid Ahmed Palak was present as the Chief Guest. In the second day, Prof. Dr. Saiful Islam, honorable Vice Chancellor, BUET was present as the Chief Guest in the industry session, and a special attraction “Pitha Utshob” was arranged and graced by the honorable state minister for ICT, Bangladesh Mr. Zunaid Ahmed Palak. Throughout the three days of the conference, parallel sessions for paper presentation were arranged for accommodating many researchers to present papers. It may be noted that all accepted, registered and presented papers & posters will be submitted to ACM Digital Library for publication. The closing ceremony of this conference was held on the 12th January 2020. The vote of thanks delivered by Mr. Mashiour Rahman, Associate Dean, Faculty of Science and Technology, AIUB. In this ceremony, awards and crests were given to the esteemed researchers among participants as well as to the contributors to the conference. It should be mentioned here that the sponsors of this conference were Dhaka Bank Ltd., Juniper Networks, B-TRAC Technologies Ltd., GATEWAY Communication & Technology, Infolink Ltd., and different media partners.


ICCA
Computing Advancements
2020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ACES ORGANIZED A SEMINAR ON "A JOURNEY INTO THE WORLD OF EMBEDDED SYSTEMS"

AIUB Community of Engineering Students (ACES) organized a seminar titled "A Journey into The World of Embedded Systems" on February 20, 2020, at the Multipurpose Hall, AIUB. The program began at 11:30 am with the participation of about 200 students from the department of CSE, CS, EEE and CoE of AIUB. The purpose of the seminar was to provide essential information about embedded systems to build up a basic knowledge and also to establish the harmonious relation between academic skills with the industrial one.

Prof. Dr A.B.M Siddique Hossain (*Dean, Faculty of Engineering, AIUB*) commenced the inauguration of the seminar through his remarkable words where he emphasized on the 4^{th} industrial revolution through embedded systems. He also highlighted some enormous applications of embedded systems like mobile phones, laptop, digital camera etc. Afterwards, speaker of the seminar Mr. Zafir Shafiee Chowdhury (*Co-Founder, Director and General Counsel, Bondstein Technologies*) began his presentation by providing a short introduction about himself. Before immersing into the main section of his presentation, he conducted a survey with 60 audiences to observe the knowledge of embedded systems among the young generation. Followed by the survey, Mr. Zafir started the seminar by covering the modern applications of embedded system that included brief illustration on Arduino. Next, he held another online quiz contest on the subject of Arduino and embedded systems of which the 3 highest scorers received prizes. Later on, he described briefly about different types of sensors with examples like HTM 32, gas sensor, ultrasonic sensor, temperature sensor, PIR, piezoelectric sensor etc. used in various applications. Mr. Zafir also featured two software namely Proteus and Eagle CAD which are used for designing bare bone circuit boards and showed some build in Schematic and PCB design in Eagle CAD. He ended his presentation by encouraging all the students to take the best from the world of knowledge and utilize them in constructing advanced effective future. The seminar came to its end with a question answer session where few students shared their experience of doing projects and the speaker also mentioned some of the projects his company working presently like smart trucking system for clean Dhaka, smart security system for exam question-papers, portable generators etc. Lastly, Prof. Dr. Md. Abdul Mannan *(Director, Faculty of Engineering, AIUB)* conveyed his closing speech where he emphasized on the importance of the embedded system in the society and inspired the students to pursue their career in this field. At the end of the event, Prof. Dr. Md. Abdul Mannan *(Director, Faculty of Engineering, AIUB)* provided crest and token of appreciation to Mr. Zafir Shafiee Chowdhury *(Co-Founder, Director and General Counsel, Bondstein Technologies) for successfully conducting the seminar*. Mr. Sujan Howlader *(Assistant Professor, Faculty of Engineering, AIUB)*, Ms. Tahmida Islam *(Lecturer, Faculty of Engineering, AIUB)*, Tahseen Asma Meem *(Lecturer, Faculty of Engineering, AIUB)*, Mr. Nirjhor Tahmidur Rouf *(Lecturer, Faculty of Engineering, AIUB)* and Mr. Abir Ahmed *(Lecturer, Faculty of Engineering, AIUB; Motivator, ACES)* graced the event with their presence.

ACES ORGANIZED A SEMINAR ON "IMPORTANCE OF DESIGN RESEARCH IN HUMAN ROBOT INTERACTION (HRI)"

AIUB Community of Engineering Students (ACES) organized a seminar titled "IMPORTANCE OF DESIGN RESEARCH IN HUMAN ROBOT INTERACTION (HRI)" on February 12, 2020. The event took place at the Seminar Room 3202, Annex 3, AIUB. The program commenced at 3:30 pm with the participation of 70 students from the Department of EEE, CSE and CoE of AIUB. The purpose of the seminar was to provide substantial information on the importance of design and research in human-robot interaction along with the impact of the upsurge of intelligent robots in society.

The seminar began with the inaugurating speech given by Prof. Dr. ABM Siddique Hossain *(Dean, Faculty of Engineering, AIUB)*. He started by expressing his appreciation to the speaker and talked about the emergence of robotics and its impact in the industrial revolution. He also mentioned how Robotics is a multidisciplinary subject and its application across various fields. Afterwards, speaker of the seminar Mohammad Shidujaman *(PhD Candidate, Department of Information Art and Design, Academy of Art and Design, Tsinghua University)* initiated his presentation with the evolution of Robotics in Bangladesh and the importance of design in HRI. He also briefed the audience about the main objective of his research and its focus on social robots, its design and various applications. Then, he presented different pictures and examples related to his experiments and the process of developing robots which can effectively interact with humans as well as which will help people in their daily lives. He interacted with the audience and faculties during the seminar and concluded his presentation by encouraging the students to explore the design and research of Robotics. Lastly, Dr. Md. Abdur Rahman *(Professor & Associate Dean, Faculty of Engineering, AIUB)* conveyed the closing speech where he encouraged the students to find suitable research topics and careers in the field of Robotics as it is a vast subject with huge opportunities.

At the end of the seminar, Dr. Md. Abdur Rahman *(Professor & Associate Dean, Faculty of Engineering, AIUB)* provided the certificate and token of appreciation to thes speaker Mohammad Shidujaman *(PhD Candidate, Department of Information Art and Design, Academy of Art and Design, Tsinghua University)*. Finally, a group photograph was taken with all the participants. Dr. Md. Kabiruzzaman *(Assistant Professor, Faculty of Engineering, AIUB),* Dr. Ferdous Jahan Shaun *(Assistant Professor, Faculty of Engineering, AIUB)* , Dr. Md. Rifat Hazari *(Assistant Professor, Faculty of Engineering, AIUB),* and Abir Ahmed *(Lecturer, Faculty of Engineering, AIUB; Motivator, ACES)* graced the event with their presence.

IEEE Student Professional Awareness Venture (SPAVe) 4.0

On 28th December 2019, IEEE AIUB Student Branch successfully organized IEEE Student Professional Awareness Venture (SPAVe 4.0), at American International University-Bangladesh (AIUB). The IEEE USA branded venture was provided with technical support by IEEE Bangladesh Section, IEEE Bangladesh Section Student Activities Committee and IEEE Young Professionals Bangladesh Section. The flagship event consisted of series of professional and career-based sessions focused on professional development. Students of different universities from all over the country came to participate in the event. The daylong event was inaugurated with a welcome speech by Dr. M Tanseer Ali, *Educational Activity Coordinator, IEEE Bangladesh Section; Sr. Asst. Professor, Faculty of Engineering, AIUB;* and also discussed the significance of IEEE SPAVe as a great initiative in developing a student professionally.

The first session titled "Power of Good Marketing for Engineers" was conducted by Mohammad Hasan Morshed Khan*, Business Development Manager, Reinhausen Asia Pacific SDN.Bhd*. The session solely focused on the power of good marketing skills and how engineers should excel in the respective field globally. The second session titled "Personal Habits for Professional Success" was conducted by Minhaz-Us-Salakeen Fahme, *Co-Founder and CEO, Battery Low Interactive Ltd.* The speaker pointed out some impressive and notable good habits for students to follow for a successful life. The third session was entitled "Growth Vs Fixed Mindset as a Leadership Quality", which was conducted by Ghulam Sumdany Don, *Chief Inspirational Officer, Don Sumdany Facilitation and Consultancy.* The session focused on the important aspects of a person's mental health, Growing and Fixed Mindset in a professional's life. The fourth session titled "Making yourself Competitive as a Young professional" was conducted by Akib Jobaer Rahman, *Vice-Chairperson, IEEE Young Professionals Bangladesh Section; System Engineer, Planning Department, Premium Connectivity*. The speaker inspired the young participants to face challenges and be responsible for their actions. The fifth session was entitled "Preparing Yourself for a Technological Tomorrow" which was conducted by Omar Shahjalal Shantanu, *Satellite Operation Engineer, Spectra International Limited.* The focus of the session was to introduce the participants to the modern era of technology and the ever-changing skill set requirements of the job market. The last session of the venture was entitled "Preparing Yourself to be The Future Leader, Starting Tomorrow", which was conducted by Chowdhury Akram Hossain, *Former Counselor, IEEE AIUB Student Branch; Sr. Asst. Professor, Faculty of Engineering; Special Assistant, Office of Student Affairs, AIUB.* The speaker shared his experiences working with IEEE, IEEE AIUB Student Branch and IEEE Bangladesh Section. He described the different levels of leadership portrayed by everyone in their daily lives. He encouraged the young leaders to initiate ideas and take responsibilities of their daily surroundings and also urged the participants to figure out their true self. All the speakers were presented with a token of appreciation after the session.

The day-long event was concluded with a closing speech from Dr. Mohammad Hasan Imam, *Counselor, IEEE AIUB Student Branch; Advisor, IEEE Engineering in Medicine and Biology*

Society AIUB Student Branch Chapter; Sr. Asst. Professor, Faculty of Engineering, AIUB. He started his speech by thanking the participants for their patience, the ambassadors as well as the speakers for their tremendous effort to make the event successful. Then, he presented tokens of appreciation and certificates to the ambassadors who participated from different affiliated universities. Finally, he invited the guest, speakers and the attendees for a group picture. The flagship event was graced by the presence of Kawshik Shikder, *Motivator, IEEE AIUB Student Branch; Advisor, IEEE Microwave Theory and Techniques Society AIUB Student Branch Chapter; Asst. Professor, Faculty of Engineering, AIUB;* A.R.M. Abdullah Rocky, *Chairperson, IEEE Young Personals Bangladesh Section; Asst. Manager, Enterprise Architecture and Planning, Bkash Ltd.;* Shams Shad Rafi, *Student Activity Coordinator, IEEE Bangladesh Section; Mentor, IEEE AIUB Student Branch; Product Delivery Engineer, CodeMarshal;* Rajesh Kumar Paul, *Specialist, Microwave Operation, Technology Division, ROBI AXIATA Ltd.; Treasurer, IEEE Young Professionals Bangladesh Section.*

Seminar on "Microwave Transmission in Telecommunications"

IEEE AIUB Student Branch successfully organized a seminar on "Microwave Transmission in Telecommunications" at American International University-Bangladesh (AIUB) in collaboration with IEEE Bangladesh Section Student Activities Committee, IEEE Young Professionals Bangladesh Section, IEEE Microwave Theory and Techniques Society AIUB Student Branch Chapter and Faculty of Engineering, AIUB. The seminar was conducted by Mr. Rajesh Kumar Paul, *Specialist, Microwave Operation, Technology Division, ROBI AXIATA Limited; Treasurer, IEEE Young Professionals Bangladesh Section*.

The seminar was inaugurated with the welcome speech of Dr. M. Tanseer Ali, *Former Counselor, IEEE AIUB Student Branch; Sr. Asst. Professor, Faculty of Engineering, AIUB* who talked about the progression of Microwave and Telecommunication sectors along with the research opportunities it provides for higher education. Later, the speaker Mr. Rajesh Kumar Paul took the stage and discussed the history along with the importance of Microwave Transmission systems in recent times. He also talked in detail about various types of Antennas and other equipments that are involved in transmission along with their characteristics, infrastructure and parameters. In addition, he talked elaborately about Synchronous Transport Module (STM), and its functions in Telecommunication system. He also gave a brief knowledge to the participants about Microwave Frequency Bands and also explained the suitable range of frequencies that are generally used. Finally, he concluded with an interactive Question-Answer session.

After that, Dr. Mohammad Hasan Imam, *Counselor, IEEE AIUB Student Branch; Sr. Assistant Professor, Faculty of Engineering, AIUB* delivered the concluding speech where he discussed about the wide range of applications of Microwave Transmission. He also motivated the participants for electing Telecommunication in higher education due to its promising future. Later, Dr. Mohammad Hasan Imam presented a token of appreciation to Mr. Rajesh Kumar Paul. A group photo session was carried out which marked the end of the seminar.

Seminar on "Tech Talk: Cyber Aware Software Engineering"

"Cybersecurity is a shared responsibility and it boils down to the more systems we secure, the more secure we all are. Everybody needs to ensure that we have the tools necessary to prepare for, protect from, and prevent the misuse and misconducts in the cyberspace today." And in order to shed light on the significance of it, along with innovative solutions and approaches to the issue at hand, the AIUB Computer Club (ACC) organized a seminar on the 11th of December 2019, titled 'Tech Talk: Cyber Aware Software Engineering'.

The purpose of the seminar was to inform the young engineers about the importance of cyber security while developing various applications and websites. The guest speaker of the seminar was Mr. Ahsan Ayub, a doctoral student and graduate research assistant at the Cybersecurity Education, Research, & Outreach Center (CEROC) of the College of Engineering in Tennessee Technological University, USA. An AIUB Alumni, Mr. Ayub began the session by expressed his gratitude on being back at his alma mater. He discussed how attackers target and hit various websites and applications, compromising their services and credibility. He also shared how software research and development is essential in testing for vulnerabilities and ensuring maximum security in the systems we use. The seminar concluded with a constructive Q&A session, where students queried on the different issues faced in cyberspace as well as the best ways to approach them.

Mr. Ayub was presented with a token of appreciation by Mr. Abhijit Bhowmik, a Senior Assistant Professor in the Faculty of Science & Technology (FST) and a Special Assistant to the Office of Student Affairs (OSA), on behalf of AIUB, for his valuable time and contribution to the seminar, followed by a group photo with the organizers and participants of the event. By sharing his experiences and ideas with the young engineers, developers, and programmers, the seminar certainly imbued a sense of awareness in the digital age.

IEEE AIUB Student Branch organized a seminar on "Optical Task Offloading for Cloud Networked Robotic Applications in Industry 4.0"

On 20th November 2019, IEEE AIUB Student Branch, in collaboration with IEEE Industry Applications Society AIUB Student Branch Chapter and Faculty of Engineering, successfully organized a seminar on "Optical Task Offloading for Cloud Networked Robotic Applications in Industry 4.0" at AIUB. The seminar focused on the applications of Cloud Networked Robotics systems and the effects of Optical-task Offloading. The seminar was inaugurated by Prof. Dr. Mohammad Abdul Mannan, Director, Faculty of Engineering, AIUB who gave a brief idea of Industry 4.0 as well as its benefits and demand. The seminar was conducted by Dr. Akhlaqur Rahman, Lecturer, Industrial Automation and Mechatronics, Engineering Institute of Technology (EIT), Melbourne, Australia. He initiated the session by briefly talking about cloud computation and its benefits. He elaborately explained the mechanism of task offloading along with the key features of Cloud Robotics. He also gave a brief idea on the Genetic Algorithm of Cloud Networked systems and also displayed some software-based simulation of various projects into which he has taken part. He also motivated the participants by explaining the promising future of cloud networked robotic systems and encouraged them for pursuing their higher education in that field.

The closing speech was delivered by Dr. Mohammad Hasan Imam, Counselor, IEEE AIUB Student Branch; Sr. Assistant Professor, Faculty of Engineering, AIUB where he discussed about the importance of Robotics in recent times and suggested the participants to focus on practical knowledge. He thanked the speaker for conducting the seminar. Dr. Imam presented a token of appreciation to Dr. Akhlaqur Rahman on behalf of IEEE AIUB Student Branch. The seminar was graced by the presence of Mr. Kawshik Shikder, Motivator, IEEE AIUB Student Branch; Asst. Professor, Faculty of Engineering, AIUB; Dr. Rifat Hazari, Asst. Professor, Faculty of Engineering, AIUB; Mr. Mohammad Khurshed Alom, Lecturer, Faculty of Engineering, AIUB; Mr. Rabiul Islam, Lecturer, Faculty of Engineering, AIUB.

ACES ORGANIZED A SEMINAR ON "POLYMERIC NANO-MATERIALS FOR ENGINEERING"

AIUB Community of Engineering Students (ACES) organized a seminar titled "Polymeric Nano-Materials for Engineering" on November 18, 2019 at AIUB. The program began at 3:30 pm with the participation of about 40 students from different departments. The purpose of the seminar was to provide substantial information on polymeric Nano-materials and their application in engineering fields.

Prof. Dr. Tafazzal Hossain *(Pro Vice Chancellor, AIUB and Dean, Faculty of Science and Technology, AIUB)* inaugurated the seminar by greeting the speakers and the students. He also shared his experience related to the seminar topic. Followed by, Prof. Dr. Md. Abdur Rahman *(Associate Dean, Faculty of Engineering, AIUB)* enlightened the importance of nanotechnology in this modern era and motivated students to learn its application on engineering fields. Later on, honorable speaker, Dr. Mohammed Tariqul Islam *(Senior Assistant Professor, Natural Science (Chemistry), AIUB)* started his presentation on Polymeric materials for Nanotechnology. He started by discussing about polymers, the process of polymerization, its classification, and a few examples related to it. He then gave a small introduction on the polymer that he synthesized during his PhD and moved on to talk about nano fabrication technology and types of nano-materials. Later on, he discussed about the application of nano-materials which includes packaging, electrical and electronic components, drug delivery system etc. After that, he focused on polymeric materials in electrical and electronics engineering where he mentioned that the materials are mostly used in displays, printable electronics, sensors, wearable sensors, rechargeable batteries, etc. Furthermore, he talked about his research work which is Morphological Studies of semi fluorinated block co-polymeric thin films and with this he concluded his presentation. A short question answer session was conducted with the participants. Afterwards, Dr. S. Mosaddeq Ahmed *(Professor and Head, Department of Natural Science (Chemistry), AIUB)* gave a short speech on Nano science and technology. Finally, Prof. Dr. Tafazzal Hossain *(Pro Vice Chancellor, AIUB and Dean, Faculty of Science and Technology, AIUB)* gave the closing speech, where he encouraged the students to explore the field of nano technology and its application. He along with Dr. S. Mosaddeq Ahmed provided certificate and crest to the speaker. Dr. Mohammad Mahbub Rabbani *(Associate Professor, Department of Chemistry, AIUB)*, Dr. Farzana Khalil *(Assistant Professor, Natural Science (Chemistry), AIUB)*, Abir Ahmed *(Lecturer, Faculty of Engineering, AIUB; Motivator, ACES)* and Mr. Md. Shahriar Pervez *(Lecturer, Faculty of Engineering, AIUB)*, graced the event with their presence.

Seminar on "Nanotechnology & Its Applications"

AIUB Community of Engineering Students (ACES) organized a seminar on "Nanotechnology & Its Applications" which was held at Multi-purpose Hall of AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH (AIUB). The goal of the seminar was to expand the knowledge of nanotechnology among the students of EEE and CoE and open the door of opportunities for them in order to keep pace with the advancing world in the field of nanotechnology.

The commencement of the seminar was done by Dr. Tafazzal Hossain (Pro Vice Chancellor, AIUB and Dean, Faculty of Science and Technology, AIUB) where he welcomed all the audiences and also emphasized on the importance of nanotechnology for engineering students. He also highlighted the development of nanotechnology in Bangladesh. Followed by, Prof. Dr. A.B.M. Siddique Hossain (Dean, Faculty of Engineering, AIUB) delivered his speech about the application of nanotechnology and the future research and working scopes in this very field. Subsequently, Dr. S. Mosaddeq Hossain (Professor, Department Head of Chemistry, AIUB) was requested to come forward and share the basic knowledge of nanotechnology. Moving forward, the speaker Dr. Mohammad Mahbub Rabbani (Associate Professor, Department of Chemistry, AIUB) was called on the stage to share his knowledge, perception and experience on the advancement of nanotechnology and its application to the audience. At the very beginning he introduced the terms "NANO" and "TECHNOLOGY" and the relation between them. He also introduced the major branches of nanotechnology such as Nano engineering, ceramic engineering, Nano electronics and Nano medicine etc. Besides, he showed a sample of Nano structure and explained about computer processing, nanowire solar cells, carbon Nano sensor, memory-storage, LED-LCD display, GD photo detector which are the particles of nanotechnology. He also extended his presentation by highlighting the extensive application of Nano technology in medical field. Furthermore, he shared his opinion about the position of nanotechnology course with respect to others and expressed his wish to expand the domain of nanotechnology course in AIUB. After the attractive presentation session, a question-answer session was held where very enthusiast students exhibit their keen interest on this field. Finally, Dr. Tafazzal Hossain (Pro Vice Chancellor, AIUB and Dean, Faculty of Science & Technology, AIUB) delivered a closing speech praising the presentation and encouraging the students towards the developing world of nanotechnology.

Seminar on Biomedical Signal Processing & Analysis Techniques: Challenges and Applications organized by IEEE AIUB Student Branch

IEEE AIUB Student Branch in collaboration with IEEE Engineering in Medicine and Biology Society (EMBS) and Department of Computer Engineering (CoE), Faculty of Engineering, AIUB successfully organized a seminar titled "Biomedical Signal Processing & Analysis Techniques: Challenges and Applications" at AIUB. The seminar focused on various types of artefacts and noises that are obtained during bio-signal recordings along with the ways of identifying those noises and the process of nullifying them from the raw data. The event was inaugurated by Prof. Dr. A.B.M Siddique Hossain, *Dean, Faculty of Engineering, AIUB; Advisor, IEEE AIUB Student Branch* who initiated his speech by introducing the importance and different sectors of Biomedical Engineering and discussed how engineering skills can be applied to the advancement of healthcare equipment to diagnose, monitor and analyze diseases. He concluded his speech by encouraging the participants to build a career in Biomedical Engineering to help and modernize medicine and biological sectors for the betterment of mankind.

The seminar was conducted by Dr. Md. Kafiul Islam, *Technical Program Chair, ICAEE 2019; Assistant Professor, Department of EEE, School of Engineering & Computer Science, Independent University Bangladesh (IUB)*. The speaker started the session by sharing his experience of different projects those he has been incorporated with. Later, he explained various techniques used for the analysis and processing of biomedical signals as well as different ways of improving the techniques. He discussed elaborately about various types of artefacts found in different Bio-signals recordings including EEG, ECG & EMG and explained different ways to identify these artefacts. He concluded his session by discussing some procedures of rectifying these artefacts including the challenges faced while doing so. Afterwards, an interactive question-answer session took place where enthusiastic participants fulfilled their queries.

The concluding speech was delivered by Dr. Mohammad Hasan Imam, *Counselor, IEEE AIUB Student Branch; Advisor, IEEE EMBS AIUB Student Branch Chapter; Sr. Asst. Professor, Faculty of Engineering, AIUB* who talked about the promising future of Biomedical Engineering and discussed the wide range of research opportunities that Biomedical sector provides in modern times. Afterwards, Dr. Md. Hasan Imam handed over a crest and a certificate to the speaker Dr. Md. Kafiul Islam as token of appreciation and group photo was taken with all the participants. The seminar was graced by the presence of Dr. Md. Humayun Kabir, *Sr. Assistant Professor, Faculty of Engineering, AIUB and* Kawshik Shikder, *Motivator, IEEE AIUB Student Branch; Asst. Professor, Faculty of Engineering, AIUB*.

Workshop on Basic Robotics: Implementing Robo Soccer Module

On October 17, 2019 (Thursday), AIUB Community of Engineering Students (ACES) successfully organized a workshop titled "Basic Robotics: Implementing Robo Soccer Module" which was supported by Frequency Lab at 5th floor, D building, American International University-Bangladesh (AIUB). The goal of the workshop was to provide the basic knowledge of implementing a robo soccer module. The workshop started at 10:00 am. 12 groups, each consisting of four students from different departments of AIUB participated in this workshop.

The instructor of the workshop, Md. Tarikul Islam Juel (*IoT & Embedded system Engineer, Frequency Lab*) started the workshop by discussing the basics of Arduino and showed the Arduino Nano as a sample. Then, he talked about the various serial communication interfaces such as UART, SPI protocol, I2C protocol. After that, he showed the participants how to control led light using various functions of Arduino which are digital pin, digital write, analog read, analog write, pin node and serial design. Furthermore, he explained how to connect all the devices with Arduino. After the lunch break, participants of the workshop were guided to implement H-Bridge topology for implementing the Robo-soccer module. Moreover, each of the groups were provided with Arduino Nano, motors, battery, wheels etc. Using them, each group successfully built and implemented robo soccer module. Later on, Md. Golam Sarowar (*Chairman, Frequency Lab*) and Md. Abdullah Al Muktadir (*Managing Director, Frequency Lab*) shared their experience with the participants. They discussed about the history, progression and future plan of Frequency Lab. They also expressed their interest to organize more workshops to encourage young minds to be more enthusiastic about Robotics. Prof. Dr. A.B.M Siddique Hossain (*Dean, Faculty of Engineering, AIUB*) delivered the closing speech where he talked about the importance of robotics in the modern era. Lastly, token of appreciations was given to the instructor and the guests. Also the participants of the workshop were provided with certificates as an acknowledgement of successful completion of the workshop.

Faculty Research and Publication

Effect of pHs on the Structure Evolution of Platinum Nanoclusters and Their Surface Plasmon Resonance Properties

Author: Dr. Md. Habib Ullah et al.

Brief Description:

Multi-structured platinum nanoclusters have been prepared through a one-step aqueous synthetic process by controlling pHs. The included structures are closely packed 3-dimensional (3D) dendrites, loosely packed 3D dendrites, short-order dendritic chains, long-order dendritic chains, flatten nanoclusters and monodisperse nanoparticles. The high resolution transmission electron microscopy images (HRTEM) display that the nanoclusters with a variety of structures are filled with grains of average size ~2.0 nm. The images of the nanoclusters demonstrated that Pt nanoparticles were not fused to each other, but their aggregations were separated by cetyltrimethylammonium bromide (CTAB). The as-prepared Pt nanomaterials were studied by UV-visible absorption spectroscopy to identify their surface plasmon resonance (SPR) activities. The structure dependent SPR signals have been observed from 200 nm–800 nm.

Source:
https://www.ingentaconnect.com/contentone/asp/jnn/2021/00000021/00000009/art00023

Common Spatial Pattern in Frequency Domain for Feature Extraction and Classification of Multichannel EEG Signals

Author: MOHAMMAD KHURSHED ALAM et al.

Brief Description:

The extraction methodology of the significant features from the signals is one of the most important pre-requisite steps for EEG signal classification. Common spatial pattern (CSP) is a widely used feature extraction method for EEG signal but with a lacking of failing to maintain discriminative features between classes in the time domain, and further as a consequence, ends up in inconvenience with erroneous output. To overcome the limitations of the convention CSP, this research work proposes a novel frequency domain CSP (FCSP) method for feature extraction. This method proposes to convert the time domain EEG signal to its power spectral density (PSD) so that the event-related variation can be found in the frequency domain. After that, the CSP method is applied to the PSD values of the selected channels to extract the variation based on the spatial pattern of the channels for the events. The output of this method helps to extract simple features from the FCSP-PSD data for the classification. The proposed method is applied to motor imagery data from BCI competition IV. To check the applicability of the proposed method, a complex environment was created considering the same lobe events such as combined left and right feet (Class#1) versus right-hand (Class#2) imagery movement. To compare the performance

of the proposed work, the method is also applied to the conventional classification problem (left-hand vs right-hand imagery movement) and found very promising results of 91% accuracy on average.

Source: https://link.springer.com/article/10.1007%2Fs42979-021-00586-9

Primary frequency control of large-scale PV-connected multi-machine power system using battery energy storage system

Author: MOHAMMAD KHURSHED ALAM et al.

Brief Description:

Large-scale grid-tied photovoltaic (PV) station are increasing rapidly. However, this large penetration of PV system creates frequency fluctuation in the grid due to the intermittency of solar irradiance. Therefore, in this paper, a robust droop control mechanism of the battery energy storage system (BESS) is developed in order to damp the frequency fluctuation of the multi-machine grid system due to variable active power injected from the PV panel. The proposed droop control strategy incorporates frequency error signal and dead-band for effective minimization of frequency fluctuation. The BESS system is used to consume/inject an effective amount of active power based upon the frequency oscillation of the grid system. The simulation analysis is carried out using PSCAD/EMTDC software to prove the effectiveness of the proposed droop control-based BESS system. The simulation result implies that the proposed scheme can efficiently curtail the frequency oscillation.

Source: https://ijpeds.iaescore.com/index.php/IJPEDS/article/view/21459

Green Supply Chain Management Practices by Superstores in Bangladesh: A Case Study in Dhaka

Author: Md. Mortuza Ahmmed et al.

Brief Description:

Green Supply Chain Management has emerged as a comparatively newfangled area of supply chain management in Bangladesh. Implementation of green supply chain management practices has been directed by the ever-increasing demand of protection of the environment in various sectors across the country, especially in the capital Dhaka. Several business institutions are dealing with the issue of sustainability in the supply chain by employing green Supply Chain Management .The study analyzes various green logistics practices implemented by different superstores in Dhaka. Primary data were collected through a pre-assigned questionnaire which included questions towards the respondents regarding green logistics practices employed. The respondents of the study were the branch or outlet managers or their counterpart in various

superstores in Dhaka. The sample size of the study was 90 drawn randomly from different locations in Dhaka. Data were analyzed applying Pearson's correlation coefficient, test of significance etc. via SPSS (Statistical Package for Social Science). Significance was determined with p-value ≤ 0.01. Findings of the study revealed highly significant correlation between arrangement of seminar and workshop with management of greening and tree plantation. One limitation of the study was the fact that some of the respondents were a bit diffident to give enough time as the superstores were going through busy schedules most of the time.

Source: https://iiste.org/Journals/index.php/EJBM/article/view/48377

Synthesis of 1-phenyl-3, 4-dihydropyrimidine-2(1H)-ones derivatives under solvent free condition and their antimicrobial activity

Author: Prof. Dr. S. Mosaddeq Ahmed et al.

Brief Description:

We report herein the use of nickel nitrate hexahydrate [Ni(NO3)2.6H2O] as a new catalyst for the one-pot Biginelli like reaction coupling of 1-phenyl thiourea, ethyl acetoacetate and aromatic aldehydes to afford the corresponding 1-phenyl-3,4-dihydropyrimidin-2(1H)-thiones under solvent free condition to avoid the usage of hazardous organic solvents. The synthesized compounds were evaluated for their antimicrobial activity by KIRBY-BAUER disk diffusion method. Most of the compounds showed good to moderate antimicrobial activity.

Source: https://doi.org/10.3329/bjsir.v54i1.40730

One pot synthesis of Biginelli 3,4-dihydro-1H-pyrimidin-2-ones and 1,2,3,4-tetrahydro pyrimidines

Author: Prof. Dr. S. Mosaddeq Ahmed et al.

Brief Description:

A simple and practical route for the Biginelli cyclocondensation reaction using anhydrous ZnCl2 as a catalyst in n-heptane-toluene medium by reaction of substituted benzaldehydes,1a-d (1a=2-ClC6H4-, 1b=2-BrC6H4- and 1c=4-ClC6H4-,1d=2-H3CC6H4-) with 1, 3-dicarbonyl compounds, 2a-b (2a= ethyl acetoacetate and 2b= acetylacetone) and urea or thiourea, 3a-b to give the corresponding Biginelli 3,4-dihydro- 1H-pyrimidin-2-ones and 1,2,3,4-tetrahydro pyrimidines, 4a-d. The structures of the compounds 4a-d were confirmed by their ultraviolet, infrared, 1H NMR, 13C NMR spectra and elemental analyses.

Source: https://doi.org/10.3329/bjsir.v55i3.49390

Michael 1:1 adducts by acid catalyzed reaction during synthesis of spiro and spiroketal compounds

Author: Prof. Dr. S. Mosaddeq Ahmed et al.

Brief Description:

Four Michael 1:1 adducts 2-[1,5-bis-(2-methoxyphenyl)-3-oxo-pent-4-enyl]-cyclohexane-1,3-dione 3a, 2-[1,5-bis-(2-methylphenyl)-3-oxo-pent-4-enyl]-cyclohexane-1,3-dione 3b, 2-[1,5-bis-(2-chlorophenyl)-3-oxo-pent-4-enyl]-cyclohexane-1, 3-dione 3c and 2-[1,5-Bis-(2-chloro-phenyl)- 3-oxo-pent-4-enyl]-5,5-dimethyl-cyclohexane-1,3-dione 3d have been synthesised by the application of Michael reaction between 1, 3-cyclohexanedione 1a or dimedone (5, 5-dimethylcy clohexane-1, 3-dione) 1b and trans,trans diarylideneacetone [1,5-diaryl-1,4-pentadien-3-one] 2a-c using acid catalyst. These adducts may be regarded as the intermediate of spiro [5.5] undecane compounds which can be achieved effectively via intramolecular cyclization of the Michael 1:1 adduct. The structures of the Michael 1:1 adducts 3a-d were determined by their UV, IR, 1H-NMR, 13C-NMR, DEPT-135 spectral data, HRMS and elemental analyses.

Source: https://doi.org/10.3329/bjsir.v55i4.50967

On Gradient Descent and Co-ordinate Descent methods and its variants.

Author: Sajjadul Bari et al.

Brief Description:

This research is focused on Unconstrained Optimization problems. Among a number of methods that can be used to solve Unconstrained Optimization problems we have worked on Gradient and Coordinate Descent methods. Step size plays an important role for optimization. Here we have performed numerical experiment with Gradient and Coordinate Descent method for several step size choices. Comparison between different variants of Gradient and Coordinate Descent methods and their efficiency are demonstrated by implementing in loss functions minimization problem.

Source: https://doi.org/10.53799/ajse.v19i3.103

Combined Item Sets Generation using Modified Apriori Algorithm

Author: A. G. M. Zaman et al.

Brief Description:

Association rule mining is used to find association relationships among data sets. Apriori algorithm is one of the classical algorithms of association rule mining. It generates the association rules from transaction data, such as, if item ‘a’ is bought then what are the chances to buy item

'b'. It uses support and confidence values to generate the association rule. In this paper, we modified the classical apriori algorithm in such way that so we can generate item sets as a package, which have higher possibility to buy together by the customers. To generate these packages, we introduced a new combined support value of the items sets. This combined support value is used along with the apriori algorithm to generate package items within a minimum support value. The generated item sets can also help the decision maker to forming new packages for the customers.

Source: https://dl.acm.org/doi/10.1145/3377049.3377125

Inter-release defect prediction with feature selection using temporal chunk-based learning: An empirical study

Author: Dr. Md Alamgir Kabir et al.

Brief Description:

Inter-release defect prediction (IRDP) is a practical scenario that employs the datasets of the previous release to build a prediction model and predicts defects for the current release within the same software project. A practical software project experiences several releases where data of each release appears in the form of chunks that arrive in temporal order. The evolving data of each release introduces new concept to the model known as concept drift, which negatively impacts the performance of IRDP models. In this study, we aim to examine and assess the impact of feature selection (FS) on the performance of IRDP models and the robustness of the model to concept drift. We conduct empirical experiments using 36 releases of 10 open-source projects. The Friedman and Nemenyi Post-hoc test results indicate that there were statistical differences between the prediction results with and without FS techniques. IRDP models trained on the data of most recent releases were not always the best models. Furthermore, the prediction models trained with carefully selected features could help reduce concept drifts.

Source: https://www.sciencedirect.com/science/article/abs/pii/S1568494621007924

AComNN: Attention enhanced Compound Neural Network for financial time-series forecasting with cross-regional features

Author: Dr. Md Alamgir Kabir et al.

Brief Description:

In recent years, many works spring out to adopt the forecast-based approach to support the investment decision in the financial market. Nevertheless, most of them do not consider mining the hidden patterns in the cross-regional financial time-series. However, the fluctuation in financial markets has always been affected by the global economy, instead of a single market. To

overcome this issue, this article proposes an Attention enhanced Compound Neural Network (AComNN) that can be applied on features of multiple-sources, including different financial markets and economic entities. The proposed novel approach compounds of Artificial Neural Network (ANN), Long Short-Term Memory (LSTM), and self-attention to progressively capture the time-zone-dependent context behind the financial time-series across regions with multiple filters. Thereby, it provides trading signals for supporting the financial investment decision. The proposed AComNN has been applied on the Hong Kong Hang Seng Index (HSI) trend prediction based on various initial features across regions. The experimental result demonstrates that the AComNN achieves the highest average accuracy for the one-day ahead trend prediction over 60%. Besides, it reveals highly superior competitiveness on the forecasting capability improved by 13.36% on average compared with the baselines. Therefore, we encourage to adopt the proposed method to the practitioners and provide a new thought, considering the analysis of cross-regional features, in the financial time-series forecasting.

Source: https://www.sciencedirect.com/science/article/abs/pii/S1568494621005706

Evaluating the effects of similar-class combination on class integration test order generation

Author: Dr. Md Alamgir Kabir et al.

Brief Description:

Context: In integration testing, the order in which classes are integrated and tested is significant for the construction of test stubs. With the existing approaches, it is usually difficult to generate the sub-optimal test orders for real applications, which have large numbers of classes. Objective: There exist moderately large numbers of classes in software systems, which is one of the main factors that complicate the generation of class integration test order (CITO). The main objectives of this study are reducing the problem space for CITO generation, and minimizing the stubbing cost of the generated test orders. Method: The approach proposed in this study is based on the hypothesis that similar-class combination can remove class dependencies and yield a smaller problem space. Identical class dependence and symmetric classes are the two main properties that are used to identify similar classes. In addition, a new cycle-breaking algorithm is introduced to minimize the stubbing cost of the generated test orders, which fully considers the two factors (number of test stubs and the corresponding stubbing complexity) that affect the overall stubbing cost. Empirical experiments are conducted on nine open-source Java programs to evaluate the performance of the proposed approach. Results: With similar-class combination, the proposed approach reduced the numbers of classes and class dependencies by over 10% and 6%, respectively, for six programs. Moreover, for four programs, the proposed approach reduced the number of cycles among class dependencies by more than 20%. The cycle-breaking algorithm achieved reduction of more than 13% in the stubbing cost, thus outperforming other competing techniques. Conclusions: The proposed method relies on the two aforementioned important

properties to identify similar classes, and these properties are known to significantly improve the performance of CITO generation. The results obtained in this study confirmed the capability of the proposed approach in terms of minimizing the number of classes and class dependencies in programs. It outperformed other competing methods in minimizing the stubbing costs of the generated test orders.

Source: https://www.sciencedirect.com/science/article/abs/pii/S0950584920301919

COSTE: Complexity-based OverSampling TEchnique to alleviate the class imbalance problem in software defect prediction

Author: Dr. Md Alamgir Kabir et al.

Brief Description:

Context: Generally, there are more non-defective instances than defective instances in the datasets used for software defect prediction (SDP), which is referred to as the class imbalance problem. Oversampling techniques are frequently adopted to alleviate the problem by generating new synthetic defective instances. Existing techniques generate either near-duplicated instances which result in overgeneralization (high probability of false alarm,) or overly diverse instances which hurt the prediction model's ability to find defects (resulting in low probability of detection,). Furthermore, when existing oversampling techniques are applied in SDP, the effort needed to inspect the instances with different complexity is not taken into consideration. Objective: In this study, we introduce Complexity-based OverSampling TEchnique (COSTE), a novel oversampling technique that can achieve low and high simultaneously. Meanwhile, COSTE also performs better in terms of and , two effort-aware measures that consider the testing effort. Method: COSTE combines pairs of defective instances with similar complexity to generate synthetic instances, which improves the diversity within the data, maintains the ability of prediction models to find defects, and takes the different testing effort needed for different instances into consideration. We conduct experiments to compare COSTE with Synthetic Minority Oversampling TEchnique, Borderline-SMOTE, Majority Weighted Minority Oversampling TEchnique and MAHAKIL. Results: The experimental results on 23 releases of 10 projects show that COSTE greatly improves the diversity of the synthetic instances without compromising the ability of prediction models to find defects. In addition, COSTE outperforms the other oversampling techniques under the same testing effort. The statistical analysis indicates that COSTE's ability to outperform the other oversampling techniques is significant under the statistical Wilcoxon rank sum test and Cliff's effect size. Conclusion: COSTE is recommended as an efficient alternative to address the class imbalance problem in SDP.

Source: https://www.sciencedirect.com/science/article/abs/pii/S0950584920301889

A Drift Propensity Detection Technique to Improve the Performance for Cross-Version Software Defect Prediction

Author: Dr. Md Alamgir Kabir et al.

Brief Description:

In cross-version defect prediction (CVDP), historical data is derived from the prior version of the same project to predict defects of the current version. Recent studies in CVDP focus on subset selection to deal with the changes of the data distributions. No prior study has focused on training data arriving in streaming fashion across the versions where the significant differences between versions make the prediction unreliable. We refer to this situation as Drift Propensity (DP). By identifying DP, necessary steps can be taken (e.g., updating or retraining the model) to improve the prediction performance. In this paper, we investigate the chronological defect datasets and identify DP in the datasets. The no-memory data management technique is employed to manage the data distributions and a DP detection technique is proposed. The idea behind the proposed DP detection technique is to monitor the algorithm's error-rate. The DP detector triggers DP, warning, and control flags to take necessary steps. The proposed technique is significantly superior in identifying the distribution differences (p-value <; 0.05). The DP's identified in the data distributions achieve large effect sizes (Hedges' g ≥ 0.80) during the pair-wise comparisons. We observe that if the error-rate exponentially increases, it causes DP, resulting in prediction performance deterioration. We thus recommend researches and practitioners to address DP in the chronological datasets. Due to its potential effects in the datasets, the prediction models could be enhanced to get the best results in CVDP.

Source: https://ieeexplore.ieee.org/abstract/document/9202527/

Training Data Selection Using Ensemble Dataset Approach for Software Defect Prediction

Author: Dr. Md Alamgir Kabir et al.

Brief Description:

Cross-project defect prediction (CPDP) is using due to the limitation of within project defect prediction (WPDP) in Software Defect Prediction (SDP) research. CPDP aims to train one project data to predict another project using the machine learning technique. The source and target projects are different in the CPDP setting, because of various structured source-target projects, sometimes it may not be a perfect combination. This study represents a categorical data set ensemble technique, where multiple data sets have been aggregated for source data instead of using a single data set. The method has been evaluated on nine data sets, taken from the publicly accessible repository with two performance indicators. The results of this data set ensemble approach show the improvement of the prediction performance over 65% combinations compared with traditional CPDP models. The results also show that same categories (homogeneous) train-test data set pairs give high performance; otherwise, the prediction

performances of different category data sets are mostly collapsed. Therefore, the proposed scheme is recommended as an alternative to predict defects that can improve the prediction of most of the cases compared with traditional cross-project SDP models.

Source: https://link.springer.com/chapter/10.1007/978-3-030-52856-0_19

A Heuristic Approach to Break Cycles for the Class Integration Test Order Generation

Author: Dr. Md Alamgir Kabir et al.

Brief Description:

It is a general objective to minimize overall stubbing cost when performing class integration test order generation. Existing approaches are unable to obtain a cost-optimal class test order, this is largely due to the lack of a comprehensive analysis on the factors that affect overall stubbing cost, i.e., the number of required test stubs and the corresponding stubbing complexity. To address this issue, we propose an approach called HBCITO (Heuristic approach to Break Cycles for the class Integration Test Order generation). Given a set of removed dependencies, a heuristic algorithm is employed to search for a near ideal set of class dependencies. Such dependencies break the same or greater number of cycles as the initialized dependencies but attract less stubbing cost. The experimental results show that HBCITO is capable of generating class test orders with significantly lower stubbing cost compared with other approaches.

Source: https://ieeexplore.ieee.org/abstract/document/8754218

Assessing the Significant Impact of Concept Drift in Software Defect Prediction

Author: Dr. Md Alamgir Kabir et al.

Brief Description:

Concept drift is a known phenomenon in software data analytics. It refers to the changes in the data distribution over time. The performance of analytic and prediction models degrades due to the changes in the data over time. To improve prediction performance, most studies propose that the prediction model be updated when concept drift occurs. In this work, we investigate the existence of concept drift and its associated effects on software defect prediction performance. We adopt the strategy of an empirically proven method DDM (Drift Detection Method) and evaluate its statistical significance using the chi-square test with Yates continuity correction. The objective is to empirically determine the concept drift and to calibrate the base model accordingly. The empirical study indicates that the concept drift occurs in software defect datasets, and its existence subsequently degrades the performance of prediction models. Two types of concept drifts (gradual and sudden drifts) were identified using the chi-square test with Yates continuity correction in the software defect datasets studied. We suggest concept drift should be considered by software quality assurance teams when building prediction models.

Source: https://ieeexplore.ieee.org/abstract/document/8754363

Revisiting the class imbalance issue in software defect prediction

Author: Dr. Md Alamgir Kabir et al.

Brief Description:

Software defect prediction is related to the testing area of software industry. Several methods have been developed for the prediction of bugs in software source codes. The objective of this study is to find the inconsistency of performance between imbalances and balance data set and to find the distinction of performance between single classifier and aggregate classifier (voting). In this investigation, eight publicly available data sets have collected, also seven algorithms and hard voting are used for finding precision, recall and F-1 score to predict software defect. In these collected data, two sets are almost balanced. For this investigation, these balanced data sets have converted into imbalanced sets as average non-defective and defective ratio of the other 6 data sets. The experiment result shows that performance of the two balanced data sets is lower than other six sets. After conversion of two data sets, the performance has increased as like as other six data sets. Another observation is the performance metric that shows the results of precision, recall and F1-score for voting are 0.92, 0.84 and 0.87 respectively, which are better than other single classifier. This study has been able to shows that- imbalance of non-defective and defective classes have a big impact on software defect prediction and the voting is the best performer among the classifiers.

Source: https://ieeexplore.ieee.org/abstract/document/8679382

A Proposed Model for Bengali Named Entity Recognition Using Maximum Entropy Markov Model Incorporated with Rich Linguistic Feature Set.

Author: Fahmida Alam et al.

Brief Description:

Named Entity Recognition (NER) is a subpart of Information Extraction task that helps to find named entities and their class in a document. This is one of the fundamental tasks for many natural language processing tasks. NER categorizes the named entities in some predefined class like person, name, organization, date, number etc. In this paper, we have proposed a model to recognize the named entities from Bengali language. Three major approaches are followed to recognize named entities. They are rule-based approach, machine learning based approach and hybrid approach. Most of the existing Bengali named entity recognition model followed machine learning approaches. Existing work done on Conditional Random Forest (CRF), Support Vector Machine (SVM) and Hidden Markov Model (HMM) etc. As. Bengali is a complex language enriched with complex linguistic feature set., in this paper we have adopted a Maximum Entropy Markov Model (MEMM) based machine learning approach that can deal with complex sequences better than other approaches to classify the named entities from Bengali language. Also, we have described a rich linguistic feature set for training our model.

Source: https://dl.acm.org/doi/abs/10.1145/3377049.3377117

Design of an Automated Non-Invasive Electromechanical Ventilator with Feedback Mechanism

Author: Rethwan Faiz et al.

Brief Description:

In medical care, ventilation provides a vital life support function for patients suffering from chronic breathing disorders or unable to breathe for themselves. Control system that delivers oxygen to such patients are still underdeveloped and mostly causes discomfort rather than easing the pain. This paper proposes the design and simulation of a noninvasive electromechanical ventilator that is capable of generating automatic feedback response based on respiratory rate (RR) and oxygen saturation (SPO 2) measurement. The automated response system can provide effective inspiration to expiration ratio of a patient for different levels of SPO 2 and RR with 3% error rate. The domain of automatic response of the mechanism ranges over 1:2 to 1:4 of inspiration to expiration ratio of a patient for different levels of SPO 2 and RR. The algorithm develops to measure RR is based on the ECG signal where number of R-peaks were identified within 10 seconds time interval. Hence this design is idle for patients as it nullifies post ventilation breathing trauma and most importantly allows them to use it without prior medical knowledge.

Source: https://ieeexplore.ieee.org/abstract/document/9391917

Solar Powered Tea Harvester with Isolated Charging Station in Sylhet, Bangladesh

Author: Rethwan Faiz et al.

Brief Description:

This paper proposes a modeling of the solar powered tea harvester with isolated charging station. The objective of this prototype is to harvest tea leaves from tea plant in a convenient manner by using solar power-based tea harvester. The system is operated by a DC battery, where the DC battery is charged up via an isolated charging station. This model is developed by using MATLAB Simulink program and Proteus 8 professional. The charging station consists of PV panel, Maximum Power Point Tracking (MPPT) controller, DC to DC converter and a solar charge controller. Solar panel produces power from solar energy which is fed to DC to DC converter to ensure an appropriate voltage for battery charging. Here the MPPT controller makes sure the output has maximum power to utilize the solar energy properly which ensures proper charging of the loaded battery much faster.

Source: https://ieeexplore.ieee.org/document/9331151

Reliability Analysis of Different Cell Configurations of Lithium-Ion Battery Pack

Author: Rethwan Faiz et al.

Brief Description:

To infer and predict the reliability of the remaining useful life of a lithium-ion (Li-ion) battery is very significant in the sectors associated with power source proficiency. As an energy source of electric vehicles (EV), Li-ion battery is getting attention due to its lighter weight and capability of storing higher energy. Problems with the reliability arises while li-ion batteries of higher voltages are required. As in this case several li-ion cells are connected in series and failure of one cell may cause the failure of the whole battery pack. In this paper, Firstly, the capacity degradation of li-ion cells after each cycle is observed and secondly with the help of MATLAB 2016 a mathematical model is developed using Weibull Probability Distribution and Exponential Distribution to find the reliability of different types of cell configurations of a non-redundant li-ion battery pack. The mathematical model shows that the parallel-series configuration of cells is more reliable than the series configuration of cells. The mathematical model also shows that if the discharge rate (C-rate) remains constant; there could be an optimum number for increasing the cells in the parallel module of a parallel-series configuration of cells of a non-redundant li-ion battery pack; after which only increasing the number of cells in parallel module doesn't increase the reliability of the whole battery pack significantly.

Source: http://ajse.aiub.edu/index.php/ajse/issue/view/

Analysis of Micro Duty Cycle Techniques for Efficient SMAC

Author: Dr. Md. Sohidul Islam et al.

Brief Description:

Wireless Sensor Network commonly known as WSN is drawing attention for the researchers as it has a vast area of applications. Also, WSN's continuously improving. Among all of those lacking, the power drainage of a WSN is a prior issue that lies within the Medium Access Control (MAC) layer. In this paper, a theoretical improvement in the MAC layer of WSN has been proposed, as MAC is accountable for the energy-affecting functioning. This paper precisely focuses on improving Sensor Medium Access Control (SMAC) by breaking its fixed duty cycles into micro duty cycles with a variable time mechanism. The investigation has been done thoroughly considering the standard SMAC in order to extort proposed strategies for energy efficient SMAC analyzing fundamental performance parameters such as energy savings, duty cycle and average sleep delay considering the sleep time analysis. It has been found that the least sleep time as micro duty cycle performs better to save energy instead listen time.

Source: https://ieeexplore.ieee.org/document/9331073

Design and analysis of a highly sensitive octagonal hollow core photonic crystal fiber for chemical sensing

Author: Dr. Md. Sohidul Islam et al.

Brief Description:

Due to the dire need to monitor, sense, and control useful and harmful chemicals for industrial, environmental, and biomedical purposes, chemical sensing has become an eminent topic among researchers. Hence, we focus mainly on a modified kagome design with a relatively high sensitivity of 99.8%, effective material loss of 0.000263 cm − 1 for constant absorption loss, and 0.0004204 per cm for variable absorption loss and low confinement loss of 2.117 × 10 E − 17 1/cm investigated with the help of the full vector finite element method in Comsol multiphysics using water, ethanol, and benzene as analytes while considering other parameters, such as nonlinearity, dispersion, numerical aperture, and effective area which are equally investigated and discussed. The results obtained are tabulated and compared with recent works published.

Source:

https://www.spiedigitallibrary.org/journals/journal-of-nanophotonics/volume-14/issue-03/036014/Design-and-analysis-of-a-highly-sensitive-octagonal-hollow-core/10.1117/1.JNP.14.036014.full?SSO=1

Fundamental Capacity Analysis for Identically Independently Distributed Nakagami-q Fading Wireless Communication

Author: Dr. Md. Sohidul Islam et al.

Brief Description:

With the advancement in technology, decent trans-fer rate of data for fast communication is an exigency. Different distributions on different wireless communication channels have been used previously to model them and to do performance analysis on the systems. In this work, capacity analysis of iden-tically independently distributed Nakagami-q fading single-input multiple-output (SIMO) wireless communication is presented. The derivation of channel capacity with the analytical solution have been conducted using small limit argument approximation. Where the small limit argument approximation corresponds to the low signal-to-noise ratio (SNR) regime. SIMO channel capacity behavior with respect to number of receiver antennas and with respect to SNR have been explored in depth. The improvement of capacity is depicted rigorously. It has been found that using Nakagami-q distribution, capacity of the system increases as number of receiver antenna increases. It is also found that the capacity of this SIMO wireless system can be further improved through changing of certain parameters

Source:
https://thesai.org/Publications/ViewPaper?Volume=11&Issue=9&Code=IJACSA&SerialNo=78

Data Rate Limit in Low and High SNR Regime for Nakagami-q Fading Wireless Channel

Author: Dr. Md. Sohidul Islam et al.

Brief Description:

Adequate data rate is always desired in wireless communication channels. Previously, few fading models were used to model wireless communication channels and to perform analysis on them. In this paper, analyses of data rate limit of single-input single-output (SISO) wireless communication system over Nakagami-q fading channels are presented. The calculation of capacity has been carried out using small and large limit argument approximations. The analytical solution for channel capacity is presented using small and large limit argument approximations. Where small and large limit argument approximation correspond low and high signal-to-noise ratio (SNR) regime. Behavior of channel capacity with respect to SNR and fading parameter respectively has been investigated deeply. The comparison of the channel capacity behavior for both low SNR and high SNR regime and have also been done and analyzed. It has found that the channel capacity increased with increasing SNR in low SNR regime. The channel capacity also behaves in the same manner in high SNR regime as well.

Source:
https://thesai.org/Publications/ViewPaper?Volume=11&Issue=7&Code=IJACSA&SerialNo=76

Low Loss Topas Based Porous-Core single-mode Photonic Crystal Fiber for THz Communications

Author: Dr. Md. Sohidul Islam et al.

Brief Description:

In this paper, an extremely low loss hybrid hexagonal porous core and octagonally structured circular cladding photonic crystal fiber (PCF) for low loss terahertz (THz) wave propagation has been designed and proposed. We have analyzed ultralow effective material loss (EML), high core power fraction and ultra-flattened dispersion in our proposed design. To investigate the transmission characteristics, perfectly matched layer (PML) is used in the outer boundary of the PCF. At an operating frequency of 1 THz, this design exhibits a low effective material loss of 0.045 cm-1 at a high core power fraction of 58.2% with 88% porosity. The proposed PCF shows dispersion variation of 0.225 ps/THz/cm. Also, this designed PCF can operate in single-mode condition successfully. It is anticipated that designed PCF can be employed in applications such as fiber optics communications, sensing and spectroscopy.

Source: http://op.niscair.res.in/index.php/IJPAP/article/view/23597

Employees Perception On Training Effectiveness – A Study On Garments Industry Of Bangladesh

Author: Samia Shabnaz et al.

Brief Description:

The garments sector of Bangladesh contributes significantly to the GDP by creating about 4.2 million employment opportunities. This industry is now facing new challenges due to the fast globalization and technological development. For gaining a major source of competitive advantage in a global market organization need to improve capabilities, knowledge and skill of the talented workforce. Thus, to cope with their challenges, effective training program are needed by all manufacturing organization. Training effectiveness depends on few things and these are trainer's knowledge and capabilities, deliverable methods of trainers, training contents and objectives. Several studies highlighted the importance of training on the employee performance through the learning process. This study focused on the perception of employees on effectiveness of the training program and identified the relation of variables with training effectiveness perception. Self-developed questionnaire using Likert Scale was used to collect data from the sample size of 100 to do the study. The results were generated using SPSS Ver. 20 where Crosstab, frequency table was used . It is evident in this research that there is significant relationship exists with gender, education level and training frequency with the employee's perception regarding the effectiveness of training program. The study will help the garments industry to design training program by focusing on factors which influences the perception of the employees regarding training effectiveness.

Source: https://ajbe.aiub.edu/index.php/ajbe/issue/view/ajbe172

Budgerigars adopt robust, but idiosyncratic flight paths

Author: Dr. Debajyoti Karmaker et al.

Brief Description:

We have investigated the paths taken by Budgerigars while flying in a tunnel. The flight trajectories of nine Budgerigars (Melopsittacus undulatus) were reconstructed in 3D from high speed stereo videography of their flights in an obstacle-free tunnel. Individual birds displayed highly idiosyncratic flight trajectories that were consistent from flight to flight over the course of several months. We then investigated the robustness of each bird's trajectory by interposing a disk-shaped obstacle in its preferred flight path. We found that each bird continued to fly along its preferred trajectory up to a point very close to the obstacle before veering over the obstacle rapidly, making a minimal deviation to avoid a collision, and subsequently returning to its original path. Thus, Budgerigars show a high propensity to stick to their individual, preferred flight paths even when confronted with a clearly visible obstacle, and do not adopt a substantially different, unobstructed route. The robust preference for idiosyncratic flight paths, and the tendency to

pass obstacles by flying above them, provide new insights into the strategies that underpin obstacle avoidance in birds. We believe that this is the first carefully controlled study of the behaviour of birds in response to a newly introduced obstacle in their flight path. The insights from the study could also have implications for conservation efforts to mitigate collisions of birds with man-made obstacles.

Source: https://www.nature.com/articles/s41598-020-59013-3

Image denoising with weighted orientation-matched filters (worm)

Author: Dr. Debajyoti Karmaker et al.

Brief Description:

Real world signals commonly exhibit slow variations or oscillations, punctuated with rapid transients. For example, images typically have smooth regions interrupted by edges or abrupt changes in contrast. These abrupt changes are often the most interesting parts of the data perceptually, as well as in terms of the information that they provide. Some of the high frequency content represents the important abrupt changes in image intensity that are associated with real edges of objects in the image. However, some of the high-frequency content also comprises the noise that is present in the image. We wish to retain this edge information, while removing the noise. In this paper, we present a dynamic filtering process where the dynamic mask is oriented to match the local gradients and its weights are proportional to the magnitude of the local gradients.

Source: https://ieeexplore.ieee.org/abstract/document/8665336

The Bird Gets Caught by the WORM: Tracking Multiple Deformable Objects in Noisy Environments Using Weight ORdered Logic Maps

Author: Dr. Debajyoti Karmaker et al.

Brief Description:

Object detection and tracking are active and important research areas in computer vision as well as neuroscience. Of particular interest is the detection and tracking of small, poorly lit, deformable objects in the presence of sensor noise, and large changes in background and foreground illumination. Such conditions are frequently encountered when an animal moves in its natural environment, or in an experimental arena. The problems are exacerbated with the use of high-speed video cameras as the exposure time for high-speed cameras is limited by the frame rate, which limits the SNR. In this paper we present a set of simple algorithms for detecting and tracking multiple, small, poorly lit, deformable objects in environments that feature drastic changes in background and foreground illumination, and poor signal-to-noise ratios. These novel algorithms are shown to exhibit better performance than currently available state-of-the art algorithms.

Source: https://ieeexplore.ieee.org/abstract/document/8665336

An Inverse Differential Game Approach to Modelling Bird Mid-Air Collision Avoidance Behaviours

Author: Dr. Debajyoti Karmaker et al.

Brief Description:

In this paper, we investigate an inverse differential game approach to modelling the mid-air collision avoidance behaviours of birds. We propose a general method for estimating the cost-functional parameters of a noncooperative differential game from partial-state measurements of an open-loop Nash equilibrium. We apply the method to data of birds performing mid-air collision avoidance. Our analysis suggests that a differential game model provides a close description of the observed bird behaviours, and could provide new insights for the design of collision avoidance strategies for unmanned aircraft.

Source: https://ieeexplore.ieee.org/abstract/document/8665336

WHoG: A weighted HoG-based scheme for the detection of birds and identification of their poses in natural environments

Author: Dr. Debajyoti Karmaker et al.

Brief Description:

We describe a technique for object detection that uses a combination of global shape descriptors and local point descriptors. Our system is able to represent pose using a global shape descriptor, rather than the commonly used part based representation. This approach considerably reduces computational complexity and achieves a significant performance improvement on an extensive dataset: CUB200-2011 [31]. Our methodology is valuable for the detection of textured objects that are viewed against background clutter and possess a high degree of articulation and variation of pose, as for example in birds. We demonstrate how high and low frequency gradients can be separated to better deal with the presence of interfering textures or stripes within the body, which is a major problem in the detection of bird-like objects. Furthermore, detection accuracy is improved by integrating appropriately designed scale invariant color features into the algorithm.

Source: https://ieeexplore.ieee.org/abstract/document/8665336

Banking Queue Waiting Time Prediction based on Predicted Service Time using Support Vector Regression

Author: Dr. Kamruddin Nur et al.

Brief Description:

Prediction using different machine learning approaches have been applied in the last few decades in different areas and research fields. Waiting time is an undeniable fact for every queue and it is very important to develop a system that predicts its duration in real life with minimum error. In this paper we applied several machine learning algorithms and among them we chose Support Vector Regression (SVR) in a real-life Banking queue dataset that contains real-life queues of multiple Banks where we predicted waiting time for everyone in the queue. Moreover, we have compared the result of prediction using SVR with different classifications and clustering methods such as K-nearest-neighbor and K means Clustering. We have shown the feasibility of applying SVR in prediction of waiting time in banking queues of developing countries for everyone, which is applicable, and it performs well in queue analysis.

Source: https://ieeexplore.ieee.org/document/9051490

Qualitative Study of Contention-aware Scheduling Algorithm for Asymmetric Multicore Processors

Author: Dr. Kamruddin Nur et al.

Brief Description:

For last few decades, multitasking is at its highest demand. To achieve multitasking, symmetric & asymmetric multi-core processors system is a popular technology. Asymmetric multi-core processors (AMPs) use the same instruction set architecture (ISA) but different clock frequency. It is shown that AMPs deliver better performance per watt comparing to its symmetric counterpart. The future multi-core system will combine a few fast cores & many slow cores. Fast core means high power consumption with complex pipelines and high clock frequency, where the slow core will have low power consumption with simple pipelines and low clock frequency. To get the best performance from the asymmetric multi-core processors, the best scheduling policy will play an important role. Scheduling co-running applications in the most suitable core types are very vital for AMPs to get its best performance. Various policies like contention-aware, parallelism-aware & asymmetric-aware need to be considered when developing a scheduling algorithm. For AMPs, contention for resource sharing is a key performance-limiting factor. Despite noteworthy research efforts, the contention for resource sharing in the multi-core processor remains unsolved. In this paper, we discuss the latest five contention-aware scheduling algorithms of AMPs. We present a comparative study exploiting the technique, parameter & performance improvement so that the future computer scientist can develop a contention-aware solution more precisely.

Source: https://dl.acm.org/doi/10.1145/3377049.3377135

A Machine Learning Approach to Identify Potential Customer Based on Purchase Behavior

Author: Dr. Kamruddin Nur et al.

Brief Description:

To lift the revenue boundary and stay ahead of the competitors it is important to understand customer's purchase behavior. Different business industries proposed different policies to explore the potentiality of a customer based on statistical analysis. In this paper, we rather propose a machine learning approach to identify potential customers for a retail superstore. The paper proposed an engineered approach to classify potential customer, based on previously recorded purchase behavior. Using this classification as ground truth, we then apply machine learning algorithms to find a pattern to predict potential customers with an accuracy of 99.4%.

Source: https://ieeexplore.ieee.org/document/8644458

OTP Based Cardless Transction using ATM

Author: Dr. Kamruddin Nur et al.

Brief Description:

Banks provide ATM cards to customer to avail the services like cash withdrawal, PIN change, balance inquiry etc. But physical cards have some problems. It can be stolen, skimmed, cloned, hijacked, damaged or expired. Due to this problem, we need to think an alternate way to provide better security. Many researchers are thinking about cardless transaction through ATM. Iyabode et. al. [1] proposed a conceptual model for cardless Electronic ATM through which customer can do cash withdrawal, balance inquiry, fund transfer etc. We have analyzed their protocol and found some flaws on this. This protocol doesn't specify what if it is off us transaction. Besides, customers get different categories of services but this protocol cannot determine which customer will get which category of services. That is why, inspired by this protocol we have proposed a modified model for getting same transaction facilities as exists which uses BPIN that will determine the bank identity (B) and a random Personal Identification Number (PIN) and One Time Password for authentication of the customer instead of biometric fingerprint because of major disadvantage of biometric authentication. And obviously it will use no card for accomplishing the transaction.

Source: https://ieeexplore.ieee.org/document/8644248

Design and Development of a Low-cost Smart Stick for Visually Impaired People

Author: Dr. Kamruddin Nur et al.

Brief Description:

One of the biggest problem faced by visually impaired people is to navigate from one place to another. They always need human support for moving either indoors or outdoors. The unfavorable conditions of the environment make it more complicated for visually impaired people. A blind person always needs to be alert to get off the situations like crashing with obstacles, holes, staircases, slipping down wet territory. Also, in case of any emergency, they might want to send an alert message to their families or friends nearly their location. Considering the above, in this paper, we have addressed all these issues and provides a solution to assist visually impaired people so that they can live without the much help of others. The Ultrasonic sensor of this system helps blind people to detect obstacles, hole, and staircase alongside water sensor is used to detect the water. The buzzer is placed at the smart stick which provides a sound when any obstacle is identified. The GPS and GSM module of this device assists peoples to obtain the specific location of the smart stick. In the system, Arduino UNO is used as a controller of the device. The proposed smart stick is a low-cost device with faster response, user-friendly, and low energy consumption.

Antenna Design & Fabrication for Biotelemetry Applications

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

This research work assumes the role of designing a Micro-strip patch antenna that exists with in the band range of 402 MHz to 405 MHz, which was considered as medical implantable communication systems (MICS) band and can be possibly implanted at human body phantom model because of its flexiblility and lower radiation characteristics. CST Microwave studio was used for designing the patch antenna and the human body phantom model with the existence of homogeneous layers (fat, skin and muscle) and the final version was fabricated. Being highly flexible, FR4 was chosen as a substrate to maintain 0.5 mm thickness throughout. For the ground and patch, copper material was selected having thickness of 0.018 mm. For the ease of fabrication and biocompatibility, silicon was selected with the thickness of being 8 mm. Maximum specific absorption rate of the proposed antenna was obtained 0.588 W/Kg for 10g tissue. Various Parameters such as VSWR, S11, Radiation efficiency, Total efficiency were found 1.1889, -21.28 dB, -45.71 dB, -45.74 dB respectively inside body phantom that ensure the antenna design was efficiently and effectively suitable for biotelemetry system which is body implantable. After fabrication the value of S11 is found -12.43 dB in open space with 453 MHz frequency.

Source: http://ijece.iaescore.com/index.php/IJECE/article/view/22165

Performance of a 5G MIMO Antenna for Detecting Damaged Lungs of Pneumonia Patients Related to Covid-19

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

Currently, world is facing COVID-19 pandemic where a huge number of people gets affected each day and dies. Various symptoms are visible in a COVID-19 affected patient. One of them is short and long-term effect on lung. Hence, in this situation conventionally people are using X-ray to detect lung affection. In this paper, the proposed antenna will help in faster detection of pneumonia affected lung due to COVID-19. In this paper, the proposed model inset fed multiple-input-multiple-output (MIMO) Microstrip patch antenna with a small size of mm is proposed for 38 GHz (Ka-band) which is in 5G frequency bands. The dimension of antenna is 3.561mm*2.449mm* 0.254mm and the main substrate of Rogers RT 5880 and a superstate of polyimide film. The antenna is placed on both normal lung phantom and affected lung phantom. Simulation results of S11, Directivity and SAR shows comparatively better values. Eventually, it can be said that the antenna has the potentiality to help in detection of affected lung.

Source: https://www.ijser.org/onlineResearchPaperViewer.aspx?Performance-of-a-5G-MIMO-Antenna-for-Detecting-Damaged-Lungs-of-Pneumonia-Patients-Related-to-Covid-19.pdf

In Body Antenna for Monitoring and Controlling Pacemaker

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

This paper is an extension of work originally presented in 2019 International Conference on Automation, Computational and Technology Management (ICACTM). A micro-strip patch in-body designed antenna is constructed on pacemaker to monitor and control the pacemaker wirelessly. The antenna is intended for ISM (Industrial, Scientific, and Medical) band (2.4 GHz to 2.48 GHz). A perfect electric conductor (PEC) is considered as pacemaker body and used as the ground of the propounded antenna having dimensions 40 x 30 x 10 mm3. The patch material is chosen Copper having dimensions 35 x 22 x 0.1 mm3 and covered up with substrate material Rogers R03010 (loss tangent δ = 0.0035 and dielectric constant, r = 10.2) with thickness of 1.55 mm to make it compatible in human body. The designed antenna is placed and analyzed in 2/3 muscle equivalent phantom by changing the depth of the antenna. Results disclose that operating frequency is 2.464 GHz with reflection coefficient -28.37 dB. The antenna maintains frequency range from 1.8075 GHz to 3.445 GHz, which represents wide bandwidth of 1.6375 GHz. To ensure the human body safety, specific absorption rate is analyzed and found 0.937 W/Kg for 10g tissue at operating frequency, which makes it biocompatible. The surface current distribution, Voltage

Standing Wave Ratio, Current density, far-field radiation characteristics, radiation efficiency, and total efficiency are investigated to analyze the effect and performance of the designed antenna. CST Microwave Studio is used for simulation and analysis the parameters of the antenna.

Source: https://astesj.com/v05/i02/p09/

On body E-shaped Patch Antenna for Biomedical Application

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

An E-shaped micro strip patch antenna is designed and analyzed in this paper which operates in MICS (402.0-406.0MHz) band. The Performance has been observed on a body of human phantom model as well as in free space with different conducting material for the designed antenna. The height of this antenna is taken 1.5mm from the ground plane. At resonance frequency of 405 MHz the S11 parameter is obtained in free space is -23.26dB for conducting material of aluminum and -17.96dB is measured on human phantom body at 405 MHz of resonance frequency. FR4 is used as substrate material. The Specific Absorption Rate (SAR) is found to be 0.3562 W/kg by placing the antanna on human phantom model. VSWR and directivity has been analyzed also.

Source: http://section.iaesonline.com/index.php/IJEEI/article/view/516

On-Body Circular Patch Antenna for Breast Cancer Detection

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

Breast Cancer is one of the deadliest forms of cancer faced by women every year. Despite having medical methods like Mammography, MRI and ultrasound available, they have various limitations due to poor tissue contrast. This results in misdiagnosis of breast cancer patients all over the world. The purpose of this paper is to detect the presence of breast cancer tumors in women by the variation of S11 parameter of a microstrip patch antenna. To reach the desired goal, a circular microstrip patch antenna has been designed in ISM band along with two types of breast phantoms in order to detect the presence of cancerous tumors. The antenna along with the breast phantoms have been created using CST design environment and its various parameters i.e. reflection coefficient, efficiency, SAR have been evaluated to reach the goal set by this paper.

Source: doi.org/10.15864/ajec.1113

Design of an On-Body Rectangular Microstrip Patch Antenna for the Diagnosis of Breast Cancer Using S-Band

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

A common cause of death of women is Breast Cancer and Tumors, and it is difficult to detect both of these at the early stage due to their minimal structure. Microwave Imaging is one of the effective techniques among the current and past methods. In this paper, a compact size microstrip patch antenna has been designed in CST Studio Suite Software for microwave imaging to diagnose breast cancer using the FR-4 (Lossy) substrate material with a resonant frequency of 2.3 GHz (S-band), varying from 1.5 GHz to 3 GHz. A feedline fed the antenna's radiating patch, which is rectangular in size. The breast model with tumors was designed in the CST consisting of skin, fat, glandular, and cancer affected tissues. A Return Loss (S1,1) value of −37.28 dB and −45.72 dB were obtained in free space and after applying the antenna in the cancer affected breast phantom, respectively. Other obtained output parameter values such as Directivity (2D and 3D), Radiation Efficiency, Polar Radiation, etc., are also presented in this paper, showing that the antenna model would be a better option for breast cancer diagnosis.

Source: https://doi.org/10.1007/978-981-16-1781-2_89

Performance Analysis of Microstrip Patch Antenna for the Diagnosis of Brain Cancer & Tumor using the Fifth- Generation Frequency Band

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

Brain Cancer and Tumors are common death factors over the world. Determining the location of a brain tumor at an early stage is difficult due to its minimal size and some disadvantages of the mechanisms used for the diagnosis of the brain tumor. In this paper, a Rectangular Microstrip Patch Antenna has been designed for Microwave Imaging (MI) with a frequency range of 1.5 GHz to 3 GHz at a resonant frequency of 2.3 GHz (5G-Band) in the CST Studio Suite Software to identify brain tumors. FR-4 Substrate material has been used to design the Antenna. The Antenna dimension that has been designed in this paper is 60.46*78.73*1.7 mm 3 and the radiating patch of the Antenna was fed by a feedline, which is rectangular in size. The human brain phantom has been created in the CST software with six different homogenous layers of skin, fat, skull, dura, CSF (Cerebrospinal Fluid), and the Brain. Besides, a 5mm tumor was also placed inside that human brain. The Antenna was applied in the brain phantom both with and without the tumor to analyze the Antenna's performance. A Reflection Factor (S 1,1) of -30.76 dB and -30.88 dB were also achieved respectively after applying the Antenna in the brain phantom with and without the tumor. Other obtained performance parameter values were also provided in this paper, such as Directivity (2D & 3D), Radiation Efficiency, Polar Radiation, Specific Absorption

Radiation (SAR), etc. the Antenna will be a safer choice for the detection of brain tumor. 5G frequency band has been used here because the free space antenna can be used in communication (5G mobile communication, WLAN, Wi-Fi), and as well as for body applications.

Source: https://ieeexplore.ieee.org/document/9422503

Single-Band 28.5GHz Rectangular Microstrip Patch Antenna for 5G Communications Technology

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

The popularity, demand, and usefulness of 5G Communication Systems are rapidly increasing. Since the future of 5G Communication systems requires higher gain and efficiency, a rectangular microstrip patch antenna has been designed in this paper. The proposed model has a better return loss and a healthy efficiency characteristic. The operating frequency of 28.5 GHz (Ka-band) was used here, one of the prominent frequency bands for 5G communication. The Patch's architectural structure is 7.885 mm*8.935 mm*0.5 mm, with the help of a return loss of -48.309 dB, a gain of 7.425 dB, VSWR of 1.007129, and directivity of 8.141 dBi have been achieved in the proposed model. Also, the efficiency of 91.16%, Bandwidth of 1.2 GHz, and a surface current of 760.4 A/m were successfully achieved, which is also helpful for faster 5G communication. Considering all these mentioned parameters, the designed antenna can be suitable for 5G communication technology soon.

Source: https://ieeexplore.ieee.org/document/9376047

Microstrip Patch Antenna for the Applications of WLAN Systems using S-Band

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

The popularity, demand, and necessity of WLAN systems are vastly growing day by day. Since WLAN systems' future requires higher gain and efficiency, considering that a rectangular microstrip patch antenna has been designed in this paper, which is carried out with the CST Studio Suite 2016 software. The proposed model has a better Return Loss (S 1,1) and a sound efficiency characteristic. The operating frequency of 2.3025 GHz (S-band) was applied here, one of the vital frequency bands for the WLAN systems. The patch's architectonic formation is 60.46*78.73*1.7 mm 3 , with the help of which a Return Loss (S 1,1) of -40.35952 dB, a gain of 5.93 dB, VSWR of 1.019375, and directivity of 6.992 dBi have been achieved. The determined efficiency of 84.81%, a bandwidth of 75.2 MHz, and a surface current of 35.65 A/m from the proposed model is a better WLAN system considering its healthy prospects. Considering these parameters, the designed antenna can be a worthy upgrade for the WLAN systems soon.

Source: https://ieeexplore.ieee.org/document/9376114

On-Body Humidity Sensing Antenna with Polyimide for BAN Applications over 5G Networks

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

This paper proposes an on-body humidity sensing antenna with polyimide working in the 5G network. The chosen operating frequency is 38 GHz which also lies in the mm-wave band. This paper discusses two antennas. The first antenna is designed using polyimide film and the other using polyimide film as a superstate with Rogers RT 5880 as the main substrate. The first antenna exhibits an intensive radiation absorption of 38.7 W/kg for every 10g of tissue, which is mitigated by the design of the second antenna. Therefore, the second antenna is analyzed for on-body humidity sensing. Due to polyimide's high sensitivity towards humidity, any change in humidity is detectable through the changes in the dielectric constant of polyimide and changes in the resonant frequency.

Source: https://ieeexplore.ieee.org/document/9216331

Wearable Microstrip Patch Antenna for Detecting Brain Tumor

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

Now-a-days the third cause of occurring death is brain tumor, which is ranking only behind heart disease and cancers through worldwide. This paper represents a wearable Micro-strip patch antenna, which works at Industrial, Scientific and Medical (ISM) band (2.4-2.4835GHz) after implanting in human head with low radiation including a flexible compact size for detecting the brain tumor in a larger bandwidth. The antenna and the human head model is designed and simulated in CST Microwave studio, where FR4 is chosen as substrate for its flexibility characteristics and copper is chosen forpatch and for ground. For ensuring the safety of patient, the human head phantom model is made of consisting six homogeneous layers (Brain, Cerebrospinal Fluid (CSF), Dura, Skull, Fat, and Skin). The antenna is surfaced on the human head phantom model to assure the patient safety and analyzed. Without tumor, the observed values of S11 is - 22.299953 dB, SAR is 0.03101 W/Kg in 10g tissue of human head model (ensuring the safety on Human body), Radiation efficiency is -15.04 dB and Total efficiency is -15.07 dB. All these parameters are analyzed to assure the suitability of the antenna, which is efficient, or not to wear on human head as well as measure the brain tumor.

Source: https://ieeexplore.ieee.org/document/9230713

A Wearable Snap-on Button Antenna for on Body Application

Author: RAJA RASHIDUL HASAN et al.

In this paper, an on-body patch antenna is proposed, which is designed based on Snap-On button. The antenna will operate at ISM (2.4 GHz to 2.48 GHz) band with resonant frequency of 2.413 GHz. FR 408 is used as a substrate and pure copper as patch. The performance of antenna has been analyzed with two different textile materials of cotton and wool. A human phantom model is created with layer of skin, fat and muscle for tasting the antenna in Bio environment. S11 is found to be -15.18 dB and -15.17 dB for cotton and wool respectively on human phantom body. SAR is also observed for ensuring safety during on body applications and found 0.134W/kg and 0.136W/kg. All design and testing is simulated in CST STUDIO SUITE.

Source: https://ieeexplore.ieee.org/document/9230713

Antenna Design for Biotelemetry System

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

This paper presents a design of Micro-strip patch antenna which operate at medical implantable communication systems (MICS) band (402 MHz to 405 MHz) after implanting in body phantom model with low radiation in a flexible compact size. For designing the antenna and the human phantom model, CST Microwave studio is used. The human body phantom model contains three homogeneous layers as skin, fat and muscle. FR4 is used as the substrate with thickness of 0.5 mm of antenna for its flexibility property. The thickness of ground and patch is 0.018 mm where copper is chosen for ground. Due to biocompatibility, the antenna is fabricated into silicon with thickness of 8 mm before implanting inside the human body phantom model. The maximum specific absorption rate of this design with copper patch is measured 0.588 W/Kg in 10g tissue of human phantom model. S11, VSWR, Radiation efficiency, Total efficiency are also calculated which is -21.28 dB, 1.1889, -45.71 dB, -45.74 dB to assure that the design is comfortable as well as efficient for body implantable in biotelemetry system.

Source: https://ieeexplore.ieee.org/document/8644307?denied=

Bio-implantable Antenna at Human Head Model

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

This paper represents a design and miniaturization of a patch antenna which operates in the MICS band (402-406MHz) for bio-medical applications and is implantable in human scalp. The motive for designing this antenna is to work inside human tissue and can transfer data from a patient to another device. In this design, Copper is chosen for both ground and patch. ISOLA FR-408(LOSSY) is chosen as its dielectric substrate for its flexibility. Before implantation inside the head phantom silicon is used for warping the antenna. For designing, CST Microwave Studio is used for creating human head phantom. After implanting the antenna inside the human head model the S11 is observed -20.801101dB and VSWR is found to be 1.2006789. SAR is also found 0.6968 W/Kg which is ensuring the safety on Human body. Far-fields radiation pattern, total efficiency and total radiation efficiency are calculated to ensure the suitability of antenna implantation.

Source: https://ieeexplore.ieee.org/document/8644333?denied=

In Body Antenna for Monitoring Pacemaker

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

Heart Attack is now a very common disease in our modern lifestyle. It occurs when heart is pumping too quickly or slowly or when body does not get enough blood. A pacemaker is an electrically charged medical device which is used to control irregular heartbeats called arrhythmias. It implants under the skin of our body. This paper represents an In-body patch antenna, which is designed on pacemaker with resonance frequency of 2.464 GHz. The antenna will be used to monitor the condition of the pacemaker wirelessly, weather it works properly or not. It can also be monitored heart function such as beat rate. The antenna is designed to operate at Industrial, Scientific, and Medical band (2.4 GHz-2.48 GHz) where the dimension of the antenna is and the dimension of the pacemaker is 40 × 30 × 10 mm 3 . The pacemaker box is imitated in the box of a perfect electric conductor, which is used as a ground of the proposed antenna to maintain the compact size. The pacemaker embedded in the 2/3 muscle-equivalent phantom where the distance between the top of the phantom and the antenna is changed and analyzed. The substrate and superstrate is chosen Rogers R03010 for its flexibility. At operating frequency (2.464 GHz), Reflection coefficient, Voltage Standing Wave Ratio, total efficiency, and radiation efficiency are found -28.37 dB, 1.08, -35.50 dB, and -35.50 dB. Besides that, far-field radiation characteristics and biocompatibility of this antenna also discussed in this paper to ensure that a comfortable design for wireless monitoring of pacemaker. CST microwave studio is used to design this antenna as well as to calculate the findings.

Source: https://ieeexplore.ieee.org/document/8776836

Ingestible Antenna at Inner-Wall of Capsule for Capsule Endoscopy

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

Wireless Capsule Endoscopy overcomes various limitations of ordinary endoscopy system including irritating wire and inability to diagnose complicated parts of intestine. Antenna is the main component that removes the hassle of wire. This paper represents the design and miniaturization of a patch antenna for capsule endoscopy with a resonance frequency in the MICS (402-405 MHz) band. The length and diameter of designed antenna are 28.47 mm and 12.45 mm respectively, resulting in a total volume of 4.493 cubic centimeters. The maximum specific absorption rate of this antenna is measured to be 0.0082 WIKg inside human phantom stomach.

A Low SAR In-Body Antenna for Wireless Monitoring Purpose of Pacemaker System

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

Breast Cancer is one of the deadliest forms of cancer faced by women every year. Despite having medical methods like Mammography, MRI and ultrasound available, they have various limitations due to poor tissue contrast. This results in misdiagnosis of breast cancer patients all over the world. The purpose of this paper is to detect the presence of breast cancer tumors in women by the variation of S11 parameter of a microstrip patch antenna. To reach the desired goal, a circular microstrip patch antenna has been designed in ISM band along with two types of breast phantoms in order to detect the presence of cancerous tumors. The antenna along with the breast phantoms have been created using CST design environment and its various parameters i.e. reflection coefficient, efficiency, SAR have been evaluated to reach the goal set by this paper.

Source: https://ieeexplore.ieee.org/document/9068787

On-Body Circular Patch Antenna for Breast Cancer Detection

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

Breast Cancer is one of the deadliest forms of cancer faced by women every year. Despite having medical methods like Mammography, MRI and ultrasound available, they have various limitations due to poor tissue contrast. This results in misdiagnosis of breast cancer patients all over the world. The purpose of this paper is to detect the presence of breast cancer tumors in women by the variation of S11 parameter of a microstrip patch antenna. To reach the desired goal, a circular microstrip patch antenna has been designed in ISM band along with two types of

breast phantoms in order to detect the presence of cancerous tumors. The antenna along with the breast phantoms have been created using CST design environment and its various parameters i.e. reflection coefficient, efficiency, SAR have been evaluated to reach the goal set by this paper.

Source: https://ieeexplore.ieee.org/document/8928707

Body Implantable Patch Antenna for Biotelemetry System

Author: RAJA RASHIDUL HASAN et al.

Brief Description:

In this study, a biocompatible in-body antenna for biotelemetry system is focused to design. The compact size, flexibility and low radiation make this antenna suitable for implanting inside human body. The main challenge is to make this antenna operate at MICS band (402 MHz-405MHz), which is safest frequency band to implant any antenna inside human body according to FCC (Federal Communications Commission). Copper is used to create the both patch and ground panel. To create the substrate panel flexible material FR-4 is selected. Silicon is chosen to wrap the antenna before implant inside the human body phantom model, due to biocompatibility. CST Microwave studio is used to design the antenna and human phantom model, where all the electrical properties and other important properties are maintained to create human body phantom model. At the end, SAR, VSWR and other important parameters are calculated to ensure this antenna is reliable for body implantable for biotelemetry system.

Source: https://ieeexplore.ieee.org/document/8712300

An Unsupervised Protection Scheme for Overhead Transmission Line with Emphasis on Situations During Line and Source Parameter Variation

Author: Dr. Md. Rifat Hazari et al.

Brief Description:

Quick removal of the short circuit faults in a power transmission and distribution system solely depends on an accurate characterization of them. Characterization of short circuit fault demands continuous monitoring of the electrical signals residing with the power transmission lines that change with the operating conditions. Taking the deficiencies as a research challenge, this paper introduces an unsupervised learning framework for fault detection and classification (FDC) based on the capsule neural network. The proposed framework learns from the unlabeled dataset and captures more extra target-oriented attributes. The Gramian angular field (GAF) image representations of the sampled signals are fed as input to the proposed model. The performance of the proposed method is verified in terms of errors due to the source and line parameters

variation. Furthermore, to acquire more intuitive insight, a comparison analysis among the existing commensurate methods and the proposed architecture is carried out. The results found from the verification indicates that the proposed method has the ability to provide more than 99% classification accuracy.

Source: https://ieeexplore.ieee.org/document/9331170

Energy conservation of nanofluids from a biomagnetic needle in the presence of Stefan blowing: Lie symmetry and numerical simulation.

Author: Fatema Tuz Zohra et al.

Brief Description:

Thermal energy management associated with the transmission of heat is one of the main problems in many industrial setups (e.g. pharmaceutical, chemical and food) and bio-engineering devices (e.g. hospital ventilation, heating, cooling devices, heat exchanger and drying food, etc). The current study aims to examine thermo-bioconvection of oxytactic microorganisms taking place in a nanofluid-saturated needle with the magnetic field. Stefan-blowing is applied. The leading equations of continuity, momentum and energy, species transport equations for oxygen concentration and population density of microorganisms are reduced dimensionless and Lie symmetry group transformations are used to generate appropriate invariant transformations. The resulting similarity boundary value problem (in which the blowing parameter is coupled with concentration) have been simulated using MATLAB (2015a) bvp5c built in function. The impact of the emerging factors on the nondimensional velocity, temperature, nanoparticle concentration and motile microorganism density functions and their slopes at the wall, are pictured and tabulated. Justification with published results are included. It is found that all physical quantities decrease with Stefan blowing and increase with power law index parameter. With elevation in magnetic field parameter i.e., Lorentzian drag force, the friction factor reduces while the local Nusselt number, local Sherwood number, and the local motile microorganism density wall gradient increase. Present study could be used in food and pharmaceutical industries, chemical processing equipment, fuel cell technology, enhanced oil recovery, etc.

Source: https://doi.org/10.1016/j.csite.2021.100861

Utilization of updated version of heat flux model for the radiative flow of a non-Newtonian material under Joule heating: OHAM application.

Author: Fatema Tuz Zohra et al.

Brief Description:

This study reports the thermal analysis and species transport to manifest non-Newtonian materials flowing over linear stretch sheets. The heat transfer phenomenon is presented by the Cattaneo–Christov definition of heat flux. Mass transportation is modeled using traditional Fick's second law. In addition, the contribution of Joule heating and radiation to thermal transmission is also considered. Thermo-diffusion and diffusion-thermo are significant contributions involved in thermal transmission and species. The physical depiction of the scenario under consideration is modeled through the boundary layer approach. Similar analysis has been made to convert the PDE model system into the respective ODE. Then, the transformed physical expressions are calculated for momentum, thermal, and species transport within the boundary layer. The reported study is a novel contribution due to the combined comportment of thermal relaxation time, radiation, Joule heating, and thermo-diffusion, which are not yet explored. Several engineering systems are based on their applications and utilization.

Source: https://www.degruyter.com/document/doi/10.1515/phys-2021-0010/pdf

Magnetohydrodynamic bio-nano-convective slip flow with Stefan blowing effects over a rotating disc

Author: Fatema Tuz Zohra et al.

Brief Description:

Microfluidic-related technologies and micro-electromechanical systems–based microfluidic devices have received applications in science and engineering fields. This article is the study of a mathematical model of steady forced convective flow past a rotating disc immersed in water-based nanofluid with microorganisms. The boundary layer flow of a viscous nanofluid is studied with multiple slip conditions and Stefan blowing effects under the magnetic field influence. The microscopic nanoparticles move randomly and have the characteristics of thermophoresis, and it is being considered that the change in volume fraction of the nanofluid does not affect the thermo-physical properties. The governing equations are nonlinear partial differential equations. At first, the nonlinear partial differential equations are converted to system of nonlinear ordinary differential equations using suitable similarity transformations and then solved numerically. The influence of relevant parameters on velocities, temperature, concentration and motile microorganism density is illustrated and explained thoroughly. This investigation indicated that suction provides a better medium to enhance the transfer rate of heat, mass and microorganisms compared to blowing. This analysis has a wide range engineering application such as electromagnetic micro pumps and nanomechanics.

Source: https://doi.org/10.1177%2F2397791419881580

Magnetohydrodynamic bio-nanoconvective Naiver slip flow of micropolar fluid in a stretchable horizontal channel

Author: Fatema Tuz Zohra et al.

Brief Description:

The purpose of this paper is to formulate and analyze a nano-bio transport model for magnetohydrodynamic convective flow, heat, and mass diffusion of micropolar fluid containing gyrotactic microorganisms through a horizontal channel. Both the walls are considered to be stretched, and the Navier slip boundary condition is taken into account. The governing bio-nano transport partial differential equations are rendered to ordinary differential equations using similarity variables. The resulting normalized self-similar boundary value problem is solved computationally with the Matlab bvp4c function. The effect of the controlling parameters on the nondimensional velocity, temperature, nanoparticle concentration, and motile microorganism density functions, and their gradients at the wall are visualized graphically and in a tabular form and expounded at length. Validation with a previous simpler model is included. All physical quantities, except the local Nusselt number, increases with an increase in the velocity slip and magnetic parameters. The present problem finds applications in industries related to pharmaceutical, nanofluidic devices, microbial enhanced oil recovery, modeling oil, and gas-bearing sedimentary basins.

Source: https://doi.org/10.1002/htj.21560

Anisotropic slip magneto-bioconvection flow from a rotating cone to a nanofluid with Stefan blowing effects

Author: Fatema Tuz Zohra et al.

Brief Description:

A mathematical model for two dimensional steady laminar natural convective anisotropic slip boundary layer flows from a rotating vertical cone embedded in ethylene glycol bionanofluid is presented. The influence of Stefan blowing is also taken into account. Four different non-particles namely Copper (Cu), Alumina (Al2O3), Copper Oxide (Cuo), Titanium Oxide (TiO2) are explored. Suitable similarity transformations are used to convert the governing equations into non-linear ordinary differential equations. These are then solved numerically, with appropriate boundary conditions, utilizing an implicit finite difference method (the BVP5C code in MATLAB). During computation Sc, Lb, Le and Lb are presented as unity, whilst is taken as 151. The effects of the governing parameters on the dimensionless velocities, temperature, nanoparticle volume fraction, density of motile microorganisms as well as on the local skin friction, local Nusselt, Sherwood number and motile micro-organism number density are thoroughly examined via tables and graphs. It is found that the skin friction factor increases with tangential slip, magnetic field and Schmidt number whilst it decreases with blowing parameter and spin parameters. It is

further observed that both the friction and heat transfer rates are highest for copper nanoparticles and lowest for TiO2nanoparticles. Validation of the BVP5C numerical solutions with published results for several special cases of the general model is included. The study is relevant to electro-conductive bio-nano-materials processing.

Source: https://doi.org/10.1016/j.cjph.2017.08.031

Bioconvective electromagnetic nanofluid transport from a wedge geometry: Simulation of smart electro-conductive bio-nanopolymer processing

Author: Fatema Tuz Zohra et al.

Brief Description:

A mathematical model is presented for steady, two-dimensional, stagnation-point flow, heat, mass, and micro-organism transfer in a viscous, incompressible, bioconvective, electromagnetic nanofluid along a wedge with Stefan blowing effects, hydrodynamic slip, and multiple convective boundary conditions. Gyrotactic micro-organisms are present in the nanofluid and bioconvection arises, characterized by micro-organisms swimming under a competing torque. Similarity transformations are used to render the system of governing partial differential equations into a system of coupled similarity equations. The transformed equations are solved numerically with the BVP5C method. The impact of emerging parameters on dimensionless velocity, temperature, magnetic induction function, nanoparticle volume fraction, and density of motile micro-organisms is studied graphically. Furthermore, the responses of the local skin friction, local Nusselt number, local Sherwood number, and the wall gradient of density of motile micro-organism number to variation in these parameters are elaborated. Validation of solutions with previous studies based on special cases of the general model is included. The simulations are relevant to the processing of biological, electro-conductive nanomaterials and industrial hygienic coating systems exploiting combined electromagnetics, nanosystems, and microscopic, bio-propulsion mechanisms.

Source: https://doi:DOI: 10.1002/htj.21300

Bioinformatics and System Biology Approaches to Identify Pathophysiological Impact of COVID-19 to the Progression and Severity of Neurological Diseases

Author: Dr. S. M. Hasan Mahmud et al.

Brief Description:

The Coronavirus Disease 2019 (COVID-19) still tends to propagate and increase the occurrence of COVID-19 across the globe. The clinical and epidemiological analyses indicate the link between COVID-19 and Neurological Diseases (NDs) that drive the progression and severity of NDs.

Elucidating why some patients with COVID-19 influence the progression of NDs and patients with NDs who are diagnosed with COVID-19 are becoming increasingly sick, although others are not is unclear. In this research, we investigated how COVID-19 and ND interact and the impact of COVID-19 on the severity of NDs by performing transcriptomic analyses of COVID-19 and NDs samples by developing the pipeline of bioinformatics and network-based approaches. The transcriptomic study identified the contributing genes which are then filtered with cell signaling pathway, gene ontology, protein-protein interactions, transcription factor, and microRNA analysis. Identifying hub-proteins using protein-protein interactions leads to the identification of a therapeutic strategy. Additionally, the incorporation of comorbidity interactions score enhances the identification beyond simply detecting novel biological mechanisms involved in the pathophysiology of COVID-19 and its NDs comorbidities. By computing the semantic similarity between COVID-19 and each of the ND, we have found gene-based maximum semantic score between COVID-19 and Parkinson's disease, the minimum semantic score between COVID-19 and Multiple sclerosis. Similarly, we have found gene ontology-based maximum semantic score between COVID-19 and Huntington disease, minimum semantic score between COVID-19 and Epilepsy disease. Finally, we validated our findings using gold-standard databases and literature searches to determine which genes and pathways had previously been associated with COVID-19 and NDs.

Source: https://www.sciencedirect.com/science/article/pii/S0010482521006533

Network-based identification genetic effect of SARS-CoV-2 infections to Idiopathic pulmonary fibrosis (IPF) patients

Author: Dr. S. M. Hasan Mahmud et al.

Brief Description:

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is accountable for the cause of coronavirus disease (COVID-19) that causes a major threat to humanity. As the spread of the virus is probably getting out of control on every day, the epidemic is now crossing the most dreadful phase. Idiopathic pulmonary fibrosis (IPF) is a risk factor for COVID-19 as patients with long-term lung injuries are more likely to suffer in the severity of the infection. Transcriptomic analyses of SARS-CoV-2 infection and IPF patients in lung epithelium cell datasets were selected to identify the synergistic effect of SARS-CoV-2 to IPF patients. Common genes were identified to find shared pathways and drug targets for IPF patients with COVID-19 infections. Using several enterprising Bioinformatics tools, protein–protein interactions (PPIs) network was designed. Hub genes and essential modules were detected based on the PPIs network. TF-genes and miRNA interaction with common differentially expressed genes and the activity of TFs are also identified. Functional analysis was performed using gene ontology terms and Kyoto Encyclopedia of Genes and Genomes pathway and found some shared associations that may cause the increased mortality

of IPF patients for the SARS-CoV-2 infections. Drug molecules for the IPF were also suggested for the SARS-CoV-2 infections.

Source: https://academic.oup.com/bib/article/22/2/1254/5918483

Bioinformatics and system biology approach to identify the influences of SARS-CoV-2 infections to idiopathic pulmonary fibrosis and chronic obstructive pulmonary disease patients

Author: Dr. S. M. Hasan Mahmud et al.

Brief Description:

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), better known as COVID-19, has become a current threat to humanity. The second wave of the SARS-CoV-2 virus has hit many countries, and the confirmed COVID-19 cases are quickly spreading. Therefore, the epidemic is still passing the terrible stage. Having idiopathic pulmonary fibrosis (IPF) and chronic obstructive pulmonary disease (COPD) are the risk factors of the COVID-19, but the molecular mechanisms that underlie IPF, COPD, and CVOID-19 are not well understood. Therefore, we implemented transcriptomic analysis to detect common pathways and molecular biomarkers in IPF, COPD, and COVID-19 that help understand the linkage of SARS-CoV-2 to the IPF and COPD patients. Here, three RNA-seq datasets (GSE147507, GSE52463, and GSE57148) from Gene Expression Omnibus (GEO) is employed to detect mutual differentially expressed genes (DEGs) for IPF, and COPD patients with the COVID-19 infection for finding shared pathways and candidate drugs. A total of 65 common DEGs among these three datasets were identified. Various combinatorial statistical methods and bioinformatics tools were used to build the protein-protein interaction (PPI) and then identified Hub genes and essential modules from this PPI network. Moreover, we performed functional analysis under ontologies terms and pathway analysis and found that IPF and COPD have some shared links to the progression of COVID-19 infection. Transcription factors-genes interaction, protein-drug interactions, and DEGs-miRNAs coregulatory network with common DEGs also identified on the datasets. We think that the candidate drugs obtained by this study might be helpful for effective therapeutic in COVID-19.

Source: https://pubmed.ncbi.nlm.nih.gov/33847347/

PreDTIs: prediction of drug–target interactions based on multiple feature information using gradient boosting framework with data balancing and feature selection techniques

Author: Dr. S. M. Hasan Mahmud et al.

Brief Description:

Discovering drug–target (protein) interactions (DTIs) is of great significance for researching and developing novel drugs, having a tremendous advantage to pharmaceutical industries and patients. However, the prediction of DTIs using wet-lab experimental methods is generally expensive and time-consuming. Therefore, different machine learning-based methods have been developed for this purpose, but there are still substantial unknown interactions needed to discover. Furthermore, data imbalance and feature dimensionality problems are a critical challenge in drug-target datasets, which can decrease the classifier performances that have not been significantly addressed yet. This paper proposed a novel drug–target interaction prediction method called PreDTIs. First, the feature vectors of the protein sequence are extracted by the pseudo-position-specific scoring matrix (PsePSSM), dipeptide composition (DC) and pseudo amino acid composition (PseAAC); and the drug is encoded with MACCS substructure fingerings. Besides, we propose a FastUS algorithm to handle the class imbalance problem and also develop a MoIFS algorithm to remove the irrelevant and redundant features for getting the best optimal features. Finally, balanced and optimal features are provided to the LightGBM Classifier to identify DTIs, and the 5-fold CV validation test method was applied to evaluate the prediction ability of the proposed method. Prediction results indicate that the proposed model PreDTIs is significantly superior to other existing methods in predicting DTIs, and our model could be used to discover new drugs for unknown disorders or infections, such as for the coronavirus disease 2019 using existing drugs compounds and severe acute respiratory syndrome coronavirus 2 protein sequences.

Source: https://academic.oup.com/bib/article/22/5/bbab046/6168499?login=true

Identification of biomarkers and pathways for the SARS-CoV-2 infections that make complexities in pulmonary arterial hypertension patients

Author: Dr. S. M. Hasan Mahmud et al.

Brief Description:

This study aimed to identify significant gene expression profiles of the human lung epithelial cells caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections. We performed a comparative genomic analysis to show genomic observations between SARS-CoV and SARS-CoV-2. A phylogenetic tree has been carried for genomic analysis that confirmed the genomic variance between SARS-CoV and SARS-CoV-2. Transcriptomic analyses have been performed for SARS-CoV-2 infection responses and pulmonary arterial hypertension (PAH)

patients' lungs as a number of patients have been identified who faced PAH after being diagnosed with coronavirus disease 2019 (COVID-19). Gene expression profiling showed significant expression levels for SARS-CoV-2 infection responses to human lung epithelial cells and PAH lungs as well. Differentially expressed genes identification and integration showed concordant genes (SAA2, S100A9, S100A8, SAA1, S100A12 and EDN1) for both SARS-CoV-2 and PAH samples, including S100A9 and S100A8 genes that showed significant interaction in the protein–protein interactions network. Extensive analyses of gene ontology and signaling pathways identification provided evidence of inflammatory responses regarding SARS-CoV-2 infections. The altered signaling and ontology pathways that have emerged from this research may influence the development of effective drugs, especially for the people with preexisting conditions. Identification of regulatory biomolecules revealed the presence of active promoter gene of SARS-CoV-2 in Transferrin-micro Ribonucleic acid (TF-miRNA) co-regulatory network. Predictive drug analyses provided concordant drug compounds that are associated with SARS-CoV-2 infection responses and PAH lung samples, and these compounds showed significant immune response against the RNA viruses like SARS-CoV-2, which is beneficial in therapeutic development in the COVID-19 pandemic.

Source: https://academic.oup.com/bib/article/22/2/1451/6144704

Dimensionality reduction based multi-kernel framework for drug-target interaction prediction

Author: Dr. S. M. Hasan Mahmud et al.

Brief Description:

The prediction of novel drug-target interactions (DTIs) has intrinsic significance in drug discovery research. Wet-lab experiments of DTIs are laborious and expensive; computational methods can help minimize the complexity of identifying unknown DTIs and accelerate the drug repositioning process. Nowadays, the number of drug-target features and their interactions regularly increases, disabling traditional computational methods' prediction and analyzing ability. Therefore, developing a new robust model to derive the reduced features for effective prediction is important. Further, accurate interactions also depend on the negative drug-target pairs, and it is worthwhile to build a technique to generate perfect negative pairs. To this end, we propose a new multi-label approach, called idti-MLKdr, by introducing multi-kernel learning (MKL) based SVM for DTIs prediction with various dimensionality reduction techniques. First, we have extracted the drug-target features from chemical structures and protein sequences, applying different feature extraction methods. A new technique has been developed to construct the negative drug-target pairs based on drug-drug (or protein-protein) similarity scores. Then, three-dimensionality reduction techniques have been applied to the extracted drug-target features.

Finally, we trained a multi kernel-based learner together with the reduced features and combined their prediction scores to show the final results. In this experiment, we considered auROC as an evaluation metric. The proposed method has been compared with the various existing methods under five-fold cross-validation, and the experimental results indicated that idti-MLKdr attains the best auROC for predicting DTIs. We believe that improved prediction performance will motivate the researchers for further drug development.

Source:
https://www.sciencedirect.com/science/article/abs/pii/S0169743921000381?via%3Dihub

DeepACTION: A Deep Learning-Based Method for Predicting Novel Drug-target Interactions

Author: Dr. S. M. Hasan Mahmud et al.

Brief Description:

Drug-target interactions (DTIs) play a key role in drug development and discovery processes. Wet lab prediction of DTIs is time-consuming, expensive, and tedious. Fortunately, computational approaches can identify new interactions (drug-target pairs) and accelerate the process of drug repurposing. However, a vast number of interactions remain undiscovered; therefore, we proposed a deep learning-based method (deepACTION) for predicting potential or unknown DTIs. Here, each drug chemical structure and protein sequence are transformed according to structural and sequence information using different descriptors to represent their features correctly. There have been some challenges, such as the high dimensionality and class imbalance of data during the prediction process. To address these problems, we developed the MMIB technique to balance the majority and minority instances in the dataset and utilized a LASSO model to handle the high dimensionality of the data. In addition, we trained the convolutional neural network algorithm with balanced and reduced features for accurate prediction of DTIs. In this study, the AUC is considered a primary evaluation metric for comparing the performance of the deep ACTION model with that of existing methods by a 5-fold cross-validation test. Our experiential dataset obtained from the DrugBank database and our deepACTION model achieved an AUC of 0.9836 for this dataset. The experimental results ensured that the model can predict significant numbers of new DTIs and provide complete information to motivate scientists to develop drugs.

Source: https://www.sciencedirect.com/science/article/abs/pii/S0003269720305108

Prediction of drug-target interaction based on protein features using undersampling and feature selection techniques with boosting

Author: Dr. S. M. Hasan Mahmud et al.

Brief Description:

Accurate identification of drug-target interaction (DTI) is a crucial and challenging task in the drug discovery process, having enormous benefit to the patients and pharmaceutical company. The traditional wet-lab experiments of DTI is expensive, time-consuming, and labor-intensive. Therefore, many computational techniques have been established for this purpose; although a huge number of interactions are still undiscovered. Here, we present pdti-EssB, a new computational model for identification of DTI using protein sequence and drug molecular structure. More specifically, each drug molecule is transformed as the molecular substructure fingerprint. For a protein sequence, different descriptors are utilized to represent its evolutionary, sequence, and structural information. Besides, our proposed method uses data balancing techniques to handle the imbalance problem and applies a novel feature eliminator to extract the best optimal features for accurate prediction. In this paper, four classes of DTI benchmark datasets are used to construct a predictive model with XGBoost. Here, the auROC is utilized as an evaluation metric to compare the performance of pdti-EssB method with recent methods, applying five-fold cross-validation. Finally, the experimental results indicate that our proposed method is able to outperform other approaches in predicting DTI, and introduces new drug-target interaction samples based on prediction probability scores. pdti-EssB webserver is available online at http://pdtiessb-uestc.com/

Source: https://www.sciencedirect.com/science/article/abs/pii/S0003269719308073

Detection of molecular signatures and pathways shared in inflammatory bowel disease and colorectal cancer: A bioinformatics and Systems Biology Approach

Author: Dr. S. M. Hasan Mahmud et al.

Brief Description:

Emerging evidence indicates IBD is a risk factor for the increasing incidence of colorectal cancer (CRC) development. We used a system biology approach to identify common molecular signatures and pathways that interact between IBD and CRC and the indispensable pathological mechanisms. First, we identified 177 common differentially expressed genes (DEGs) between IBD and CRC. Gene set enrichment, protein-protein, DEGs-transcription factors, DEGs-microRNAs, protein-drug interaction, gene-disease association, Gene Ontology, pathway enrichment analyses were conducted to these common genes. The inclusion of common DEGs with bimolecular networks disclosed hub proteins (LYN, PLCB1, NPSR1, WNT5A, CDC25B, CD44, RIPK2, ASAP1), transcription factors (SCD, SLC7A5, IKZF3, SLC16A1, SLC7A11) and miRNAs (mir-335-5p,

mir-26b-5p, mir-124-3p, mir-16-5p, mir-192-5p, mir-548c-3p, mir-29b-3p, mir-155-5p, mir-21–5p, mir-15a-5p). Analysis of the interaction between protein and drug discovered ASAP1 interacts with cysteine sulfonic acid and double oxidized cysteine drug compounds. Gene-disease association analysis retrieved ASAP1 also associated with pulmonary and bladder neoplasm diseases.

Source: https://www.sciencedirect.com/science/article/abs/pii/S0888754320300562

Estimation of Rain Attenuation of Earth-to-Satellite Link over Nepal for Ku & Ka Bands

Author: Md. Sakir Hossain et al.

Brief Description:

Due to the extensive use of lower frequency bands & huge demand of large bandwidth in satellite communications, engineers need to use the higher frequency bands such as K u to K a bands. However, the rain attenuation is severe in these bands. Before installing an earth station, the estimation of the rain attenuation is a prerequisite task to know the required fade margin to ensure a certain availability of the network. In this paper, we estimate the rain attenuation for different regions of Nepal. The R-H and ITU models are used for rain rate and rain attenuation estimation, respectively. A significant temporal and spatial variation in rain attenuation is observed. Among three different regions of Nepal, namely Terai, Hilly, and Himalaya, while the maximum rain attenuation is found in Terai region, the minimum is in Himalaya. Jhapa of the Terai region experiences the highest attenuation and requires 80 dB and 24 dB fade margin for K a and K u bands, respectively. Solukhumbu of Himalaya region, on the other hand, is found to be the least rain attenuation affected site. The required fade margin for an earth station site in Solukhumbu for using K u and K a bands are 12 dB and 40 dB, respectively. The minimum attenuation, which is observed in November and December, is several times lower compared to the highest rain attenuation, observed in July. The minimum attenuation caused by the K a band is higher than the maximum attenuation caused by the K u band irrespective of the locations of the earth station sites.

Source: https://ieeexplore.ieee.org/abstract/document/8644484/

Healthcare informatics and analytics in big data

Author: Md. Sakir Hossain et al.

Brief Description:

Healthcare informatics and analytics (HCI&A), also known as healthcare information technology (HIT), healthcare IS (HIS), and so on, has rapidly evolved with the emerge of advanced data analytics technologies applied to the medical domain. Currently, HCI&A has emerged as an

important area of study for both practitioners and academic researchers. Accordingly, this emerging field has prompted for an inquiry of the opportunities and challenges related to management of healthcare data, and the application of advanced data analytics to the contemporary healthcare industry. In order to contribute to the literature of healthcare informatics and analytics, this study proposes an HCI&A framework under the context of big data, which covers four important segments such as the underlying technologies, system applications, system evaluations, and emerging research areas. Based on the key features and capabilities of underpinning technologies, the evolution of HCI&A are conceptualized by three stages, namely HCI&A 1.0, HCI&A 2.0, and HCI&A 3.0. By analyzing the technological growth and current research trends, this study outlines the trend map of HCI&A for education and knowledge transfer. We also contributed to conduct a bibliographic study on healthcare informatics and healthcare information systems. To the best of our knowledge, our study is among the very few comprehensive bibliographic studies about HCI&A. We hope that our study can contribute to supplement contemporary thoughts on HCI&A research, and facilitate the related knowledge transfer to the healthcare industry.

Source: https://www.sciencedirect.com/science/article/abs/pii/S0957417420302128

Privacy preserving big data analytics: A critical analysis of state-of-the-art

Author: Md. Sakir Hossain et al.

Brief Description:

In the era of “big data,” a huge number of people, devices, and sensors are connected via digital networks and the cross-plays among these entities generate enormous valuable data that facilitate organizations to innovate and grow. However, the data deluge also raises serious privacy concerns which may cause a regulatory backlash and hinder further organizational innovation. To address the challenge of information privacy, researchers have explored privacy-preserving methodologies in the past two decades. However, a thorough study of privacy preserving big data analytics is missing in existing literature. The main contributions of this article include a systematic evaluation of various privacy preservation approaches and a critical analysis of the state-of-the-art privacy preserving big data analytics methodologies. More specifically, we propose a four-dimensional framework for analyzing and designing the next generation of privacy preserving big data analytics approaches. Besides, we contribute to pinpoint the potential opportunities and challenges of applying privacy preserving big data analytics to business settings. We provide five recommendations of effectively applying privacy-preserving big data analytics to businesses. To the best of our knowledge, this is the first systematic study about state-of-the-art in privacy-preserving big data analytics. The managerial implication of our study is that organizations can apply the results of our critical analysis to strengthen their strategic deployment of big data analytics in business settings, and hence to better leverage big data for sustainable organizational innovation and growth.

Source: https://wires.onlinelibrary.wiley.com/doi/ftr/10.1002/widm.1387

Soft Frequency Reuse With Allocation of Resource Plans Based on Machine Learning in the Networks With Flying Base Stations

Author: Md. Sakir Hossain et al.

Brief Description:

Flying base stations (FlyBSs) enable ubiquitous communications in the next generation mobile networks with a flexible topology. However, a deployment of the FlyBSs intensifies interference, which can result in a degradation in the throughput of cell-edge users. In this paper, we introduce a flexible soft frequency reuse (F-SFR) that enables a self-organization of a common SFR in the networks with an unpredictable and dynamic topology with the FlyBSs. We propose a graph theory-based algorithm for an allocation of resource plans, which is understood as a bandwidth allocation and a transmission power setting in the context of SFR. Furthermore, we introduce a low-complexity implementation of the proposed resource allocation using deep neural network (DNN) to significantly reduce the computation complexity. We show that the proposed F-SFR increases the throughput of cell-edge users by 16% to 26% and, at the same time, improves the satisfaction of the cell-edge users by up to 25% compared to the state-of-the-art solutions. We also demonstrate that the proposed scheme ensures a higher fairness in the throughput among the users with respect to the state-of-the-art solutions. The implementation via DNN also outperforms all state-of-the-art solutions despite its very low complexity.

Source: https://ieeexplore.ieee.org/abstract/document/9493880

A Concept: Classifying Student's Feedback Electronically for Improving Academics

Author: Dr. Md. Abdullah - Al - Jubair et al.

Brief Description:

Student's feedback on academics can provide valuable information for an institution for finding their current teaching practices quality and, also can provide suggestions for improving the overall teaching process. There are various kinds of student feedback systems used in different institutions and are mostly manual based process. Therefore, the study proposes a concept of computerized student feedback system (SFS) for academics. Student generally provides their feedback using open ended sentences. SFS will classify all feedback into several categories such as positive, negative, neutral. The proposed SFS uses a combination of machine learning's rule-based and lexicon based custom corpus datastore. This system will be implemented and evaluated in various educational institutions to test the effectiveness of SFS in the academic's context.

Source: https://dl.acm.org/doi/10.1145/3377049.3377082

Extracting Relevant Information Using Handheld Augmented Reality

Author: Dr. Md. Abdullah - Al - Jubair et al.

Brief Description:

Augmented Reality (AR) technology is being incorporated into education materials to attract students and to make the learning experience more engaging. This study focuses on the development of 3D object, audio-visual and interaction in Handheld AR. This research aims to bridge that gap using Handheld AR for a magazine, which allows students to get an overview and interact with the 3D model of the campus, view general information and events of the university. This magazine also benefits students that live outside Dhaka, who are unable to visit the campus beforehand. The users can use their Android phone camera for real-time video capture and render virtual objects in the augmented environment through Vuforia and Unity engine integration. To evaluate system effectiveness and user satisfaction, a survey is conducted. The survey consists of user background information, functionality tests and a user feedback questionnaire. The outcome of the survey shows satisfactory of the successful implementation of 3D and multimedia modules. This paper also discusses the future scopes and summarizes how to extract relevant information for students to gain knowledge and get entertainment by using handheld AR.

Source: https://dl.acm.org/doi/10.1145/3377049.3377069

Electronic Opinion Analysis System for Library (E-OASL)

Author: Dr. Md. Abdullah - Al - Jubair et al.

Brief Description:

This paper demonstrates a new algorithm for Electronic Opinion Analysis System (E-OASL) for university library where it can analyze the user opinion on library and categorized it in different classification such as positive, negative, neutral and suggestions. The system also shows the percentage of each classification as system output. Our proposed algorithm is based on hybrid approach of sentiment analysis where machine learning's rule-based classifier and lexicon approach's corpus datastore are utilized. We needed to collect around 1200 raw data from the different types of user who are using university library to build our algorithm. The system integrates MySQL database for faster and better data processing. The paper also shows the evaluation of the E-OASL which showed satisfactory result of effectiveness and efficiency of EOASL compare to manual opinion analysis approach.

Source: https://dl.acm.org/doi/10.1145/3377049.3377066

A HYBRID APPROACH OF SENTIMENT BASED ALGORITHM FOR COMPUTERIZED OPINION ANALYSIS IN THE CONTEXT OF PUBLIC UNIVERSITY ADMISSION SYSTEM IN BANGLADESH

Author: Dr. Md. Abdullah - Al - Jubair et al.

Brief Description:

In this study of opinion analysis, we propose a new algorithm which takes the Public University Admission System in Bangladesh issue as the case study. This study reviews previous approaches of opinion analysis to identify drawbacks and strengths in manual approach and procedures. This study proposes a hybrid approach of sentiment analysis including supervised machine learning algorithm and lexicon-based approach to overcome the drawbacks of manual approach. For the development of the algorithm, corpus data-store including keywords and machine learning approach's rule-based classifier's if-else method has been used which is able to categorize the given sentences by using the data store. On the basis of the algorithm, we develop a computerized approach for checking whether the algorithm is working or not. The evaluation on computerized opinion analysis approach indicates significantly better and effective results in comparison with the manual approach.

Source: https://conference.pim.ac.th/zh/wp-content/uploads/2021/03/F-Engineering-and-Technology.pdf

AN IOT BASED FIRE ALARMING AND RESCUE ASSIST SYSTEM FOR HOUSEHOLD & INDUSTRY USING GSM MODULE

Author: Dr. Md. Abdullah - Al - Jubair et al.

Brief Description:

Nowadays, Bangladesh is known mostly around the world one of the main reasons for that is our industries.Our Ready Made Garments industry is already one of the largest in the world and still it's growing. Industries like leather, electronic appliance, Agro-food processing, and different others are also growing at a rapid speed which is reflecting in our economy as well. To reach our goal of getting a status developed country by 2041 we need to be more productive and some problems are coming between this goal.Fire accidents are one of the top in the list of those problems.It's making life difficult for both industry owners and workers.Now it's not only limited to industries as fire accidents are occurring almost everywhere like shopping mall corporate offices and also in residential houses.IoT has already solved thousands of real-life problems including emergency health careresponse, automated water supply, and soon.A lot of researchers have also implemented it to reduce the damage of fire accidents by alerting the responsible persons as early as possible.So,we have also made a prototype of a system named EFARAS which will help to reduce the losses and will detect fire less than 10 seconds after the fire ignition. It can detect the exact location of the source of the fire and after detecting fire it will end an alert to the owners, in habitants, and emergency services i.e, fire brigade, police station

etc. It has some safety features as we like in strong smoke during evacuation it will glow fluorescent light strips to show the path of the emergency fire exit, automatically open the fire exit door, and activated the hydrant system of the building before the arrival of emergency response. It also has safety measures to nullify the false alarms. It's one of the efficient systems in the market right now as it takes only 3 seconds to detect the fire after ignition and from our public survey and reviews over 85% of people are satisfied with the prototype system. Though there was a concern over the visual confirmation of fire via video/image feed which is not done yet but an objective which will be performed in the future iterations.

Source: https://conference.pim.ac.th/zh/wp-content/uploads/2021/03/F-Engineering-and-Technology.pdf

INTERACTIVE LEARNING MEDIA FOR KIDS

Author: Dr. Md. Abdullah - Al - Jubair et al.

Brief Description:

Augmented Reality is probably the most recent innovation being joined into educational materials to draw in understudies and to make the learning experience all the more captivating. With the rising popularity of handled gadgets, for example, smartphones and tablets, utilizing AugmentedReality on smartphones have become a wonder. Since the kids of country Bangladesh don't have any interactive study method yet, this exploration means to overcome that issue utilizing Mobile Augmented Reality. The reason for this research is to find and introduce newer and more interactive ways of learning for the Kids, using Augmented Reality rather than traditional textbooks, and furthermore acquaint them with the space of Augmented Reality. The system is manufactured utilizing the Vuforia Target Library, Unity Game Engine, and Android SDK. The research comprises client foundation data, usefulness tests, and a client criticism survey. This paper sums up how to separate pertinent data for college understudies to pick up information by utilizing Augmented Reality by means of Smartphones.

Source: https://conference.pim.ac.th/zh/wp-content/uploads/2021/03/F-Engineering-and-Technology.pdf

The Significant of Augmented Reality based magazine book for historical places of Bangladesh: Case Study

Author: Dr. Md. Abdullah - Al - Jubair et al.

Brief Description:

Augmented Reality (AR) is the integration of real-world objects with real-time use of information in the form of text, graphics, audio and other virtual enhancements. In mobile augmented reality, a client can see virtual particles superimposed on live video of this display utilizing visual rendering. The tourism sector is very important for the economy of any country. There are many tourist sectors in our country. But they are not concentrated in any particular place.For this, if tourists want to see a famous place in Bangladesh, they have to go to that place or collect images from the web.Augmented reality technology is still new in Bangladesh. We have seen in various articles that this technology is being used successfully.To implement augmented reality in our tourism sector, we have proposed an idea of developing an AR-based magazine books in our research. We used Vuforia SDK for this and developed the graphical parts(2D/3D images, animations, and videos) ourselves. Then we have selected some top historical places of Bangladesh for our magazine book and designed the app accordingly. Finally. we have evaluated how effective this system could be, where 50 people attended and most were satisfied about the effectiveness of our magazine book in the tourism sector.

Source: https://compass.eai.eu/events/detail/225/eai-icidm-2021

Deep Learning Aided Data-Driven Fault Diagnosis of Rotatory Machine: A Comprehensive Review

Author: Dr. M M Manjurul Islam et al.

Brief Description:

This paper presents a comprehensive review of the developments made in rotating bearing fault diagnosis, a crucial component of a rotatory machine, during the past decade. A data-driven fault diagnosis framework consists of data acquisition, feature extraction/feature learning, and decision making based on shallow/deep learning algorithms. In this review paper, various signal processing techniques, classical machine learning approaches, and deep learning algorithms used for bearing fault diagnosis have been discussed. Moreover, highlights of the available public datasets that have been widely used in bearing fault diagnosis experiments, such as Case Western Reserve University (CWRU), Paderborn University Bearing, PRONOSTIA, and Intelligent Maintenance Systems (IMS), are discussed in this paper. A comparison of machine learning techniques, such as support vector machines, k-nearest neighbors, artificial neural networks, etc., deep learning algorithms such as a deep convolutional network (CNN), auto-encoder-based

deep neural network (AE-DNN), deep belief network (DBN), deep recurrent neural network (RNN), and other deep learning methods that have been utilized for the diagnosis of rotary machines bearing fault, is presented.

Source: https://www.mdpi.com/1996-1073/14/16/5150/htm

State of the Arts in Fault Diagnosis and Prognosis

Author: Dr. M M Manjurul Islam et al.

Brief Description:

Reliable fault diagnosis and prognosis (FDP) of complex engineering systems is a pressing need to prevent catastrophic failure by avoiding unanticipated problems that could lead to performance deficiencies and adverse effects on safety. In the era of the Internet of Things (IoT), the dramatic increase of sensors, data rates, and communication capabilities continue to drive the complexity of FDP applications to new levels. As a result, governments and commercial industrial communities are looking for new insights to use the massive volume of streaming in from their systems and sensors. Therefore, this study presents a data-driven FDP framework for rotating bearings based on advanced signal processing and improved machine learning (ML) techniques. This framework comprises of three important modules: robust condition monitoring scheme-based on time-frequency signal analysis, feature engineering (i.e., classical machine learning)- and feature learning (i.e. deep learning)-based reliable fault diagnosis methodology, and data-driven prognostics framework using new health index (HI) and variants of least-square support vector machines for remaining useful life (RUL) estimation.

Source:

https://www.researchgate.net/publication/353718974_State_of_the_Arts_in_Fault_Diagnosis_and_Prognosis

Induction Motor Bearing Fault Classification Using Extreme Learning Machine Based on Power Features

Author: Dr. M M Manjurul Islam et al.

Brief Description:

Electric motors perform the crucial task of converting electrical energy into essential mechanical energy on demand. Motors are plentifully used in the industrial sector all over the world to drive mechanical appliances. Despite being robust and sturdy, motors are not entirely fault-proof, and faults that are caused by the bearings trouble them the most. Early detection of these faults allows engineers to take preventive measures and avert hard breakdowns. Numerous studies have been conducted in this area of research. Many methods have been proposed and

implemented to detect the existence and determine the type of fault present in an induction motor. However, this field of research is still open since there is room for improvements in the claimed results. In this paper, a novel fault diagnosis method has been proposed involving an emerging machine learning technique named extreme learning machine to identify the existence of flaws in motor bearings and specify their origins. The described method is tested on a benchmark bearing fault dataset provided by Case Western Reserve University Bearing Data Center. The acquired result yields a maximum classification accuracy of 99.86% and an average classification accuracy of 98.67% after being tested on multiple fault datasets.

Source: https://link.springer.com/article/10.1007/s13369-021-05527-5

CISMET: A semantic ontology framework for regulatory requirements compliant information systems development and its application in the GDPR case

Author: Mohammad Mahmudul Hasan et al.

Brief Description:

Compliance to regulatory requirements is a critical concern in information system development projects. Managing this aspect is increasingly challenging while failures impose costly consequence on the organizations world-wide. However, how a legislation may or may not affect information system development projects is often not easily identifiable due to lack of clear understanding and guidelines. This paper presents compliant information system development (CISMET) ontology, exploiting concepts from 21 existing ontologies (regarding regulatory compliance and information system development). The key findings are the six parent classes in the CISMET ontology describing the system development goals, services, process, activities, artifacts, and resources. Also, there are 26 sub classes and 21 class properties that describe various concepts and their relationships in regulatory compliant information system development. The General Data Protection Regulation (GDPR) of the European Union has been instantiated in the proposed framework to indicate how regulatory requirements compliance concepts are mapped to system development projects. Thus, involved stakeholders (information system researchers and system developers) may identify dependencies and actions needed with relation to various rules in the regulation and their link to the system elements through a relevant software application. The latter enables users to easily submit queries towards the backend ontology through a specialized front-end application that can aid in formulating and submitting these queries.

Source: https://www.igi-global.com/article/cismet/272532

A Hybrid Framework for Interconnecting Various Software Engineering Process Models and Techniques

Author: Mohammad Mahmudul Hasan et al.

Brief Description:

In the software development lifecycle, a software process model provides a standardized format for planning, organizing, and executing a software project. Dozens of different models exist and are used in the software industries, but many of them has only some minor variations on a small number of basic software engineering models. Nevertheless, in real life scenario software developer does not implement most of process models that we have seen theoretically exists because there are many modes available and it is very difficult to analysis which models should be implemented in which stage of the software development process. Hence, this study presents a hybrid framework that describes three categories of process models based on the project characteristics such as small, medium and large. And provides an analysis of finding which model supports which types of project and what steps need to be followed. The contribution of this study lays on the software engineer who will be assisted with the hybrid framework to take informed decisions about the model selection based on making query about the project characteristics such as project requirements, risk factors involved in the project, availability of the customers, budget and expenses incur in the project, etc.

Source: https://dl.acm.org/doi/abs/10.1145/3377049.3377065

An Ontology based Framework for Regulatory Requirements Compliance

Author: Mohammad Mahmudul Hasan et al.

Brief Description:

E-Government has gained an enormous amount of attention by researchers and practitioners interested in digitizing the public sector through enacting policies and regulations. Compliance of regulatory requirements from these policies and regulations is an important requirement in e-Government service development projects. However, the concepts of regulatory requirements compliance are still scattered around in developing e-Government services. This article presents an e-Government regulatory requirement compliance (eGRRC) ontology framework that describes the interrelated concepts of regulatory requirements compliance in e-Government service development. The proposed eGRRC ontology is then applied on the recently introduced general data protection regulation (GDPR) for personal data processing across European Union (EU) countries, in order to indicate how the concepts can be mapped to the defined entities. The contribution of this article is on introducing a framework for researchers and practitioners to explore regulatory requirements compliance and their interrelationships in e-Government service development. Furthermore, e-Government legislation can accordingly be modeled using on the eGRRC ontology, that serves as basis for queries to infer knowledge about the source of

regulatory requirements, objectives of the regulation, various types of requirements, the services affected, orientation of regulatory rules in requirements, priorities, and amendments of regulations in e-Government service development.

Source: https://www.igi-global.com/article/an-ontology-based-framework-for-e-government-regulatory-requirements-compliance/225076

University-government collaboration for the generation and commercialization of new knowledge for use in industry

Author: Mohammad Mahmudul Hasan et al.

Brief Description:

The concept of Triple Helix relates to collaboration between universities, governments and industry. Such collaboration can take different forms in different countries. This paper describes collaboration between universities and government in China, specifically in the city of Hefei in Anhui province, one of the most rapidly developing regions in the country. The research question is: How can bi-lateral research collaboration be a source of knowledge generation and commercialization for use in industry? The study is qualitative, involving individual focus group interviews with university team leaders and team members from successful projects. Government representatives in China were also interviewed. We used the SECI knowledge creation method to analyze the findings. We also describe the collaboration process from idea and application through to review, funding, realization and commercialization. Our study shows that the government in China plays a dominant role in the process of knowledge creation and commercialization. We conclude that collaboration is a source of new knowledge generation and that the government plays a key role by funding universities and creating a research environment that meets the policy requirements of industry today. In particular, we show that universities and their research groups use resources, such as skilled manpower, laboratories and equipment, to accomplish tasks within a set timeframe.

Source: https://www.sciencedirect.com/science/article/pii/S2444569X18300301

C-code Implementation of a Shunt Active Power Filter Based on Finite Set Model Predictive Control

Author: S. M. Imrat Rahman et al.

Brief Description:

This paper proposes the design of an instantaneous power theory based 3-phase 2-level Shunt Active Power Filter (SAPF) for compensating current harmonics and reactive power using C-codes. The application of Finite Set Model Predictive Control (FS-MPC) for generating the

compensating currents is also investigated in this paper. Additionally, the design of a High Pass Filter to extract oscillating component of active power and a controller to balance the dc link voltage is presented. The entire active power filter has been designed using C-codes which allows it to be directly implemented in a real time system. Furthermore, a MATLAB/SIMULINK model has been designed to inspect the operation of the developed active filter.

Source: https://doi.org/10.1109/ICREST.2019.8644287

Effect of Underlap with Fixed Gate Length: GaN-Based Double-Gate MOSFETs

Author: Md Rabiul Islam et al.

Brief Description:

The effect of gate length 8 nm with underlap of double-gate MOSFET has been designed for VLSI Technology. The evaluation process was followed by NEGF (non-equilibrium Green's function) formalism using SILVACO ATLAS followed to ITRS-2013. The investigations on the threshold voltage, Subthreshold Slope, I ON , I OFF , I ON /I OFF , DIBL, and switching characteristics of the electric field have been done with the simulation results. In the simulation, adopting symmetrical distances from the source to gate and gate to drain (S-G and G-D) by fixing the gate length identical are cited as underlap. Here, the observation has been done for L UN = (0 to 4 nm) underlap length. GaN and HfO 2 have been chosen as channel material and dielectric material, respectively. The Proposed device structure indicates that GaN-based DG-MOSFETs for L G =8 nm with various underlap lengths is a promising candidate for the aspect of modern VLSI applications.

Source: https://ieeexplore.ieee.org/abstract/document/9331038

Smart Security Device for Women Based on IoT Using Raspberry Pi

Author: Md Rabiul Islam et al.

Brief Description:

In today's world, the major question in every girl's mind is about her security and safety. A few years back, a woman has to go for the convivial system (social media) to protest and warn about sexual harassment faced their self. A report shows that 51% have to experience sexual harassment unwillingly. The percentage turned to 66%, 38% and 35% for the public places, workplace and at their home respectively. At first, the cases handling by the police are a major issue but there have some botherations like not knowing the victim's exact location, not knowing

surely the crime occurred at all, and then lack evidence, police stops investigation. This paper is focused on a new IoT based evidence-collecting device to ensure women's safety and security. This system consists of a Raspberry pi, buzzer, and camera; flex sensor, GSM, and GPS modules in a combined way. Women can use this compact device with their undergarments easily and comfortably.

Source: https://ieeexplore.ieee.org/document/9331174

Performance Analysis of Multipurpose AGROBOT

Author: Md Rabiul Islam et al.

Brief Description:

Agriculture is a major sector for any developing country. As per Bangladesh's perspective, it is essential for us to focus on the Agriculture sector. In western or modern countries there had been a huge improvement in this sector by introducing modern automation techniques. Also, there is a need for a combination of electrical and agricultural scientists working together for development. The result of the combined work is called AGROBOT. The goal of the AGROBOT project is the implementation of a robotic system for agricultural operations such as plowing the field, sowing seeds, spraying fertilizers, nutrition deficiency and controlled use of fertilizers and pesticides. The agricultural scientists are experimenting to replace tractor driven mechanization with robotic agriculture by introducing “AGROBOT”. Electricity for this can be obtained from renewable energy resources like solar energy. Thus this robot is a clean energy-based farmer-friendly device. The main purpose of this project is to increase the productivity of agricultural land.

Source: https://ieeexplore.ieee.org/document/9019906/authors#authors

Design and Performance Analysis: Lightning Protection-Marking of Air Terminals and Down Conductor-Perspective of Bangladesh

Author: Md Rabiul Islam et al.

Brief Description:

This project focused on installing of lightning protection system and its equipment's. This project was implanted for both shade building and full building with a rooftop. The objective of replacing air-terminal is to catch the strike of lightning and conveyed the current through the down

conductor to earth pit. The whole process was followed by BNBC-2006 to make sure a structure or building safe from lightning. As it is essential for factories and industries to take protective action to make ensure the industrial electrical equipment's, as well as the life of the workers, do work there. To monitor the working process, the Lightning counter device was used to detect how many strikes it caught. The risk assessment of lightning protection system has been done considering 7 index factor (A, B, C, D, E, F, and G), which recommended LPS is essential by calculating total index figure. The diameter of air-terminal was selected as 8 mm and air terminal height was varied 500 mm, 700 mm, 800 mm, 2 meters and 2.5 meters. Therefore, adopting the meshing technology following the BNBC-2006 can be the challenging and easily adaptable for the perspective of Bangladesh.

Source: https://ieeexplore.ieee.org/document/8644107

Sub-nano Regime DG-MOSFETs

Author: Md Rabiul Islam et al.

Brief Description:

The significance of device performance of Gallium Nitride based double gate metal-oxide-semiconductor field-effect-transistor has been executed. The simulations were done by Silvaco Atlas simulation software with focusing on non-equilibrium green function (NEGF). Multiple gate length (LG=9.1 nm) was observed to distinguish the transfer characteristics curve. The other concentration was observed for device ON-State Current (ION), OFF-State Current (IOFF), Drain Induced Barrier Lowering (DIBL), Sub Threshold Slope (SS) and Electric Field (EF).

Source: http://engineeringjournals.stmjournals.in/index.php/JoSDC/article/view/1037

Heritage Architecture: Conservation and Revitalization of Adamjee Jute Mill

Author: Ashik Vaskor Mannan et al.

Brief Description:

Bangladesh has a glorious history of producing jute and jute products. Adamjee jute mill was the largest jute mill in the world, established in 1950. But unfortunately, it has been shut down in 2002 due to some unavoidable and political reasons. Later government and many private entrepreneurs tried to revitalize this mill but failed, and at present only a few broken infrastructures exist as old memories. This ruined huge abandoned shade representing not only the jute culture in our country but also signifying our history. Nature changes with the time but the memory of space remains timeless if we preserve them. Rapid competition of development

of our country creating threats for the survival and continuity of our heritage and culture. The purpose of this study is to point out the possibility and importance to revitalize Adamjee jute mill as a heritage site and raise awareness about the increasing demand for jute in the world market.

Source: https://ajse.aiub.edu/index.php/ajse/article/view/93

Automatic Quality Evaluation of Whole Slide Images for the Practical Use of Whole Slide Imaging Scanner

Author: Hossain Md Shakhawat et al.

Brief Description:

A whole slide imaging (WSI) scanner scans pathological-specimens to produce digital images for monitor-based diagnosis and analysis. However, the image quality is sometimes insufficient due to focus-error or noise, in which case the slide needs to be rescanned. In previous work, a referenceless quality evaluation technique was proposed, but some artifacts (i.e. tissue-fold, air-bubble) were detected as false positives. Those artifacts need to be ignored in determining whether rescanning is necessary or not, because they are not caused in the scanning but slide preparation stage. This paper proposes a method for a more practical system to assess WSI quality by distinguishing the origins of quality degradation; the focus-error or noise caused by the scanner and the artifact occurred in the slide preparation. In the method, a support vector machine detects artifacts first, and then quality is evaluated excluding artifact regions. The effectiveness of the proposed system has been experimentally demonstrated.

Source: https://www.jstage.jst.go.jp/article/mta/8/4/8_252/_pdf

A method to score biomarker signals based on the dye abundance for automatic HER2 quantification in chromogenic in situ hybridization (CISH) for invasive breast cancer patients 9

Author: Hossain Md Shakhawat et al.

Brief Description:

Quantification of human epidermal growth factor receptor 2 (HER2) gene amplification is performed routinely for all invasive breast cancers (BC) to decide on the prognosis and treatment for HER2 positive BC patients. The amplification is calculated based on the HER2 to chromosome enumeration probe (CEP) signals' ratio in cancer affected nuclei following the American Society of Clinical Oncology (ASCO)/ College of American Pathologists (CAP) guidelines. Fluorescence in situ hybridization (FISH) and CISH are the standard assays for HER2 quantification. CISH offers better specimen storage, morphology assessment and easy to identify tumor heterogeneity. The CISH is assessed by counting signals manually from at-least 20 cancer affected nuclei according

to ASCO/CAP 2018 guidelines. But manual counting is time prohibitive and laborious. Therefore, an automatic quantification method is obligatory for the efficient CISH assessment. For an automatic quantification, it is necessary to detect and use reliable signals. In this paper, we proposed a method to score the HER2 and CEP17 biomarker signals for the selection of suitable signals for quantification. The proposed method utilizes the color unmixing technique and estimates the likelihood of a signal based on the dye abundance. Finally, the HER2 to CEP17 ratio was calculated to determine the HER2 amplification status. The correlation coefficient between the proposed automatic CISH quantification and pathologists' manual counting was 0.975. The p-values larger than 0.05 from a one-sided paired t-test ensured that the proposed method yields statistically indifferent results to the reference method. The method was established on WSI scanned by two different scanners. Through the experiments, the capability of the proposed system has been demonstrated.

Source: http://jsmbe.org/en/index.html

Development of a Secured and Low-budget Biometric Electronic Voting Machine for Bangladesh

Author: Nirjhor Rouf et al.

Brief Description:

One of the fundamental goals of `Digital Bangladesh ' is ensuring people's democracy, human rights, transparency, and delivering government services through the maximum use of modern technologies. However, Bangladesh Election Commission is still striving to implement Electronic Voting Machines (EVM) in the parliamentary general election on an extended scale due to the lack of acceptance concerning EVM accuracy, easy accessibility, and security. This paper describes an implementation of a low-budget and securely accessible solution for the Electronic Voting Machine feasible for Bangladesh with the benefit of verifying the registered voters with a central database through a biometric identification process and maintaining the secrecy of the voters. The proposed system uses low profile microcontrollers (Arduino Uno), which reduces the device's cost to approximately half of the price of other available versions of EVM. The system can communicate with the database to store voter information and vote counts that make the system secure against any fraudulence during the election process and eliminate manual vote tallying problems.

Source: https://ieeexplore.ieee.org/document/9331137

Exploration of open-source licensing model as a tool to enhance digitalization in Bangladesh

Author: Md Khalid Rahman et al.

Brief Description:

The twenty first century offers us the greatest gift that human kind can achieve – technology by which we can now explore the riches of global village from any corner of the world. In the global village that we live in, information technology has made tremendous strides to make the lives of people more productive and more convenient. Bangladesh has been making inroads into the adoption of technology though at a slower rate than the developed world. In this paper, we have explored socio-legal framework that would facilitate digitalization and benefit for the stakeholders, namely, consumers, vendors, software developers and society in general. In particular, we have explored the modalities of open source licensing and investigated the barriers, its positive impacts on consumers and developers, and implementation of the licensing model from social and legal perspectives. It is a general perception that the cost of licensing remains out of reach for most of the computer users in Bangladesh. Most of the popular software are proprietary in nature, copyright protected and of foreign origin. As a result of prohibiting cost of acquiring software, consumers are often dissuaded from purchasing licensed products. As a consequence, consumers in the developing countries such as Bangladesh are inclined to use non-licensed software, which is a clear violation of copyright laws, and suffers from lacking features and support for the software. On the contrary, open source licensing holds the promise of delivering software free of cost with creative features and appropriate customization for the end-users. We conducted an exploratory study on the implications of using open-source licensing both in legal and societal contexts of Bangladesh. We relied mostly on secondary data. Our research demonstrates that open source licensing could facilitate the adoption of technology at a higher rate. Open source licensing could expedite the use and distribution of software in conformance with national and international legal standards. We also found that compared to developed countries, Bangladeshi users are not often encouraged from the government bodies to use and disseminate open-source licensed products.

Source: https://ajbe.aiub.edu/index.php/ajbe/article/view/22

A Comprehensive Study of Real-Time Vacant Parking Space Detection Towards the need of a Robust Model

Author: Rifath Mahmud et al.

Brief Description:

Full Text: Detection of vacant parking space is becoming a challenging task gradually. Space utilization and management of vehicle space is now a demandable field of research. Searching for an empty parking space in congested traffic is a time-consuming process. The existing vacant

parking space detection methods are not robust or generalized for images captured from different camera viewpoints. Finding a proper parking space in a busy city is really a challenging issue and people are facing this problem on a daily basis. The main purpose of this research is to comprehensively discuss the previous researches of vacant parking space detection and compare them from different aspects. Methods used in previous researches are descriptively discussed along with their advantages and disadvantages. The frameworks of previous researches were compared on six generalized phases and the experimental results are compared in terms of dataset, accuracy, processing time and other performance measures. This research also focuses on the challenges of vision-based vacant parking space detection which will contribute to future researches and researchers can work to overcome these challenges.

Source: http://ajse.aiub.edu/index.php/ajse/article/view/80

An Overview of Image Processing Techniques for Detecting COVID-19 and Other Infectious Diseases

Author: Tanvir Ahmed et al.

Brief Description:

Modern-day medical activities and disease recognition systems are mostly based on the usage of modern technologies. Image processing system is one of the most usable and highly valuable technologies which is used in numerous amount of disease detection process. In this paper, a review will be given based on detecting several infectious and cancerous diseases of different organs in a human body through applying different types of image processing techniques. Image processing system consists of several numbers of image processing techniques which apply to a different category of data and resources. The infectious diseases in a human body possess a certain amount of area in any organ of a human body. Modern medical science of these days is very much advanced that x-ray images, CT or MRI scan images can provide a digital image of a human figure and with the help of these images infections can easily be detected by applying image processing techniques to make sure certain region is affected. A detailed overview will be provided in this review that are the most used image processing techniques to get accurate results on detecting different types of infectious diseases.

Source: https://ajse.aiub.edu/index.php/ajse/article/view/153

Enhancing Smartphone Lock Security using Vibration Enabled Randomly Positioned Numbers

Author: Victor Stany Rozario et al.

Brief Description:

In this age of information, we can't think a day without our cell phone which is a very important component in storing data which is mostly personal. In recent times we are using E-banking, E-shopping and personal messaging photo sharing, we use many social media applications etc. So

it is a basic understanding that our mobile phone security system is very important. Now a days it's very common to have patterns, pins and gestures-based security options. Since it is very common to have one these systems on devices, attackers are always developing new ways to bypass these security systems using attacks like smudge detection, shoulder surfing, gesture recognition and using a dictionary attack (brute force method) any pattern or PIN can be exposed with given time. In our proposed model through randomizing PIN number position on the phone screen and use of vibration as pin input we have sufficiently secured the user's password from smudge attacks, shoulder surfing and gesture recognition also we have delayed the chance of being successful in a brute force attack as we have used vibration as a variable (and by limiting the attempt). In our proposed model we also designed the lock system app interface where the input buttons size and distance between two buttons are more than standard so that will help to reduce the human error and provides more comfort in use.

Source: https://dl.acm.org/doi/10.1145/3377049.3377099

The Design Approach of an Artificial Human Brain in Digitized Formulation based on Machine

Author: Victor Stany Rozario et al.

Brief Description:

Since the dawn of human evolution, man has been searching and designing aspects to meet up the human needs. After the revolutionary change in Technological Advancement, everything has changed the human concept of modern devices and applications. With the buzz alternating around concepts like AI, Machine Learning, Deep Learning, IoT we are approaching the next level of an era of technology and what was once a fantasy is now actually taking place in human history. This paper is upon the research and investigation of the digitized form of the human brain which is processed and analyzed in terms of algorithms and data analysis with integrated data provided from different aspects of human cognition. Using approaches like data analysis, machine learning, neural networking and human perspective approach the formation of the digitized brain has been demonstrated with its approach, usage, and applicability.

Source: https://ieeexplore.ieee.org/document/9154000

Multi-Modal Case Study on MRI Brain Tumor Detection Using Support Vector Machine, Random Forest, Decision Tree, K-Nearest Neighbor, Temporal Convolution & Transfer Learning

Author: Victor Stany Rozario et al.

Brief Description:

In the Medical field, Brain Tumor Detection has become critical and demanding task because of their several shapes, locations, and the intensity of image. That’s why an automated system is important to aid physicians and radiologists in detecting and classifying brain tumor. In this

research, we have discussed different machine learning as well as deep learning algorithm which are mostly used for image classification. We have also compared different models that are being used for tumor classification based on machine learning and deep learning. MRI images of Glioma tumor, Pituitary tumor, Meningioma tumor are the base of this research, and we have compared different techniques along with the accuracy of different classification model using those MRI images. We have used different deep learning pre-trained model for training brain tumor images. Those pre-trained models have provided outstanding performance along with less power consumption and computational time. EfficientNet-B3 has provided the best accuracy of 98.16% among other models as well as traditional machine learning algorithms. The experimental result of this model is proven the best and most efficient for tumor detection and classification in comparison with other recent studies.

Source: https://ajse.aiub.edu/index.php/ajse/article/view/175

Design of an Automated Non-Invasive Electromechanical Ventilator with Feedback Mechanism

Author: Nuzat Nuary Alam et al.

Brief Description:

In medical care, ventilation provides a vital life support function for patients suffering from chronic breathing disorders or unable to breathe for themselves. Control system that delivers oxygen to such patients are still underdeveloped and mostly causes discomfort rather than easing the pain. This paper proposes the design and simulation of a noninvasive electromechanical ventilator that is capable of generating automatic feedback response based on respiratory rate (RR) and oxygen saturation (SPO 2) measurement. The automated response system can provide effective inspiration to expiration ratio of a patient for different levels of SPO 2 and RR with 3% error rate. The domain of automatic response of the mechanism ranges over 1:2 to 1:4 of inspiration to expiration ratio of a patient for different levels of SPO 2 and RR. The algorithm develops to measure RR is based on the ECG signal where number of R-peaks were identified within 10 seconds time interval. Hence this design is idle for patients as it nullifies post ventilation breathing trauma and most importantly allows them to use it without prior medical knowledge.

Source: https://ieeexplore.ieee.org/abstract/document/9391917

Improvement of Bearing Capacity of Clay Soil Using Fly Ash

Author: Mr. Abul Hasnat et al.

Brief Description:

The principal aim of the study is to improve the engineering properties of the soil sample using fly ash as a binding material. Bangladeshi fly ash was used in this study. Effects of fly ash on physical and mechanical properties of soil (Atterberg limits, moisture-density relationship, and unconfined compressive strength) are evaluated in the presence of 0%, 2%, 4%, 5%, 8%, 10%, 15%, 20% & 25% fly ash. For understanding the improvement of engineering properties of soil, a parametric analysis is conducted to determine the allowable bearing capacity, settlement and the time required for the consolidation. The allowable bearing capacity is evaluated using several equations for both saturated and unsaturated conditions. It is found that for 5% fly ash content, the maximum allowable bearing capacity is achieved. The maximum value of allowable bearing capacity is 660.12 kN/m2 in the unsaturated condition. The increment of maximum allowable bearing capacity is 77.74% for 5% fly ash content. The lowest value of the settlement was 336 mm (saturated) and 183 mm (unsaturated) for 25% fly ash content. Considering normally consolidated soil, it is found that the least time required for consolidation is 3.19 years for 25% fly ash content.

A REVIEW OF UTILIZING SHAPE MEMORY ALLOY IN STRUCTURAL SAFETY

Author: Mr. Abul Hasnat et al.

Brief Description:

The advancement of material technology has paved the way for smart materials to emerge in the civil engineering sector. These smart materials possess the potential to encounter structural deterioration. Therefore, proper attention should be provided to smart materials regarding both research and application. Shape memory alloy (SMA) is a unique smart material that demonstrates growing applicability in numerous sectors. Recently, a lot of emphasis is being given to SMA research with a view to utilizing SMA in civil engineering structures. SMAs have some special properties such as high damping capacity, self-centering mechanism, twoway memory, self-adaptability etc. for which they can be used to make various types of structural control devices. An integrated assessment of the fundamental properties of SMAs, based on the existing data is presented by this paper in a concise and graphical manner. This paper also discusses the possibility of implementing SMAs in a wide range of civil engineering application, therefore motivating the large scale development of smart structures.

Response Surface Methodology based MultiObjective Optimization of Stock Bridge Damper for Pump Induced Floor Vibration

Author: Mr. Abul Hasnat et al.

Brief Description:

To attenuate the vibration induced by pump on a steel floor, an investigation has been done following Weighted Desirability Function (WDF) and Response Surface Methodology (RSM) coupled central composite design and Weighted Desirability Function (WDF). The main purpose of this paper was to formulate a Weighted Multi-Objective Optimization (WMO) of Stockbridge Damper parameters. Mass ratio and frequency ratio were considered as design variable to optimize the parameters of damper. The objective functions were the frequency response and the top displacement. The optimization has been carried out under pump which can generate different frequency with different RPM (0-3000). The optimal Stockbridge Damper depending on RSM indicates improved response among different cases. The proposed response model shows an efficacious approach regarding Stockbridge Damper optimization.

Effects of Lewis number on two phase natural convection flow of nanofluid inside a square cavity with an adiabatic obstacle

Author: Tanzia Zerin Khan et al.

Brief Description:

In this study thermophoresis and Brownian motion effects on natural convection in an enclosure with an adiabatic obstacle filled with Cu-water nanofluid is investigated. The Navier Stokes equations in their vorticity-stream function form are used to simulate the flow pattern, isotherms and concentration. The governing equations are solved via Galerkin's Finite Element Method. Effect of Lewis number (Le = 2,4,6 and 8) on streamline, isotherm, iso-concentration and local Nusselt numbers are examined. The results indicate that Nusselt number is a decreasing function of Lewis number.

Source: https://doi.org/10.1063/1.5115914

Synthesis of Carbon Nanotube by Chemical Vapor Deposition (CVD) Method

Author: Md. Masud Parvez et al.

Brief Description:

We synthesize the carbon nanotube (CNT) by chemical vapor deposition (CVD). The morphological images have been observed before and after the CNT growth on the Si/SiO2/Co substrate. Scanning electron microscope (SEM) images confirmed the growth of CNT onto the Si/SiO2/Co substrate. The SEM image of Si/SiO2/Co substrate having no CNT was found little dark

due to having Co catalyst on the top, whereas lots of amorphous carbon was existed on the Si/SiO2/Co/CNT surface according to SEM image. The growing CNT has no regularity and directionality.

Source: http://dx.doi.org/10.31364/SCIRJ/v8.i6.2020.P0620780

Fabrication of Carbon Nanotube (CNT) by Chemical Vapor Deposition and Investigate the Second Harmonic Response from CNT/Peptide and Si/SiO2/Peptide Interfaces.

Author: Md. Masud Parvez et al.

Brief Description:

We observed the second harmonic generation (SHG) intensity from the peptide molecules absorbed carbon nanotube surface grown on the Si/SiO2/Co substrate. We dropped different concentrations of peptide molecules such as 100nM, 1µM and 10µM on the three Si/SiO2/Co/CNT substrate individually. The SHG intensity was measured from the CNT/PEP interface by using 1.17 eV pulsed laser light. The results show that, the SHG intensity increased with increasing the peptide concentrations. In order to confirm about the SHG signal detected from the CNT/PEP interface, we dropped similar concentrations of peptide molecule on the three different Si/SiO2 substrate having no CNT layer individually and we observed the same results as found for CNT/PEP interface. In this case, the SHG intensity also increased with increasing the concentrations of peptide molecules on the surface. So, the generation of second harmonic signal is due the peptide molecule for both cases.

Source: http://www.ijsei.com/papers/ijsei-910120-07.pdf

Synthesis of Bismuth Ferrite Nanoparticles by Modified Pechini Sol-Gel Method

Author: Md. Masud Parvez et al.

Brief Description:

Different methods have been adopted for preparing BiFeO3 nanopowder. Recently, wet chemical methods have received abundant attention. Among the wet chemical methods, the modified Pechini sol-gel method is very cost-effective, simple, and suitable for the synthesis of highly homogenous and very fine crystalline nanopowder. The process is based on the mixing of reactants that oxidize easily, such as metal nitrates, and an organic chelating agent that acts as a reducing agent.

Source: http://www.ijsei.com/papers/ijsei-910120-06.pdf

A Study on CNT/Peptide interface by second harmonic generation (SHG) method

Author: Md. Masud Parvez et al.

Brief Description:

We observed the second harmonic generation (SHG) intensity from the peptide molecules absorbed carbon nanotube surface grown on the Si/SiO2/Co substrate. We dropped different concentrations of peptide molecules such as 100nM, 1µM and 10µM on the three Si/SiO2/Co/CNT substrate individually. The SHG intensity was measured from the CNT/PEP interface by using 1.17 eV pulsed laser light. The results show that, the SHG intensity increased with increasing the peptide concentrations. In order to confirm about the SHG signal detected from the CNT/PEP interface, we dropped similar concentrations of peptide molecule on the three different Si/SiO2 substrate having no CNT layer individually and we observed the same results. In this case, the SHG intensity also increased with increasing the concentrations of peptide molecules on the surface. So, the generation of SHG is occurred only from the surface of peptide due to have crystalline directional behavior, no matter whether there is CNT layer or not.

Source: https://bdphso.org/

Subsequent of Nanomedicine and Nano drug delivery system

Author: Md. Masud Parvez et al.

Brief Description:

Despite the overpowering information of the destiny prospect of nanomedicine and nano-drug delivery system, its real effect in healthcare system, even in cancer method of healing/prognosis, continue to exist to be very limited. This attributes to the field being a new area of technology with handiest decades of real studies on the subject and many key fundamental attributes nonetheless being unknown. The fundamental markers of diseased tissues together with key biological markers that permit absolute concentrated on without altering the ordinary cellular technique is one main density location of research. Ultimately , the placing of nanomedicine will strengthen with our increasing information of diseases at molecular degree or that mirrors a nanomaterial-subcellular size comparable marker identification to open up avenues for brand new diagnosis and therapy. Hence, understanding the molecular signatures of sickness in the future will lead to advances in nanomedicine applications. Beyond what we have outlined on this review the usage of the recognised nanoprobes and nanotheranostics products, further research might be key.

Source: https://icpm-2020.bmpaweb.org/

A Side-sensitive Modified Group Runs Control Chart with Auxiliary information to Detect Process mean Shifts

Author: Dr. Mahfuza Khatun et al.

Brief Description:

This study aims to develop a side-sensitive modified group runs control chart using auxiliary information (SSMGR-AI) to enhance the speed of detecting mean shifts in a process. The average run length (ARL) and expected average run length (EARL) criteria are adopted as performance measures of the proposed chart. The performance of the proposed chart is compared to the exponentially weighted moving average chart with AI (EWMA-AI) and the run sum chart with AI (RS-AI), in terms of the ARL and EARL criteria. The results reveal that the optimal SSMGR-AI chart generally outperforms all charts under comparison for detecting shifts in the process mean. An application with numerical data is presented to elaborate the implementation of the SSMGR-AI chart.

Source: http://www.pertanika.upm.edu.my/resources/files/Pertanika%20PAPERS/JST%20Vol.%2027%20(2)%20Apr.%202019/20.%20JST%201319-2018.pdf

One-Sided Control Charts for Monitoring the Multivariate Coefficient of Variation in Short Production Runs

Author: Dr. Mahfuza Khatun et al.

Brief Description:

In production, it is common to deal with short production runs, where flexibility is required in the built-up of parts to produce numerous variants of manufactured goods. Monitoring the multivariate coefficient of variation (MCV) is an effective method to monitor the relative multivariate variability compared with the mean. Monitoring the relative multivariate variability is important when practitioners are not interested in the changes in the mean vector or the covariance matrix. Monitoring the univariate coefficient of variation in short production runs has already been successfully executed. In this paper, the statistical performance of one-sided charts for monitoring the MCV of a multivariate process with finite horizon is investigated. Prior to this work, no attempt has been made to study process monitoring of MCV in short production runs. Investigations are made when the exact shift size can be specified and when there is a random shift size. It is found that the proposed upward chart detects an increasing shift in the MCV quicker than its downward counterpart detects a decreasing shift, for the same shift size (from the nominal value). An example is presented to illustrate the implementation of the new method.

Source: https://journals.sagepub.com/doi/abs/10.1177/0142331218789481

A New Distribution-free Adaptive Sample Size Control Chart for a Finite Production Horizon and its Application in Monitoring Fill Volume of Soft Drink Beverage Bottles

Author: Dr. Mahfuza Khatun et al.

Brief Description:

Nonparametric control charts have received increasing attention in process monitoring. In this article, a new nonparametric sign (SN) control chart with variable sample size (VSS) for a finite horizon process is developed. The novelty of this research lies in the incorporation of the VSS technique into the nonparametric SN chart for a finite horizon process, hence, resulting in the development of a more sensitive nonparametric short run chart. The statistical performance of the new nonparametric VSS SN control chart is evaluated and compared with the existing fixed sample size (FSS) SN chart for a finite horizon process. The charts' performances are compared using the truncated average run length (TARL) and truncated standard deviation of the run length (TSDRL) criteria. The results obtained show that the nonparametric VSS SN short run chart is always quicker than the FSS SN short run chart in detecting process shifts for various under-lying process distributions, hence, reducing scrap and rework cost. Finally, an application of the proposed control charting scheme is shown through a real-life example on the fill volume of soft drink beverage bottles.

Source: https://onlinelibrary.wiley.com/doi/epdf/10.1002/asmb.2545

Similarity Requirements for Mixed Convective Boundary Layer Flow over Vertical Curvilinear Porous Surfaces with Heat Generation/Absorption

Author: Prof. Dr. Kh. Abdul Maleque et al.

Brief Description:

Similarity requirements for three dimensional combined forced and free convective laminar boundary layer flows over the porous inclined vertical curvilinear surfaces with buoyancy effects and heat absorption/generation effects are investigated theoretically. The potential flow in the mainstream and Gabriel lame coefficients outside of the boundary layer are the function of . Hence, the external velocity components (,) and Gabriel lame coefficients are independent of . Here, has been set such that represents actual distance measured normal to the surface. Similarity requirements for an incompressible fluid are sought on the basis of detailed analyses in order to reduce the governing partial differential equations into a set of ordinary differential equations. Finally, different possible cases are exhibited in a tabular form with the inclusion of variations for onward flow study that are helpful to the future researchers for the flow over the orthogonal curvilinear surfaces.

Source:
https://scholar.google.com/citations?view_op=view_citation&hl=en&user=UhkxgEQAAAAJ&sortby=pubdate&citation_for_view=UhkxgEQAAAAJ:dQ2og3OwTAUC

Applications of Real-Time Big Data Analytics

Author: Dr. Akinul Islam Jony et al.

Brief Description:

In recent years, time-critical processing or real-time processing and analytics of bid data have received a significant amount of atten- tions. There are many areas/domains where real-time processing of data and making timely decision can saves thousands of human lives, minimizing the risks of human lives and resources, enhance the quality of human lives, enhance the chance of profitability, ef- ficient resources management etc. This paper have presented such type of real-time big data analytic applications and a classification of those applications. In addition it presents the time requirements of each type of these applications along with its significant bene- fits. Also, a general overview of big data to describe a background knowledge on this scope.

Source: http://dx.doi.org/10.5120/ijca2016910208

Real Time Social Network Data Analysis for Community Detection

Author: Dr. Akinul Islam Jony et al.

Brief Description:

In WWW becomes a widely used platform for different social networks and social medias for the social communication. This platform becomes the oasis of a huge amount of data. Therefore, this data repository draws tremendous attention from corporate, government, NGOs, social workers, politician, etc. to either promote their products or to convey their message to the targeted community. But identification of community structure and social graph becomes a challenging issue for the social network researcher and graph theory researchers since the pervasive usage of instant messaging systems and fundamental shift in publishing contents in these social medias. Although a lot of attention has been given by the researcher to introduce several algorithms for identifying the community structure, most of them are not suitable for dealing with the large scale social network data in real time. This paper presents a model for community detection from social graph using the real time data analytic. In this paper, we introduce data analytic algorithms that can analysis contextual data. These algorithms can analyze large scale social interaction data and can detect a community based on the user supplied threshold value for community detection. Experiment result shows that the proposed algorithms can identify expected number meaningful communities from the social graph.

Source: http://dx.doi.org/10.5120/ijca2016907645

Towards a scalable and efficient open cloud marketplace

Author: Dr. Akinul Islam Jony et al.

Brief Description:

As an exchange foundation of cloud software services, the cloud marketplace plays an important role to promote the capability and creativity of cloud services. However, existing cloud marketplaces are usually based on online stores operated by some particular companies. Users are usually required to get involved in their particular ecosystems, seriously restricting their creativity and competition. Moreover, these marketplaces lack efficient and flexible service publishing and discovery mechanisms. Therefore, this makes them difficult to handle a huge number of dynamic cloud service exchanges efficiently. To address this issue, we propose in this paper an open cloud marketplace middleware system for cloud software services based on a service publishing and subscription model. This model extends traditional content-based distributed publish/subscribe paradigm. By introducing the matching mechanism of multidimensional contents such as service functionality, service behavior, and quality of service etc, a new distributed publish/subscribe paradigm for service publishing and subscription is proposed. This new paradigm allows service providers to publish their services to and allows service consumers to subscribe services from the open marketplace based on service descriptions and requirements. We illustrate the design of the open cloud marketplace and present our preliminary results.

Source: http://dx.doi.org/10.1145/2875913.2875921

Design and Implementation of Smart Old Age Home

Author: Abir Ahmed et al.

Brief Description:

In modern era, smart old age homes are identified as a proper medium for an independent and comfortable life of older and disable persons. In this project, the wireless home automation system allows voice control switching, location tracking, health monitoring and fall detection. The voice control switching system can do remote controlling of home appliance such as TV, light, fan etc. The health monitoring and location tracking system are used in clinical perspectives and intensive care. A System of fall detection is added to abstain from unintentional injury and death. This paper will focus on integration of automation system and health monitoring system to develop smart old-age home.

Source: https://ieeexplore.ieee.org/abstract/document/9528237

IoT Based Power Monitoring of Solar Panel Incorporating Tracking System

Author: Abir Ahmed et al.

Brief Description:

Solar power added a significant value in energy harvesting in developing country like Bangladesh. People use solar power for homemade electrical appliances, vehicles, satellites and industries etc. The sun position and dust may affect the output of solar panel. Therefore, this paper designed an internet of thing (IoT) based smart system which can rotate the panel to enable tracking characteristics, cleaning and monitoring of the output. The overall IoT system is employed Arduino Uno, Wi-fi module and mobile phone to get necessary information in the application. Designed system has been verified through both simulation and hardware analysis to validate the work.

Source: https://ieeexplore.ieee.org/document/9528207

Design and Implementation of a Human Prosthetic Hand

Author: Abir Ahmed et al.

Brief Description:

With an aging population and war veterans, the disabilities of a human being are increasing day by day. In particular, prosthesis is finding their way into the lives of many individuals. The aim of the paper is to find cheaper solution for robotic prosthetic hand than the product found in market. Human innovations for any problems or disability should serve both poor and rich person of the world. Lack of money should not restrict the people to use advance technology. In this paper, a detailed design of voice and muscle controlled prosthetic hand is proposed. This paper will mostly on the development and manufacturing of the prototype of the prosthetic hand.

Source: https://ieeexplore.ieee.org/abstract/document/9331202

Design and Implementation of Assistive Robot for The Elderly and Impaired Person

Author: Abir Ahmed et al.

Brief Description:

In this paper, the design of an autonomous robot is proposed which can detect, search, pick up and drop any object. A central processing unit using Raspberry Pi will take sonar sensor input and control the motor drivers to move freely. Artificial intelligence technology integrated with an image processing unit that will be able to remember its owner and track objects. Four motorized wheels that can be controlled by the user or the robot itself make the robot move to any direction or place. The cameras and microphones will be equipped in the robot to help the robot recognize

environments. This mechanism in the robot will allow helping elderly and impaired person inhouse work The proposed design is implemented and successfully verified through commanding to accomplish different work.

Source: https://ieeexplore.ieee.org/abstract/document/9331121

An IoT Based Smart Irrigation System

Author: Abir Ahmed et al.

Brief Description:

This paper aims to deliver a smart and cost-effective irrigation system. The main objective of this paper is to integrate a real-time monitoring system, remote controlling and cloud computation of acquired data. The system operates on some designated parameter ratings. Depending on the parameter values, the system executes actions such as switching the motor on and off. Adding to that, this paper also offers a user-friendly experience with the help of the mobile application which enables the users to operate the system. A website has also been developed for the user which contains various news and parameters related to agriculture in Bangladesh. Along with that it contains a manual guide of threshold parameter values for various crops. This will also help the user to Figure out if their surroundings are suitable enough for their desired agricultural system.

Source: https://ieeexplore.ieee.org/document/9331092

Design of Smart Biofloc for Real-Time Water Quality Management System

Author: Abir Ahmed et al.

Brief Description:

Indoor fish farming quality heavily depends on water quality management. Full-time monitoring can be a way to improve the management system but the conventional manual process cannot ensure efficient monitoring. Human eyes cannot detect all physical and chemical parameters. Internet of Things (IoT) can play a vital role to monitor, manage water quality to flourish the indoor Aquaculture Industry. In this paper, an IoT based model is proposed considering all chemical aspects and a prototype is implemented. A mobile application is also developed for real-time monitoring and controlling all the devices which can stabilize the system if any parameter exceeds the ideal value.

Source: https://ieeexplore.ieee.org/document/9331166

UWB Microwave Imaging for Non-Invasive Anomaly Detection in Human Lung and Possible Application in COVID-19 Diagnosis: A Review

Author: Abir Ahmed et al.

Brief Description:

In this paper an overview of the general process and important design factors of UWB Microwave Imaging is given for medical purposes, and the feasibility of its application in the context of COVID-19 detection is discussed in brief. The recent research into COVID-19 detection using other imaging technologies are reviewed for the sake of comparison, and the research limitations for employing UWB imaging for the same goal with acceptable results are identified.

Source: https://ieeexplore.ieee.org/document/9331250

Significant reduction of defect states and surface tailoring in ZnO nanoparticles via nano-bio interaction with glucose for bio-applications

Author: Bithi Paul et al.

Brief Description:

In this study, we have investigated the structural and optical properties of nanoconjugates (NJs) consisting of phase pure zinc oxide (ZnO) nanoparticles (NPs) with glucose biomolecules. All NJs were fabricated using a standard biochemical synthesis process. Structural, optical, vibrational, and biochemical interface properties of nano-bio composites are probed by different complementary characterization techniques. The XRD patterns of the NPs and NJs illustrate a highly phase pure ZnO structure. A visible green emission in the photoluminescence spectrum, mainly associated with the oxygen vacancies on the surface of ZnO nanostructure, is significantly reduced by the incorporation of glucose biomolecules. The strong binding interaction of glucose biomolecule on the surface of ZnO NPs results in the reduction in green-yellow-orange emission intensities. The interaction of glucose molecules modifies oxygen vacancies by capturing free electrons from the ZnO surface region. Significant changes in the peak intensity and relative peak position of some of the glucose and ZnO NPs in Raman spectra refer to the direct binding between these two nano- and bio-components. In the X-ray photoelectron spectroscopy, the binding energy of O 1s core level in NJs increases from 531 eV (O 1s core level position for ZnO) and the increment is more with higher initial glucose concentration in the solution during synthesis. This study serves as a promising platform for the development of new kinds of NJs and investigation of their interfacial properties which can take the frontier forward for integration and multifunctionality.

Source: https://doi.org/10.1109/TNB.2019.2919231

Fabrication and ferromagnetic resonance study of BZT-BCT/LSMO heterostructure films on LAO and Pt

Author: Bithi Paul et al.

Brief Description:

In this article, dynamic magnetic properties of La0.7Sr0.3MnO3 (LSMO) thin film capped with a Pb-free ferroelectric BZT-BCT layer deposited on two different substrates, i.e. lanthanum aluminate (LAO) and Platinum (Pt), by pulsed laser deposition (PLD) have been investigated using ferromagnetic resonance (FMR) spectroscopy. The heterostructures of BZT-BCT/LSMO on LAO substrate were highly (0 0 l)-oriented whereas these were randomly oriented on Pt substrate. The well-behaved M-H hysteresis loops were observed at room temperature for both heterostructures indicating the ferromagnetic behavior of LSMO. The right shift of the hysteresis loop of the heterostructure was observed due to the magnetoelectric coupling between ferroelectric and ferromagnetic layers. The FMR measurements yield optimum values of different important parameters such as the linewidth offset, Gilbert damping, gyromagnetic ratio, and in-plane uniaxial anisotropy field of the thin films, which are essential to design spin valve and magnetic tunneling based devices. We found the lowest Gilbert damping parameter of ∼0.03 for the BZT-BCT/LSMO/LAO heterostructure due to spin orbit coupling. In addition, the gyromagnetic ratio was also obtained to be small (0.002 GHz/Oe) in the same film. These results open new possibilities to use BZT-BCT/LSMO heterostructure for future spintronic device applications.

Source: https://doi.org/10.1016/j.jmmm.2019.01.098

Structural, Electronic, and Magnetic Analysis and Device Characterization of Ferroelectric–Ferromagnetic Heterostructure (BZT–BCT/LSMO/LAO) Devices for Multiferroic Applications

Author: Bithi Paul et al.

Brief Description:

Ferroelectricity and ferromagnetism have been investigated in a lead-free 0.5Ba(Zr 0.2 Ti 0.8)O 3 -0.5(Ba 0.7 Ca 0.3)TiO 3 (BZT-BCT)/La 0.7 Sr 0.3 MnO 3 (LSMO) heterostructure for multiferroic (MF) applications. The BZT-BCT thin film has been grown on LSMO/lanthanum aluminate, LaAlO 3 (LAO) by pulsed laser deposition (PLD). Prior to that, the LSMO layer was deposited on a single-crystal LAO substrate by PLD. The epitaxial growth of the (001) oriented films was confirmed by X-ray diffraction analysis. The small value of the full-width at half-maximum of the rocking curve peak (0.1°) performed about (002) plane of the BZT-BCT film indicates an out-of-plane orientation of the film. The polarization switching behavior in the heterostructure device was observed with a remnant polarization of ~47 μC/cm 2 and a coercive field of ~180kV/cm at an applied voltage of 5 V. The frequency-dependent relative dielectric constant varies in-between 5100 and 4900 in the frequency range from 1 to 50 kHz during the dielectric measurements of the fabricated

device. The observed low value of the dielectric loss (0.02) confirms the outstanding quality of the ferroelectric device. A well-saturated room temperature magnetization-applied field curve, with a coercive field of ~1200A/m and a remnant magnetization of ~110kA/m, was observed in the LSMO/LAO system indicating the ferromagnetic behavior of the film. The temperature-dependent magnetization of the LSMO film exhibits a ferromagnetic-to-paramagnetic transition at ~360K. These results on all solid-state ferroelectric-ferromagnetic heterostructure using BZT-BCT and LSMO open viable possibilities for MF applications.

Source:
http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=8500758&source=authoralert

Heatline analysis for mixed convection flow of nanofluid in a two sided lid-driven cavity with a heat generating block: effect of Reynolds number

Author: Ayesha Siddiqua et al.

Brief Description:

Mixed convective flow and heat transfer characteristics of nanofluid inside a double lid driven cavity with a square heat generating block is analyzed numerically based on heatline approach. The upper and lower lids of the cavity are kept adiabatic and are moving in opposite direction while the other two boundaries are kept fixed at uniform temperature Tc. The water-alumina nanofluid is chosen as the operational fluid through the enclosure. The governing differential equations with proper boundary conditions are solved by Finite Element Method using Galerkin's weighted residual scheme. Calculations are performed for different Reynolds number such as 20, 50, 100 and 150. Results are shown in terms of stream lines, isothermal lines, heatlines, average Nusselt number and average temperature. An enhancement in heat transfer rate is observed with the variation of Reynolds number.

Source: https://doi.org/10.1063/1.511591

Integrating Factor for Non-exact Reducible to Homogeneous Ordinary Differential Equations,

Author: Ayesha Siddiqua et al.

Brief Description:

1st order 1st degree reducible homogeneous ordinary differential equations (ODE) are usually solved by variable separable method after reduced it to homogeneous. In this note an integrating factor technique is proposed to solve the reducible to homogeneous ODE after reduced it to homogeneous form in an unconventional way.

Source: http://doi.org/10.5281/zenodo.4590203

Assessment of heavy metals and water quality parameters of Buriganga river of Dhaka, Bangladesh: A review

Author: Ayesha Siddiqua et al.

Brief Description:

The intention of this work is to mark out the literature survey of water pollution of Buriganga River. The method used for this write-up is a survey of scholarly journal articles, web materials, academic books, conference papers, project reports and freely accessible materials on the Buriganga river water pollution. All previous writers whose works were checked, concurred on water pollution and spatial variation of physicochemical parameters over time and location more than other sources in terms of both chemical and physical water toxins that shown uplifted values of major chemical parameters (lead, cadmium, chromium, copper and some anions) beyond the acceptable/lower limits set by administrative bodies. Authors also agreed on the issue that human, aquatic and physical environment are in alarming situation due to rising values of chemical parameters. From the survey and analyzing the output of past studies, we can conclude that Buriganga river is polluted and water must be treated before use both for domestic and industrial purposes to avoid the spread of epidemics. Proposals of the scrutiny incorporate: (1) consistent survey of Buriganga river water pollution; (2) strict organization of directions water quality benchmarks and (3) Well-planned monitoring of the environments of water bodies by authorities and the local people.

Impact of COVID-19 on Academic and Psychological aspects of Undergraduate Students in Bangladesh: A Case Study

Author: Ayesha Siddiqua et al.

Brief Description:

Undergraduate students are considered susceptible in terms of anxiety, drug abuse, depression, and bad dietary habits in comparison to the general people. Their academic and psychological facets have severely been altered due to COVID-19 pandemic. The objective of this study is to identify the effect of COVID-19 on the academic and psychological aspects of undergraduate students in Bangladesh accompanied by other pertinent factors. Data were accumulated from the undergraduate students of the Fall semester 2020-21 of American International University-Bangladesh (AIUB) by questionnaire provided through Microsoft Forms. The associations among the variables were assessed through the chi-square test. All the statistical analyses required to meet the goals of the study were done through Statistical Package for Social Sciences (SPSS). Nearly one-fourth of the students suffered from anxiety and depression at an extreme level while close to one-third of them suffered quite a bit signaling a tormenting psychological state of the students. Chi-square tests found that depression, anxiety, study hour, assessment of online learning, and income issue due to COVID-19 of the student had a highly significant association

with effects on their study and psychological aspects. Failure to address the aforesaid issues during an epidemic might have negative consequences on the academic and psychological aspects in the long run.

Source: https://doi.org/10.53799/ajse.v20i3.169

Application of Fuzzy Logic for Collision Avoidance of Mobile Robots in Dynamic-Indoor Environments

Author: Asif Mahfuz et al.

Brief Description:

Application of Mobile Robots have increased many folds in recent years. A heuristic effort is dedicated in making Mobile Robots adept to indoor environments to perform different type of activities. Autonomous Mobile Robots, for a long time, have remained in the focal point of many researches due to its potentials in multifunctional application and its suitability in well-defined, structured environments. As indoor environments can easily be represented as a structured environment, mobile robots become a potential candidate to make indoor activities human free. Nevertheless, the prime features like path planning and motion control need to have further development s before these autonomous mobile robots can be used successfully in highly dynamic environments. One of the important behaviors to achieve successful motion planning is the collision avoidance behavior of mobile robots. In this paper, we address the design of a collision avoidance controller with fuzzy logic. The first part of the paper addresses the improvement of the existing fuzzy logic controller for a more complex environment involving more than two known-dynamic obstacles. And in the second part, we have improved the design of the controller for unknown-dynamic obstacles in indoor environment based on information of onboard sensor. The results of the MATLAB simulations, in structured 2D environments, illustrates the successful navigation of mobile robots in both scenarios and thus validating the design of the controllers.

Source: https://doi.org/10.1109/ICREST51555.2021.9331072

Primary frequency control of large-scale PV-connected multi-machine power system using battery energy storage system

Author: Asif Mahfuz et al.

Brief Description:

Large-scale grid-tied photovoltaic (PV) station are increasing rapidly. However, this large penetration of PV system creates frequency fluctuation in the grid due to the intermittency of solar irradiance. Therefore, in this paper, a robust droop control mechanism of the battery energy

storage system (BESS) is developed in order to damp the frequency fluctuation of the multi-machine grid system due to variable active power injected from the PV panel. The proposed droop control strategy incorporates frequency error signal and dead-band for effective minimization of frequency fluctuation. The BESS system is used to consume/inject an effective amount of active power based upon the frequency oscillation of the grid system. The simulation analysis is carried out using PSCAD/EMTDC software to prove the effectiveness of the proposed droop control-based BESS system. The simulation result implies that the proposed scheme can efficiently curtail the frequency oscillation.

Source: https://ijpeds.iaescore.com/index.php/IJPEDS/article/view/21459

UWB Microwave Imaging for Non-Invasive Anomaly Detection in Human Lung and Possible Application in COVID-19 Diagnosis: A Review

Author: Md Ashif Islam Oni et al.

Brief Description:

In this paper an overview of the general process and important design factors of UWB Microwave Imaging is given for medical purposes, and the feasibility of its application in the context of COVID-19 detection is discussed in brief. The recent research into COVID-19 detection using other imaging technologies are reviewed for the sake of comparison, and the research limitations for employing UWB imaging for the same goal with acceptable results are identified.

Source: https://ieeexplore.ieee.org/document/9331250

Energy conservation of nanofluids from a biomagnetic needle in the presence of Stefan blowing: Lie symmetry and numerical simulation.

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

Thermal energy management associated with the transmission of heat is one of the main problems in many industrial setups (e.g. pharmaceutical, chemical and food) and bio-engineering devices (e.g. hospital ventilation, heating, cooling devices, heat exchanger and drying food, etc). The current study aims to examine thermo-bioconvection of oxytactic microorganisms taking place in a nanofluid-saturated needle with the magnetic field. Stefan-blowing is applied. The leading equations of continuity, momentum and energy, species transport equations for oxygen concentration and population density of microorganisms are reduced dimensionless and Lie symmetry group transformations are used to generate appropriate invariant transformations. The resulting similarity boundary value problem (in which the blowing parameter is coupled with concentration) have been simulated using MATLAB (2015a) bvp5c built in function. The impact

of the emerging factors on the nondimensional velocity, temperature, nanoparticle concentration and motile microorganism density functions and their slopes at the wall, are pictured and tabulated. Justifications with published results are included. It is found that all physical quantities decrease with Stefan blowing and increase with power law index parameter. With elevation in magnetic field parameter i.e., Lorentzian drag force, the friction factor reduces while the local Nusselt number, local Sherwood number, and the local motile microorganism density wall gradient increase. Present study could be used in fooc.d and pharmaceutical industries, chemical processing equipment, fuel cell technology, enhanced oil recovery, etc.

Source: https://doi.org/10.1016/j.csite.2021.100861

Multiple slip effects on nanofluid dissipative flow in a converging/diverging channel: A numerical study

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

A mathematical model is developed for viscous slip flow and heat transfer in water/Ethylene glycol-based nanofluids containing metallic oxide nanoparticles, through a converging/diverging channel. We adopt the single-phase Tiwari–Das model. The governing equations are transformed to a set of similarity differential equations with the help of similarity transformation, before being solved numerically using Maple 20. Validation of the velocity gradient and temperature solutions is achieved with the second-order implicit finite difference Keller Box method. Further validation is included for the special case of no-slip nanofluid flow in the absence of viscous heating. The effects of the parameters, namely velocity slip, thermal jump, channel apex angle, Eckert number, Prandtl number, Reynolds number, and nano-particle volume fraction on velocity, temperature, skin friction, and heat transfer rate are investigated in detail. It is found that with increasing velocity slip, for water-TiO_2 and ethylene glycol-TiO_2 nanofluids, the channel bulk flow is decelerated whilst with greater solid (nanoparticle) volume and in the presence of momentum slip, the flow is also retarded. With the increasing semivertex angle, the channel flow is generally accelerated. An increase in divergent semiangle leads to decelerate the flow from the centerline for the core flow region, whereas near and at the channel wall, it results in a *weak acceleration*. Higher temperatures are achieved with greater thermal slip values, for both water-TiO_2 and ethylene glycol-TiO_2 nanofluids, whereas for greater nanoparticle volume fraction, temperatures are weakly decreased for water-TiO_2 whereas a more significant decrease is observed for ethylene glycol-TiO_2 nanofluid. With a greater diverging channel angle, a substantial decrease in temperatures is caused by greater Reynolds numbers, and the reverse effect is computed for the

converging channel. The novelty of the current work is that it extends previous studies to include multiple slip effects and viscous heating (Eckert number effects), which are shown to exert a significant influence on heat and momentum transfer characteristics. The study is relevant to certain pharmaco-dynamics devices (drug delivery), next-generation 3D nanotechnological printers, and also nano-cooling systems in energy engineering where laminar flows in diverging/converging channels arise

Source: https://doi.org/10.1002/htj.22341

Numerical investigation of Von Karman swirling bioconvective nanofluid transport from a rotating disk in a porous medium with Stefan blowing and anisotropic slip effects

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

In recent years, significant progress has been made in modern micro- and nanotechnologies for micro/nano-electronic devices. These technologies are increasingly utilizing sophisticated fluid media to enhance performance. Among the new trends is the simultaneous adoption of *nanofluids and biological micro-organisms.* Motivated by bio-nanofluid rotating disk oxygenators in medical engineering, in the current work, a mathematical model is developed for steady convective von-Karman swirling flow from an impermeable radially stretched disk rotating in a Darcy porous medium saturated with nanofluid doped with gyrotactic micro-organisms. Anisotropic slip at the wall and blowing effects due to concentration are incorporated. The nano-bio transport model is formulated using nonlinear partial differential equations, which are transformed to a set of similarity ordinary differential equations (SODEs) by appropriate transformations. The transformed boundary value problem is solved by a Chebyshev spectral collocation method (CSCM). Impacts of key parameters on dimensionless velocity components, concentration, temperature and motile microorganism density distributions are investigated and graphically visualized. Validation with previous studies is included. It is found that that the effects of suction provide a better enhancement of the heat, mass and microorganisms transfer in comparison to blowing. Moreover, physical quantities decrease with higher slip parameters irrespective of the existence of blowing. Temperature is suppressed with increasing thermal slip, while nanoparticle concentration is suppressed with increasing wall mass slip. Micro-organism density number increases with the greater microorganism slip. Radial skin friction is boosted with positive values of the power law stretching parameter, whereas it is decreased with negative values. The converse response is computed for circumferential skin friction, nanoparticle mass transfer rate and motile micro-organism density number gradient. Results from this study are relevant to novel bioreactors, membrane oxygenators, food processing and bio-chromatography.

Source: https://doi.org/10.1177/0954406220973061

Magnetohydrodynamic bio-nano-convective slip flow with Stefan blowing effects over a rotating disc

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

Microfluidic-related technologies and micro-electromechanical systems–based microfluidic devices have received applications in science and engineering fields. This article is the study of a mathematical model of steady forced convective flow past a rotating disc immersed in water-based nanofluid with microorganisms. The boundary layer flow of a viscous nanofluid is studied with multiple slip conditions and Stefan blowing effects under the magnetic field influence. The microscopic nanoparticles move randomly and have the characteristics of thermophoresis, and it is being considered that the change in volume fraction of the nanofluid does not affect the thermo-physical properties. The governing equations are nonlinear partial differential equations. At first, the nonlinear partial differential equations are converted to system of nonlinear ordinary differential equations using suitable similarity transformations and then solved numerically. The influence of relevant parameters on velocities, temperature, concentration and motile microorganism density is illustrated and explained thoroughly. This investigation indicated that suction provides a better medium to enhance the transfer rate of heat, mass and microorganisms compared to blowing. This analysis has a wide range engineering application such as electromagnetic micro pumps and nanomechanics.

Source: https://doi.org/10.1177%2F2397791419881580

Numerical study of self-similar natural convection mass transfer from a rotating cone in anisotropic porous media with Stefan blowing and Navier slip

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

A mathematical model is presented for laminar, steady natural convection mass transfer in boundary layer flow from a rotating porous vertical cone in anisotropic high-permeability porous media. The transformed boundary value problem is solved subject to prescribed surface and free stream boundary conditions with a Maple 17 shooting method. Validation with a Chebyshev spectral collocation method is included. The influence of tangential Darcy number, swirl Darcy number, Schmidt number, rotational parameter, momentum (velocity slip), mass slip and wall mass flux (transpiration) on the velocity and concentration distributions is evaluated in detail. The computations show that tangential and swirl velocities are enhanced generally with increasing permeability functions (i.e., Darcy parameters). Increasing spin velocity of the cone accelerates the tangential flow, whereas it retards the swirl flow. An elevation in wall suction depresses both tangential and swirl flow. However, increasing injection generates acceleration

in the tangential and swirl flow. With greater momentum (hydrodynamic) slip, both tangential and swirl flows are accelerated. Concentration values and Sherwood number function values are also enhanced with momentum slip, although this is only achieved for the case of wall injection. A substantial suppression in tangential velocity is induced with higher mass (solutal) slip effect for any value of injection parameter. Concentration is also depressed at the wall (cone surface) with an increase in mass slip parameter, irrespective of whether injection or suction is present. The model is relevant to spin coating operations in filtration media (in which swirling boundary layers can be controlled with porous media to deposit thin films on industrial components), flow control of mixing devices in distillation processes and also chromatographical analysis systems.

Source: https://link.springer.com/article/10.1007/s12648-019-01520-9

Boundary layer flow of a nanofluid past a horizontal flat plate in a Darcy porous medium: A Lie group approach

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

This research paper addresses the two-dimensional steady laminar incompressible free convective flow of a nanofluid past a horizontal plate saturated in the porous medium, where both the thermal and the mass convective boundary conditions are taken into consideration. Mathematical modeling via similarity transformations (which was developed using one-parameter continuous group of transformation) was applied to obtain a reduced mathematical model, which describes the problem. The solutions of the reduced system were obtained by a numerical method called the fourth- and fifth-order Runge–Kutta–Fehlberg method with the aid of computational software called Maple version 13. The resulting distributions of dimensionless temperature, velocity, and nanoparticle volume fraction are studied graphically to demonstrate the effect of pertinent parameters. Moreover, some of the new findings are shown in graphs. An excellent agreement was found after comparing the results with the previous literature, which assures the validity of the analysis. It is found that the flow is accelerated with an increase in thermal and mass convective parameters. Temperature and concentration are enhanced for rising values of (thermal and concentration) conjugate parameters.

Source: https://doi.org/10.1177/0954406219896594

Non-similar solution of g-jitter induced unsteady magnetohydrodynamic radiative slip flow of nanofluid

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

We present a mathematical model and numerical simulation of the unsteady 2-D g-jitter-free and forced the convective flow of water-based nanofluid from a flat plate, considering both the velocity slip and thermal slip conditions imposed on the wall of the plate. The Darcian model is used, and both cases of a calm and moving free stream are considered. In place of the extensively used linearly varying radiative heat flux, the nonlinearly varying heat flux calculation is applied to produce practically useful results. Further, we incorporate the "zero mass flux boundary condition" which is believed to be more realistic than the earlier extensively used "actively" controlled model. The parameter influences the non-dimensional velocity, temperature, nanoparticle volume fraction, skin friction and heat transfer rates are visualized graphically and discussed in detail. Special cases of the results are benchmarked with those existing in the literature, and a good arrangement is obtained. It is found that the rate of heat transfer is lower for the calm free stream rather than the moving free stream.

Source: https://doi.org/10.3390/app10041420

Title: Influence of variable viscosity and thermal conductivity, hydrodynamic, and thermal slips on magnetohydrodynamic micropolar flow: A numerical study

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

Thermophysical and wall slip effects arise in many areas of nuclear technology. Motivated by such applications, in this article the collective influence of variable viscosity, thermal conductivity, velocity and thermal slips effects on a steady two dimensional magnetohydrodynamic microplar fluid over a stretching sheet are analyzed numerically. The governing nonlinear partial differential equations have been converted into a system of non-linear ordinary differential equations using suitable coordinate transformations. The numerical solutions of the problem are expressed in the form of non-dimensional velocity and temperature profiles and discussed from their graphical representations. Nachtsheim-Swigert shooting iteration technique together with the sixth order Runge-Kutta integration scheme has been applied for the numerical solution. A comparison with the existing results has been done and an excellent agreement is found. Further validation with adomian decomposition method is included for the general model. Interesting features in the heat and momentum characteristics are explored. It is found that greater thermal slip and thermal conductivity elevate thermal boundary layer thickness. Increasing Prandtl number enhances Nusselt number at the wall but reduces wall couple stress (micro-rotation

gradient). Temperatures are enhanced with both magnetic field and viscosity parameter. Increasing momentum (hydrodynamic) slip is found to accelerate the flow and elevate temperatures.

Source: https://doi.org/10.1002/htj.21575

Magnetohydrodynamic bio-nanoconvective Naiver slip flow of micropolar fluid in a stretchable horizontal channel

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

The purpose of this paper is to formulate and analyze a nano-bio transport model for magnetohydrodynamic convective flow, heat, and mass diffusion of micropolar fluid containing gyrotactic microorganisms through a horizontal channel. Both the walls are considered to be stretched, and the Navier slip boundary condition is taken into account. The governing bio-nano transport partial differential equations are rendered to ordinary differential equations using similarity variables. The resulting normalized self-similar boundary value problem is solved computationally with the Matlab bvp4c function. The effect of the controlling parameters on the nondimensional velocity, temperature, nanoparticle concentration, and motile microorganism density functions, and their gradients at the wall are visualized graphically and in a tabular form and expounded at length. Validation with a previous simpler model is included. All physical quantities, except the local Nusselt number, increases with an increase in the velocity slip and magnetic parameters. The present problem finds applications in industries related to pharmaceutical, nanofluidic devices, microbial enhanced oil recovery, modeling oil, and gas-bearing sedimentary basins.

Source: https://doi.org/10.1002/htj.21560

Numerical solution of bio-nano-convection transport from a horizontal plate with blowing and multiple slip effects

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

In this paper, a new bio-nano-transport model is presented. The effects of first- and second-order velocity slips, thermal slip, mass slip, and gyro-tactic (torque-responsive) microorganism slip of bioconvective nanofluid flow from a moving plate under blowing phenomenon are numerically examined. The flow model is expressed by partial differential equations which are converted to a similar boundary value problem by similarity transformations. The boundary value problem is converted to a system of nonlinear equations which are then solved by a Matlab nonlinear equation

solver fsolve integrated with a Matlab ODE solver ode15s. The effects of selected control parameters (first order slip, second order slip, thermal slip, microorganism slip, blowing, nanofluid parameters) on the non-dimensional velocity, temperature, nanoparticle volume fraction, density of motile micro-organism, skin friction coefficient, heat transfer rate, mass flux of nanoparticles and mass flux of microorganisms are analyzed. Our analysis reveals that a higher blowing parameter enhances micro-organism propulsion, flow velocity and nano-particle concentration, and increases the associated boundary layer thicknesses. A higher wall slip parameter enhances mass transfer and accelerates the flow. The MATLAB computations have been rigorously validated with the second-order accurate finite difference Nakamura tri-diagonal method. The current study is relevant to microbial fuel cell technologies which combine nanofluid transport, bioconvection phenomena and furthermore can be applied in nano-biomaterials sheet processing systems.

Source: https://doi.org/10.1177/0954406219867985

Stefan Blowing and Slip Effects on Unsteady Nanofluid Transport Past a Shrinking Sheet: Multiple Solutions

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

The aim of a present article is to investigate the laminar unsteady two-dimensional boundary layer flow of a nanofluid with Stefan blowing and slip effect. First, governing boundary layer equations are converted in the ordinary form of the differential equations (ODEs) from partial differential equations using appropriate coordinate transformations. The obtained ODEs are then solved by applying a shooting method with the Runge-Kutta fourth order method by implementation of the Maple software. The influences of different controlling dimensionless parameters over the dimensionless velocity, temperature, concentration, friction factor, local heat as well as mass transfer have been discussed and represented by plots. It is found that there exist dual solutions for the different applied nanofluid parameters along with the blowing parameter. The results reveal that by increasing the values of the Brownian motion (Nb), thermophoresis (Nt) and blowing parameters (fw), the skin friction increases (decreases) in the first (second) solution.

Source: https://doi.org/10.1002/htj.21470

Three-Dimensional Bioconvection Nanofluid Flow from a Bi-Axial Stretching Sheet with Anisotropic Slip

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

A theoretical study is presented for three-dimensional flow of bioconvection nanofluids containing gyrotactic microorganisms over a bi-axial stretching sheet. The effects of anisotropic slip, thermal jump and mass slip are considered in the mathematical model. Suitable similarity transformations are used to reduce the partial differential equation system into a nonlinear ordinary differential system. The

transformed nonlinear ordinary differential equations with appropriate transformed boundary conditions are solved numerically with the bvp4c procedure in the symbolic software, MATLAB. The mathematical computations showed that an increase in Brownian motion parameter corresponds to a stronger thermophoretic force which encourages transport of nanoparticles from the hot bi-axial sheet to the quiescent fluid. This increases the nanoparticle volume fraction boundary layer. Fluid temperature and thermal boundary layer thickness are decreased with increasing stretching rate ratio of the bi-axial sheet. The present simulation is of relevance in the fabrication of bio-nanomaterials and thermally-enhanced media for bio-inspired fuel cells.

Source: http://dx.doi.org/10.17576/jsm-2019-4805-23

MHD boundary layer bionanoconvective non-Newtonian flow past a needle with Stefan blowing

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

The purpose of the article is to present a transport model for magnetohydrodynamics-forced convective non-Newtonian boundary flow from a thin needle in a nanofluid in the presence of microorganisms and Stefan blowing. The governing equations are reduced to ordinary differential equations with the help of similarity transformations and then numerically solved by using the Matlab bvp4c function. The effect of various emerging parameters on the flow field, heat, mass, and density of motile microorganisms transfer was computed and studied. It was found that some of the parameters have an important effect on the boundary layer thickness. Justification with earlier simpler model in the absence of magnetic field is included. The model finds applications in various transdermal delivery system, biomedical electromagnetic treatments and to design new medical devices for cell delivery to the central nervous system.

Source: https://doi.org/10.1002/htj.21403

Computation of Melting Dissipative Magnetohydrodynamic Nanofluid Bioconvection with Second-order Slip and Variable Thermophysical Properties

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

This paper studies the combined effects of viscous dissipation, first and second-order slip and variable transport properties on phase-change hydromagnetic bio-nanofluid convection flow from a stretching sheet. Nanoscale materials possess a much larger surface to volume ratio than bulk materials, significantly modifying their thermodynamic and thermal properties and substantially lowering the melting point. Gyrotactic non-magnetic micro-organisms are present in the nanofluid. The transport properties are assumed to be dependent on concentration and temperature. Via appropriate similarity variables, the governing equation with boundary conditions are converted to nonlinear ordinary differential equations and are solved using the BVP4C subroutine in the symbolic software MATLAB. The

non-dimensional boundary value features a melting (phase change) parameter, temperature-dependent thermal conductive parameter, first as well as second-order slip parameters, mass diffusivity parameter, Schmidt number, microorganism diffusivity parameter, bioconvection Schmidt number, magnetic body force parameter, Brownian motion and thermophoresis parameters. Extensive computations are visualized for the influence of these parameters. The present simulation is of relevance in the fabrication of bio-nanomaterials for bio-inspired fuel cells.

Source: https://doi.org/10.3390/app9122493

UNSTEADY MHD BIO-NANOCONVECTIVE ANISTROPIC SLIP FLOW PAST A VERTICAL ROTATING CONE

Author: MOHAMMED JASHIM UDDIN et al.

Brief Description:

The MHD bioconvective of nanofluid flow past a rotating cone with anistropic velocity slips, thermal slip, mass slip and microorganism slips is studied theoretically and numerically. Suitable similarity transformations are used to transform the governing boundary-layer equations into non-linear ODE which were then solved numerically. The effect of the governing parameters on the dimensionless velocities, temperature, nanoparticle volume fraction (concentration), density of motile microorganisms as well as on the local skin friction, local Nusselt, Sherwood number and the local motile microorganism numbers are examined. Results from this investigation were compared with previous related investigations and good agreement was found. It is found that for both in the presence and absence of magnetic field, increasing velocity slips reduce the friction factor. It is also found that increasing thermal slip, mass slip and microorganism slips strongly reduce heat, mass and microorganism transfer, respectively. This study is relevant in bio-chemical industries in which microfluidic devices involved.

Source: http://thermalscience.vinca.rs/2019/2/2

Predicting Bowling Performance in Cricket from Publicly Available Data

Author: Aneem Al Ahsan Rupai et al.

Brief Description:

Cricket is one of the most popular games worldwide. The aim of this paper is to predict bowlers' performance from publicly available data. Team management follows different strategies to win in the tournaments. They anticipate bowlers' performance of the opposite team in diverse conditions and prepare their batsmen accordingly. Similarly, they also foresee the strength and weakness of opponent teams' batsmen and suggest their bowlers to perform different tricks in various environments. In this paper, we build a machine learning based approach to predict bowler's performance in varying conditions by using 6,031 bowling instances of One day International (ODI) matches. Our classifier shows substantial prediction potential to predict bowler's performance.

Source: https://dl.acm.org/doi/abs/10.1145/3377049.3377112

Introduction- Blockchain in Data Analytics

Author: Aneem Al Ahsan Rupai et al.

Brief Description:

Blockchain is one of the most-hyped topics of the computing world recently, as well as in the financial technology (FinTech) industry. Experts say that the future of monetary transactions, and secure information exchange rests on the shoulders of blockchain. Blockchain provides the potential to change how the world moves forward. For example, if you want to buy any asset, such as a house, vehicle, or any other tangible or intangible property, you currently need to go through a lot of paperwork and labor-intensive effort. However, blockchain makes life easier, and accomplishes these cumbersome functions within a short period of time. Blockchain can be defined as a simple block of transparent digital information which is highly secured and shareable, but immutable. Transparent digital information means the data exploited is traceable and identifiable. In this chapter, we present briefly what blockchain is, how it works, and what the major application areas in the real world are.

Machine Translation from Natural Language to Code Using Long-Short Term Memory

Author: Rashidul Hasan Nabil et al.

Brief Description:

Making computer programming language more understandable and easy for the human is a longstanding problem. From assembly language to present day's object-oriented programming, concepts came to make programming easier so that a programmer can focus on the logic and the architecture rather than the code and language itself. To go a step further in this journey of removing human-computer language barrier, this paper proposes machine learning approach using Recurrent Neural Network (RNN) and Long-Short Term Memory (LSTM) to convert human language into programming language code. The programmer will write expressions for codes in layman's language, and the machine learning model will translate it to the targeted programming language. The proposed approach yields result with 74.40% accuracy. This can be further improved by incorporating additional techniques, which are also discussed in this paper.

Source: https://doi.org/10.1007/978-3-030-32520-6_6

Banking Queue Waiting Time Prediction based on predicted service time using Support Vector Regression

Author: Rashidul Hasan Nabil et al.

Brief Description:

Prediction using different machine learning approaches have been applied in the last few decades in different areas and research fields. Waiting time is an undeniable fact for every queue and it is very important to develop a system that predicts its duration in real life with minimum error. In this paper we applied several machine learning algorithms and among them we chose Support Vector Regression

(SVR) in a real-life Banking queue dataset that contains real-life queues of multiple Banks where we predicted waiting time for everyone in the queue. Moreover, we have compared the result of prediction using SVR with different classifications and clustering methods such as K-nearest-neighbor and K means Clustering. We have shown the feasibility of applying SVR in prediction of waiting time in banking queues of developing countries for everyone, which is applicable, and it performs well in queue analysis.

Source: https://ieeexplore.ieee.org/document/9051490

Blood Count Prediction for Disease Prognosis based on Combined Multi-modal Interaction Model with Related Attributes

Author: Rashidul Hasan Nabil et al.

Brief Description:

Many machine learning approaches have been applied in order to predict different types of diseases over last few years. Early diagnosis and prognosis depending on these predictions have become very necessary for further treatment policy in different sectors. Moreover, in order to predict something like these diseases or abnormality might need real-life data interaction. The importance of these predictions has led many researchers to study bioinformatics and machine learning. However, selecting correct attributes to design prediction models is also necessary. In this paper we have introduced an approach where several machine learning models will be fitted with the related attributes while performing the predictions from data interaction.

Source: https://doi.org/10.1145/3377049.3377059

Agile Understanding Analysis and Comparison Through Students Evaluation

Author: Supta Richard Philip et al.

Brief Description:

The software engineering ideology Agile is becoming increasingly common in the field of software development in comparison with the traditional techniques. Graduates with an advanced understanding of software engineering methodologies are subject to software organizations. Agile has already introduced to the software engineering education through the university curriculum, because of its success. They have begun teaching Agile theoretically, in laboratories effectively and have also held workshops where qualitative experience is exchanged with learners. After having finalized the initiatives in the laboratory by pursuing agile values, this article seeks to fulfill the Agile commitment for witnessing the perception of students who are graduates of Software Engineering course. This paper intended to do a survey type analysis through students after completing their software engineering course, because when they will move to software organizations this will help them to cope up with Agile. They will not feel that they have fallen down to the ocean of Project Management.

Source: https://doi.org/10.1109/ICCIKE47802.2019.9004271

Proposed Service Oriented Architecture for the Inheritance Web App of Bangladesh

Author: Supta Richard Philip et al.

Brief Description:

The software creates an all-round workplace for people's lives and practices, where they progressively incorporate the increased systems of interaction. This study wants to explore the benefits of the Service-Oriented Architecture (SOA) in the daily life of the people of a nation. Cutting-edge demand to reach successful government services, they have to provide services to inhabitants, industries and government chains. To achieve the vision and dream of Digital Bangladesh, the Government of Bangladesh has launched so many e-services for the people of Bangladesh, whereas there is a web application for the family inheritance purpose named "Uttarahdikar" which is available as a web app and Android App. Our objective is to propose an SOA model that will permit the consumers of "Uttaradhikar" to use it efficiently, reliably, effectively. This study will show the real time-saving calculation for the consumers which will create the eagerness and sincerity of the Bangladeshi Nations to use it for their inheritance purpose. The integration structures of other related services to this app will also be discussed in this paper.

Source: https://doi.org/10.1109/ICCAKM46823.2020.9051542

Cluster-based load balancing algorithm for ultra-dense heterogeneous networks

Author: Md Mehedi Hasan et al.

Brief Description:

In a highly dense heterogeneous cellular network, the loads across cells are uneven due to random deployment of cells and the mobility of user equipments (UEs). Such unbalanced loads result in performance degradation such as throughput and handover success. In order to solve the uneven load problem for better network performance, we propose a cluster-based mobility load-balancing algorithm for heterogeneous cellular networks. Traditional mobility load balancing (MLB) schemes that consider only the adjacent neighbors cannot provide enough improvement in network performance. On the other hand, the previous MLB schemes consider neighbors in the entire network suffer from unnecessary MLB actions. However, in the load balancing process, the proposed algorithm considers overloaded cells and their neighbors within then-tiers. First, the algorithm models the network as a directed multi-graph and constructs clusters taking the overloaded cells and their n-tier neighbors. Therefore, by adjusting cell individual offset parameters of the cells in the clusters the algorithm achieves load balancing locally. Since load balancing is performed inside the clusters, the network can be optimized more efficiently by avoiding unnecessary MLB actions. Simulations show that the proposed algorithm distributes the load across the network more evenly than other MLB algorithms, and in a low UE

velocity scenario, it increases the overall network throughput by 6.42% compared to a non-optimized network without an MLB algorithm.

Source: https://ieeexplore.ieee.org/abstract/document/8941047/

Distributed Dynamic Channel Assignment for Sensor Networks in 5G mMTC

Author: Md Mehedi Hasan et al.

Brief Description:

Billions of physical devices are expected to be connected to the Internet by 2020, which will eventually lead to massive machine-type-communication (mMTC), a use case of the fifth generation (5G) wireless access technology. In mMTC, wireless sensor networks (WSNs) can be used to support modern applications such as surveillance and monitoring. To meet the role of mMTC in 5G, cognitive radio technology can be integrated with wireless sensors, and WSNs are then called cognitive radio sensor networks (CRSNs). A channel assignment mechanism is needed to choose licensed channels for the radio interfaces of the sensor nodes. A channel assignment mechanism needs to consider the issue of interference because interference among sensor nodes decreases the performance of the CRSN. In this paper, we propose a channel assignment algorithm for multi-radio multi-channel clustered CRSNs. The proposed algorithm models a network of cluster heads as a conflict graph to determine the interfering links and then chooses different channels for these interfering links to minimize the interference. Using the conflict graph, the algorithm selects different channels to maintain minimum interference among the sensor nodes and to ensure network connectivity. Simulation results show that the proposed algorithm has a 30% higher packet delivery ratio, compared to previous channel assignment mechanism. The algorithm shows robustness to the number of available channels and different clustered routing algorithms.

Source: https://ieeexplore.ieee.org/abstract/document/9016447

A Workflow Based Application Processing System to Reduce Corruption and Public Sufferings In Bangladesh

Author: Raihan Uddin Ahmed et al.

Brief Description:

Corruption and inefficient work processes are hindering the establishment of better governance in Bangladesh. Citizens are dependent upon government services for various activities. Seeking permits for diverse activities is one such service people need frequently. Whether a citizen is applying for a building permit or a driver's license, he or she has to go through a nightmarish process due to corrupt/irresponsible/untrained officials and/or less-then-efficient procedures.

These issues can be dealt with appropriately through the establishment of EGovernment. At a more granular level of the E-Government, an automated computer based application workflow system can drive the processing of any request for any type of permits in a productive manner. We propose such a system in this paper. From submission to resolution, any application for any government permit must go through this workflow system. Timestamps will be used at each state an application goes through to ensure timely processing. It will use auditing to identify irregularities or any non-performing employees. Applicants will have the opportunity to check their application status at any time using SMS or web portal. Our prediction is that such a system will reduce corrupt practices, streamline task management at public sectors and provide citizens with services they deserve in the manner that they deserve them.

Block Chain and Industry 4.0 - Block chain in Data Analytics (Chapter 3)

Author: Dr. Razib Hayat Khan et al.

Brief Description:

Industry 4.0 reveals the fourth industrial revolution that includes Internet of Things (IoT), Cloud Computing, Cyber-Physical system, and Cognitive Science. This enables user to perform real-time system interactions with the help of IoT and cyber-physical systems. This interactive process supervised by tightly integrated algorithms and software. The physical infrastructures are converted to a virtual network which allows decentralized decision making. If we consider the financial sector, decentralization has become the trending concept. Integration of the blockchain comprised of cryptocurrency ensures safety in the digital ledger. Above all, the blockchain is potential enough to build efficient, flexible and optimized business model as well as to ensure the security and trust of all stakeholders.

Bearing this concept, we describe in this chapter about how we can enhance the performance of Industry 4.0 by integrating blockchain. The chapter includes introduction and issues of Industry 4.0, Blockchain implementation, utilization and future business scope to support Industry 4.0.

Source:
https://books.google.com.bd/books?hl=en&lr=&id=z_zLDwAAQBAJ&oi=fnd&pg=PA52&ots=zxWAJ8XTCC&sig=JMeAyr7B7aP-YjzFnLeNTk_J_qc&redir_esc=y#v=onepage&q&f=false

Vehicular cloud computing networks: availability modeling and sensitivity analysis

Author: Dr. Razib Hayat Khan et al.

Brief Description:

Vehicle ad hoc networks (VANETs) have emerged to make traffic more efficient and intelligent. Road side units (RSUs) can act as sensors and as a provider of route information for vehicles. RSUs have processing, storage, and communication capabilities. However, RSUs can suffer from peak requests, non-functional data demands and unavailability. To overcome this deficiency, cloud computing can act as an additional resource, processing part of the requests, named vehicular cloud computing (VCC). This paper uses stochastic Petri nets (SPNs) and reliability block diagrams (RBD) to assess a VCC architecture's availability and reliability with multiple RSUs. Two sensitivity analyses were performed which have identified the model's components that have the most significant impact. In addition to a base model, extended models with greater redundancy were also proposed. The base model has obtained A = 97.68%, and the extended model obtained A = 99.19%. Therefore, the models aim to help network administrators plan more optimised VANET architectures, reducing failures.

Source: https://www.inderscienceonline.com/doi/abs/10.1504/IJSNET.2021.117229

Image Based Automatic Traffic Surveillance System Through Number-Plate identification And Accident Detection

Author: Shuvra Saha et al.

Brief Description:

The unpredictability and blockage of current transportation frameworks frequently produce traffic circumstances that endanger the security of the individuals in question. A simple invention can make easy to control the traffic system. This paper presents a programmed traffic observation framework to gauge significant traffic boundaries from video arrangements utilizing just captures from cameras. A traffic control kit is developed to detect over speeding cars on highways, number plates in Bengali, and initiating emergency call to 999 on detecting accidents. A GPS enabled traffic surveillance camera can detect the location of accident and send message to the traffic control room with location information of accident. A Python program is used to detect over speed which provides accurate speed of a vehicle very fast. OCR Tesseract is used to detect number plate which has very high performance in detecting noisy texts. To identify a case of accident, a simple Python code with Dens-net Architecture is used. A GSM module of the experimental kit initiate the call and message after analyzing the data through a code of C language. Machine Learning (ML) is used to train the program in identifying number plates. It is done by Anaconda.

Source: https://ieeexplore.ieee.org/document/9331102

Comparative Study of Microcell's Performance using Different Models in Different Regions

Author: Shuvra Saha et al.

Brief Description:

In this paper the performance of Microcells was analyzed using MATLAB simulation to create a real-life scenario of radio-waves signals propagating in three different environments: urban, suburban and rural area to find out the signal loss, and from that it is understood which areas are best suited for Microcells. This was achieved using several propagation models of both empirical and deterministic types for comparison purposes like Winner II model, Stanford University Interim (SUI) model, and Ericsson 9999. 1800 MHZ frequency band is considered, as Micro cell works best at this frequency range. For corresponding models, their mathematical model is used to find the Estimated maximum allowable path loss and model loss for 4G LTE process. The results are compared, and it is concluded based on simulation results that Microcells give the best result for Winner II model and poor result for Ericsson 9999 model, while real life results may differ. Mobile phone system like PHS and DECT are using Microcell which covers limited area like mall, hotel or transportation hub.

Source: https://ieeexplore.ieee.org/document/8644121

C-code Implementation of a Shunt Active Power Filter Based on Finite Set Model Predictive Control

Author: Shuvra Saha et al.

Brief Description:

This paper proposes the design of an instantaneous power theory based 3-phase 2-level Shunt Active Power Filter (SAPF) for compensating current harmonics and reactive power using C-codes. The application of Finite Set Model Predictive Control (FS-MPC) for generating the compensating currents is also investigated in this paper. Additionally, the design of a High Pass Filter to extract oscillating component of active power and a controller to balance the dc link voltage is presented. The entire active power filter has been designed using C-codes which allows it to be directly implemented in a real time system. Furthermore, a MATLAB/SIMULINK model has been designed to inspect the operation of the developed active filter.

Source: https://ieeexplore.ieee.org/document/8644287

Internet of Things (IoT): A Review of Its Enabling Technologies in Healthcare Applications, Standards Protocols, Security, and Market Opportunities

Author: Md Masum Billah et al.

Brief Description:

The Internet of Things (IoT) is a methodology or a system that encompasses real-world things to interact and communicate with each other with the assistance of networking technologies. This article describes surveys on advances in IoT-based healthcare methods and reviews the state-of-the-art technologies in detail. Moreover, this review classifies an existing IoT-based healthcare network and represents a summary of all perspective networks. IoT healthcare protocols are analyzed in this context and provide a broad discussion on it. It also initiates a comprehensive survey on IoT healthcare applications and services. Extensive insights into IoT healthcare security, its requirements, challenges, and privacy issues are visualized in IoT surrounding healthcare. In this review, we analyze security and privacy features consisting of data protection, network architecture, Quality of Services (QoS), app development, and continuous monitoring of healthcare that are facing difficulties in many IoT-based healthcare architectures. To mitigate the security problems, an IoT-based security architectural model has been proposed in this review. Furthermore, this review discloses the market opportunity that will enhance the IoT healthcare market development. To conduct the survey, we searched through established journal and conference databases using specific keywords to find scholarly works. We applied a filtering mechanism to collect only papers that were relevant to our research works. The selected papers were then examined carefully to understand their contributions/research focus. Eventually, the paper reviews were analyzed to identify any existing research gaps and untouched areas of research and to discover possible features for sustainable IoT healthcare development.

Source: https://ieeexplore.ieee.org/document/9365708/authors#authors

Data Rate Limit in Low and High SNR Regime for Nakagami-q Fading Wireless Channel

Author: Md. Mazid-Ul-Haque et al.

Brief Description:

Adequate data rate is always desired in wireless communication channels. Previously, few fading models were used to model wireless communication channels and to perform analysis on them. In this paper, analyses of data rate limit of single-input single-output (SISO) wireless communication system over Nakagami-q fading channels are presented. The calculation of capacity has been carried out using small and large limit argument approximations. The analytical solution for channel capacity is presented using small and large limit argument approximations. Where small and large limit argument approx-imations correspond low and high signal-to-noise ratio (SNR) regime. Behavior of channel capacity with respect to SNR and fading parameter respectively has been investigated deeply. The comparison of the channel capacity behavior for

both low SNR and high SNR regime and have also been done and analyzed. It has found that the channel capacity increased with increasing SNR in low SNR regime. The channel capacity also behave in the same manner in high SNR regime as well.

Source:
https://thesai.org/Publications/ViewPaper?Volume=11&Issue=7&Code=IJACSA&SerialNo=76

Fundamental Capacity Analysis for Identically Independently Distributed Nakagami-q Fading Wireless Communication

Author: Md. Mazid-Ul-Haque et al.

Brief Description:

With the advancement in technology, decent transfer rate of data for fast communication is an exigency. Different distributions on different wireless communication channels have been used previously to model them and to do performance analysis on the systems. In this work, capacity analysis of identically independently distributed Nakagami-q fading single-input multiple-output (SIMO) wireless communication is presented. The derivation of channel capacity with the analytical solution have been conducted using small limit argument approximation. Where the small limit argument approximation corresponds to the low signal-to-noise ratio (SNR) regime. SIMO channel capacity behavior with respect to number of receiver antennas and with respect to SNR have been explored in depth. The improvement of capacity is depicted rigorously. It has been found that using Nakagami-q distribution, capacity of the system increases as number of receiver antenna increases. It is also found that the capacity of this SIMO wireless system can be further improved through changing of certain parameters.

Source:
https://thesai.org/Publications/ViewPaper?Volume=11&Issue=9&Code=IJACSA&SerialNo=78

A Robust Fault Detection Scheme Using Wavelet Analysis for High Voltage Transmission

Author: Abu Hena MD Shatil et al.

Brief Description:

The transmission lines repeatedly face an aggregation of shunt-faults and its impact in the real time system increases the vulnerability, damage in load, and line restoration cost. Fault detection in power transmission lines have become significantly crucial due to a rapid increase in number and length. Any kind of interruption or tripping in transmission lines can result in a massive failure over a large area, which necessitates the need of effective protection. The diagnosis of faults helps in detecting and classifying transients that eventually make the protection of transmission lines convenient. In this paper, we propose a Discrete Wavelet Transform (DWT) based technique

for the detection and classification of transmission line faults. The results indicate that the proposed approach is capable of accurately classifying and detecting faults in transmission line with high precision.

Source: http://ijet.pl/index.php/ijet/index

LOAD FACTOR OPTIMIZATION WITH DIFFERENT ALGORITHM

Author: Abu Hena MD Shatil et al.

Brief Description:

The energy is obtained to the primary and secondary substations during high demand, using dynamic weight-based load. The shifting algorithms minimize demand by shifting the load, maximizing utilization and enhancing load factor efficiency by distributing loads over various time frames. Maintaining stable demand and increasing users' consumption is a cost-effective way of increasing output while maximizing the usage of electricity. The load factor would improve in both cases and, thus, reduce the average unit cost per kWh. The main factors in establishing the theory of optimal energy usage are high energy use and the depletion of established energy resources. The existing algebraic theory model approach is incapable of properly optimizing the load factor for a large distribution network, resulting in excessive load energy consumption. To solve this issue, this article proposes many load factor optimization methods. The trend of the grid's load curve is studied in order to achieve the grid's optimum load factor management under various situations. The simulation findings indicate that the Genetic Algorithm approach performs better in terms of control performance and accuracy while optimizing load factors

Source: https://seu.edu.bd/seujeee/downloads/vol_01_issue_02_Jul_2021/SEUJEEE-Vol01Issue02-5.pdf

Design and Comparison of grid connected Permanent Magnet Synchronous Generator Non-salient Pole and Salient Pole Rotor Wind Turbine

Author: Abu Hena MD Shatil et al.

Brief Description:

Variable speed wind turbines are widely used wind energy conversion system (WECS). Among them doubly fed induction generator (DFIG) and permanent magnet synchronous generator (PMSG) are mostly used. PMSG based wind turbines are getting more popular in recent times because of their several advantages over other types. Direct drive capability and low speed operation are some of it’s significant advantage over other type. This paper describes two rotor types of grid connected PMSG, non-salient pole or round pole rotor and salient pole rotor and

shows a comparative study between them. The mathematical model was designed and simulated using Matlab/Simulink. Simulation results have been shown to analyze their performances.

Source: https://ajse.aiub.edu/index.php/ajse/article/view/136

Constrained optimization rosens gradient projection method

Author: Abu Hena MD Shatil et al.

Brief Description:

In node-based shape optimization, there are a vast amount of design parameters, and the objectives, as well as the physical constraints, are non-linear in state and design. Robust optimization algorithms are required. The methods of feasible directions are widely used in practical optimization problems and know to be quite robust. A subclass of these methods is the gradient projection method. It is an active-set method, it can be used with equality and non-equality constraints, and it has gained significant popularity for its intuitive implementation. One significant issue around efficiency is that the algorithm may suffer from zigzagging behavior while it follows non-linear design boundaries. In this work, we propose a modification to Rosen's gradient projection algorithm. It includes the efficient techniques to damp the zigzagging behavior of the original algorithm while following the non-linear design boundaries, thus improving the performance of the method.

Source: https://cardiffjournals.org/constrained-optimization-rosens-gradient-projection-method/

Modeling and Simulation of a Synchronous Generator with Rotor Angle Stability and Solve Inter Area Mode of Oscillation in Power System using Power System Stabilizer(PSS)

Author: Abu Hena MD Shatil et al.

Brief Description:

Power System stabilizers are a form of supplementary control that is used to provide additional damping to the inter area mode oscillations or to stabilize a generator whose voltage regulator gain is such that it may result in negatively damped machine-to-system oscillations under certain conditions. It has seen observed that the damping of these small power oscillations can be improved by leading back appropriate stabilizing signals to the input of the gain's exciter. Some input signals that have been considered in the research are slip speed, accelerating power, frequency. In this manuscript, we will use an establish approach to obtain a preliminary design for a power system stabilizer with slip speed as the feedback signal.

Source: https://ajse.aiub.edu/index.php/ajse/article/view/20

Effective Point of Measurement (EPOM) of Some Ionization Chambers for High Energy Photon Beam Dosimetry used in Radiotherapy for the Treatment of Cancer Patient.

Author: Dr. Humayra Ferdous et al.

Brief Description:

The volumetric effect occupied by the air cavity for the dosimetry of high energy photon beam is impossible to ignore using standard ionization chambers. Hence, the dose measurement should be corrected with a displacement perturbation correction factor (Pdis) or using an Effective Point of Measurement (EPOM). The aim of this study was to calculate the EPOM of some ionization chambers and evaluation of the shift of EPOM that recommended by various international protocols under both reference and non-reference condition. The work was performed with Percentage Depth Dose (PDD) curves by placing chambers (PTW 30013, FC 65G and Semiflex 31010) at the geometrical centers for field size(s) of 5cm × 5cm to 30cm × 30cm at 100 cm Source to Surface Distance (SSD) for photon energy 6, 10 and 15MV respectively. The shift of the cylindrical chambers also estimated from PDD values in comparison with reference PDD values by Parallel Plate Chamber (PPC 40 and Murkus 23343) of 100%, 80% and 50% depth in the water. The present study shows that the effective shift is not only varies with chamber materials but also with photon energy. On the other hand the periodical calibration factor of some ionization chambers at standard procedures were compared with manufacturer values also varies with time which is an important issues for the precision dosimetry in radiotherapy. The details of the EPOM and chamber calibration factor is discussed.

Source: DOI: 10.26717/BJSTR.2019.21.003539

Fabrication of Carbon Nanotube (CNT) by Chemical Vapor Deposition and Investigate the Second Harmonic Response from CNT/Peptide and Si/SiO2/Peptide Interfaces

Author: Dr. Humayra Ferdous et al.

Brief Description:

We observed the second harmonic generation (SHG) intensity from the peptide molecules absorbed carbon nanotube surface grown on the Si/SiO2/Co substrate. We dropped different concentrations of peptide molecules such as 100nM, 1µM and 10µM on the three Si/SiO2/Co/CNT substrate individually. The SHG intensity was measured from the CNT/PEP interface by using 1.17 eV pulsed laser light. The results show that, the SHG intensity increased with increasing the peptide concentrations. In order to confirm about the SHG signal detected from the CNT/PEP interface, we dropped similar concentrations of peptide molecule on the three different Si/SiO2 substrate having no CNT layer individually and we observed the same results as found for CNT/PEP interface. In this case, the SHG intensity also increased with increasing the concentrations of peptide molecules on the surface. So, the generation of second harmonic signal is due the peptide molecule for both cases.

Source: http://www.ijsei.com/papers/ijsei-910120-07.pdf

Synthesis of Bismuth Ferrite Nanoparticles by Modified Pechini Sol-Gel MethodName of the Journal: International

Journal of Science and Engineering Investigations

Author: Dr. Humayra Ferdous et al.

Brief Description:

Different methods have been adopted for preparing BiFeO3 nanopowder. Recently, wet chemical methods [1] have received abundant attention. Among the wet chemical methods, the modified Pechini sol-gel method is very cost effective, simple and suitable for synthesis of highly homogenous and very fine crystalline nanopowder. The process is based on the mixing of reactants that oxidize easily, such as metal nitrates, and an organic chelating agent that acts as reducing agent.

Source: http://www.ijsei.com/papers/ijsei-910120-06.pdf

A Study on CNT/Peptide interface by second harmonic generation (SHG) method

Author: Dr. Humayra Ferdous et al.

Brief Description:

We observed the second harmonic generation (SHG) intensity from the peptide molecules absorbed carbon nanotube surface grown on the Si/SiO2/Co substrate. We dropped different concentrations of peptide molecules such as 100nM, 1µM and 10µM on the three Si/SiO2/Co/CNT substrate individually. The SHG intensity was measured from the CNT/PEP interface by using 1.17 eV pulsed laser light. The results show that, the SHG intensity increased with increasing the peptide concentrations. In order to confirm about the SHG signal detected from the CNT/PEP interface, we dropped similar concentrations of peptide molecule on the three different Si/SiO2 substrate having no CNT layer individually and we observed the same results. In this case, the SHG intensity also increased with increasing the concentrations of peptide molecules on the surface. So, the generation of SHG is occurred only from the surface of peptide due to have crystalline directional behavior, no matter whether there is CNT layer or not.

Source: https://bdphso.org/

Smartphone-Based Context Flow Recognition for Outdoor Parking System with Machine Learning Approaches

Author: Md Ismail Hossen et al.

Brief Description:

Outdoor parking systems are one of the most crucial needs in a smart city to find vacant parking spaces in outdoor environments, such as roadsides, university campuses, and so on. In a typical outdoor parking system, the detection of a vehicle entering and leaving the parking zone is a major step. At present, there are numerous external sensor-based and camera-based parking

systems available to detect the entrance and leaving of vehicles. Camera-based parking systems rely on sophisticated camera set-ups, while sensor-based parking systems require the installation of sensors at the parking spots or vehicles' sides. Due to such complication, the deployment and maintenance costs of the existing parking systems are very high. Furthermore, the need for additional hardware and network capacity increases the cost and complexity, which makes it difficult to use for large deployment. This paper proposes an approach for outdoor parking utilizing only smartphone integrated sensors that do not require manpower support nor additional sensor installation. The proposed algorithm first receives sensor signals from the driver's phone, performs pre-processing to recognize the context of drivers, which is followed by context flow recognition. The final result is obtained from context flow recognition which provides the output of whether the driver is parking or unparking. The proposed approach is validated with a set of comprehensive experiments. The performance of the proposed method is favorable as it uses only the smartphone's internal sensors to recognize whether the cars are entering or leaving the parking area.

Source: https://www.mdpi.com/2079-9292/8/7/784

An Automated Driver's Context Recognition Approach Using Smartphone Embedded Sensors

Author: Md Ismail Hossen et al.

Brief Description:

Context recognition plays an important role in connecting the space between high-level applications and low-level sensors. To recognize human context, various kinds of sensors have been adopted. Among the variety of exploited sensors, smartphone internal sensors such as accelerometer and gyroscope are widely used due to convenience, non-intrusiveness and low deployment cost. Automatic detection of driver's context is a very crucial factor to determine the driver's behaviors. This paper proposes an approach to recognize driver's context which is a very specific research direction in the domain of human context recognition. The objective of this approach is to automatically detect the contexts of drivers using a smartphone's internal sensors. The proposed algorithm explores the power of a smartphone's built-in accelerometer and gyroscope sensors to automatically recognize the driver's context. Supervised machine learning k-nearest neighbor is employed in the proposed algorithm. Empirical results validated the efficiency of the proposed algorithm.

Source: https://link.springer.com/chapter/10.1007/978-981-15-0058-9_11

Smartphone-Based Drivers Context Recognitio

Author: Md Ismail Hossen et al.

Brief Description:

Various embedded sensors such as accelerometer and gyroscope have opened a new horizon in the scientific studies. One of the most prevailing areas of research is context recognition which can be adopted for smartphone-based parking, road condition detection and sports. To the best of our knowledge, the existing context recognition research covers human's basic contexts such as walking, jogging and are position dependent that require tightening sensors in fixed position of the body. Furthermore, none of the work has seen to be more specific to detect the contexts of driver. Therefore, to be more specific, in this study, we have constructed a position-independent approach to recognize driver's contexts that occurs while a driver parks car or leaves from parking place. The support vector machine, random forest and decision tree are employed and the accuracies of 83.38, 93.71 and 98.41% are obtained, respectively.

Source: https://link.springer.com/chapter/10.1007/978-981-13-8311-3_21

Bragg Grating Solitons in a Dual-core System with Separated Bragg Grating and Cubic-quintic Nonlinearity

Author: Dr. Nadia Anam et al.

Brief Description:

We analyze the stability of solitons in a semilinear dual-core system where one core is linear with a Bragg grating and the other core is uniform and has cubic-quintic nonlinearity. It is found that there exist three spectral gaps in the model's linear spectrum. The quiescent soliton solutions are found by means of numerical techniques. It is found that the soliton solutions exist only in both the upper and lower bandgaps. Two distinct and disjoint families of solitons (i.e., Type 1 and Type 2 solitons) are found in the upper and lower bandgaps that are separated by a border. Stability of solitons are analyzed numerically. The stability analysis shows that stable Type 1 solitons may only exist in a part of the upper bandgap. Type 2 solitons in both upper and lower gaps are found to be unstable.

Source: 10.5220/0007251300240028

Interactions of Bragg Solitons in a Semilinear Coupler with Separated Grating and Cubic-quintic Nonlinearity

Author: Dr. Nadia Anam et al.

Brief Description:

We investigate the interactions of solitons in a dual-core system where one core is uniform and has cubic-quintic nonlinearity and the other is linear with a Bragg grating. The effects of system parameters on the outcomes of the interactions are discussed.

Source: 10.1109/IPCon.2019.8908430

Moving Bragg Solitons in a Coupler with Separated Grating and Cubic-Quintic Nonlinearity

Author: Dr. Nadia Anam et al.

Brief Description:

We investigate the existence and stability of moving solitons a semilinear directional coupler where one core has cubic-quintic nonlinearity and the other core is linear with uniform Bragg grating.

Source: 10.1109/NUSOD52207.2021.9541446

An Investigation of SHG Response from the CNT/Peptide Interface as a Function of Variant Peptide Concentrations and Tunable Wavelengths by Using a Monochromator

Author: Dr. Md. Ehasanul Haque et al.

Brief Description:

The carbon nanotubes (CNT) was fabricated on the Si/SiO2/Co substrate by chemical vapor deposition (CVD) method. After that, we dropped variant concentrations of peptide molecules on the CNT surface and measured the SHG intensity from the CNT/PEP interface. We found that the SHG intensity was maximum for all concentrations of peptide molecules at 532 nm when we tuned the wavelength manually by using monochromator. At the fixed SHG wavelength, the intensity was increased with the increase of peptide concentrations. This is because of the availability of the different types of C-bonds may produce chiral structure. This chirality behavior could be the reason for the generation of SHG signal with the increase of peptides concentrations on the CNT surface.

Source: http://www.sciepub.com/JMPC/abstract/13620

A Study on the Mechanical, Optical, and Electrical Properties of Nylon-mesh/Epoxy Composite

Author: Dr. Md. Ehasanul Haque et al.

Brief Description:

We fabricated the nylon-mesh reinforced epoxy composite by using the hand lay-up method. In this composite, nylon mesh act as the reinforcing material whereas epoxy resin is the matrix material. Comparisons have been made between blank epoxy sheet and the composite. We observed improved mechanical properties such as tensile strength, strain, hardness, and flexural strength from the composited rather than blank epoxy sheet. However, Young's modulus was not found promising. In case of optical observations, Light absorbance increases, and optical band gap decreases slightly. Considering the Electrical properties, we observed better electrical insulation properties from our fabricated composite than the blank epoxy sheet. In addition, the water absorption properties have also been discussed in this research article. These observations of different properties will contribute to open the new wings of many new applications and help to further improve the quality of the composites.

Source: https://banglajol.info/index.php/BJPhy

Synthesis of Carbon Nanotube by Chemical Vapor Deposition (CVD) Method

Author: Dr. Md. Ehasanul Haque et al.

Brief Description:

We synthesize the carbon nanotube (CNT) by chemical vapor deposition (CVD). The morphological images have been observed before and after the CNT growth on the Si/SiO2/Co substrate. Scanning electron microscope (SEM) images confirmed the growth of CNT onto the Si/SiO2/Co substrate. The SEM image of Si/SiO2/Co substrate having no CNT was found little dark due to having Co catalyst on the top, whereas lots of amorphous carbon was existed on the Si/SiO2/Co/CNT surface according to SEM image. The growing CNT has no regularity and directionality.

Source: http://dx.doi.org/10.31364/SCIRJ/v8.i6.2020.P0620780

Fabrication of Carbon Nanotube (CNT) by Chemical Vapor Deposition and Investigate the Second Harmonic Response from CNT/Peptide and Si/SiO2/Peptide Interfaces

Author: Dr. Md. Ehasanul Haque et al.

Brief Description:

We observed the second harmonic generation (SHG) intensity from the peptide molecules absorbed carbon nanotube surface grown on the Si/SiO2/Co substrate. We dropped different concentrations of peptide molecules such as 100nM, 1µM and 10µM on the three Si/SiO2/Co/CNT substrate individually. The SHG intensity was measured from the CNT/PEP

interface by using 1.17 eV pulsed laser light. The results show that, the SHG intensity increased with increasing the peptide concentrations. In order to confirm about the SHG signal detected from the CNT/PEP interface, we dropped similar concentrations of peptide molecule on the three different Si/SiO2 substrate having no CNT layer individually and we observed the same results as found for CNT/PEP interface. In this case, the SHG intensity also increased with increasing the concentrations of peptide molecules on the surface. So, the generation of second harmonic signal is due the peptide molecule for both cases.

Source: http://www.ijsei.com/papers/ijsei-910120-07.pdf

Synthesis of Bismuth Ferrite Nanoparticles by Modified Pechini Sol-Gel Method

Author: Dr. Md. Ehasanul Haque et al.

Brief Description:

Different methods have been adopted for preparing BiFeO3 nanopowder. Recently, wet chemical methods have received abundant attention. Among the wet chemical methods, the modified Pechini sol-gel method is very cost-effective, simple, and suitable for the synthesis of highly homogenous and very fine crystalline nanopowder. The process is based on the mixing of reactants that oxidize easily, such as metal nitrates, and an organic chelating agent that acts as a reducing agent.

Source: http://www.ijsei.com/papers/ijsei-910120-06.pdf

Role of Polyethylene Glycol (PEG) on trivalent chromium electrodeposition

Author: Dr. Md. Ehasanul Haque et al.

Brief Description:

The effect of polyethylene glycol (PEG) was observed on the quality of trivalent chromium electroplating. The thickness and the current efficiency of the $Cr3^{+}$ deposit were decreased with increasing the concentration of PEG, whereas the optical reflectivity and the corrosion resistivity increased. At the higher concentration of PEG (0.3 g/L), the best quality electrodeposition was observed.

Source: http://www.sciencedomain.org/abstract/23755

A Study on CNT/Peptide interface by second harmonic generation (SHG) method

Author: Dr. Md. Ehasanul Haque et al.

Brief Description:

We observed the second harmonic generation (SHG) intensity from the peptide molecules absorbed carbon nanotube surface grown on the Si/SiO2/Co substrate. We dropped different concentrations of peptide molecules such as 100nM, 1µM and 10µM on the three Si/SiO2/Co/CNT substrate individually. The SHG intensity was measured from the CNT/PEP interface by using 1.17 eV pulsed laser light. The results show that, the SHG intensity increased with increasing the peptide concentrations. In order to confirm about the SHG signal detected from the CNT/PEP interface, we dropped similar concentrations of peptide molecule on the three different Si/SiO2 substrate having no CNT layer individually and we observed the same results. In this case, the SHG intensity also increased with increasing the concentrations of peptide molecules on the surface. So, the generation of SHG is occurred only from the surface of peptide due to have crystalline directional behavior, no matter whether there is CNT layer or not.

Source: https://bdphso.org/

Design of an Absorber Plate for Solar Air Dryer Using Nickel Oxide Nano Particle Coating

Author: Dr. Md. Ehasanul Haque et al.

Brief Description:

Energy, whether non-renewable or renewable, is vital for survival of all the living things on this planet. Growing human population all over the world has increased the demand for energy resources and energy from the sun has earned significant interest in recent times. However, the efficiency, cost and longevity of the absorber plates that are commercially used have been a common issue. In this paper, an attempt has been made to make an absorber plate for a solar dryer and make a better use of renewable solar energy. The goal is to fabricate an absorber plate capable of transferring heat and low in price for the people of Bangladesh. For this, similar past works were studied thoroughly and a literature review was made for a reliable comparison. From there, several coating materials were shortlisted as a candidate for this research project. After observing that Nickel oxide nano-particles serves as the best coating material for this work, simulations of the computational model were performed using Excel spreadsheets. Based on simulation results, the plan is to fabricate an affordable plate and analyze the performance by different characterizations for applying in practical uses such as solar dryers, solar stills etc. The computational model was validated with the work of a similar research which will be discussed below

Source: http://issat.polban.ac.id/2021/

Investigation of security challenges from the perspective of Stakeholders in IoT

Author: MD SAJID BIN FAISAL et al.

Brief Description:

Internet of Things (IoT) has become one of the major study concerns and prospects in recent times. The ecosystem that makes the interconnection between person, objects, device in a secured acceptable and useful manner is in the boundary of Internet of Things. One of the major concerns in IoT is its security and the technologies which are working behind. The security measures are taken under a vast amount of studies and applications. The concept of this research is to consider the existing technologies that are working for security assurance and the challenges which are faced by different angles of participants and manufacturers due to make IoT a secure electronic ecosystem. Basically, the focus over the security challenges are on the stakeholders and they are user, manufacturer and service provider. At last in this literature, the security-oriented level of challenges (integration, costing, handling & observation) have been mathematically produced from the 3 different perspectives of the stakeholders mentioned.

Source: https://ajse.aiub.edu/index.php/ajse/article/view/120/97

Fluid flow of a rotating rectangular straight Duct in Darcian Porous medium

Author: PRODIP KUMAR GHOSE et al.

Brief Description:

This paper mainly discusses the fluid flow of a straight duct which rotated counterclockwise along the y-axis in the porous. Darcy is used to defining the porous ($\boldsymbol{Da} \leq \mathbf{500}$) and non-Darcy ($\boldsymbol{Da} \geq \mathbf{500}$) media. Three different cases that have been studied such as Dean number $\boldsymbol{Dn} = \mathbf{100}, \mathbf{500}$, and $\mathbf{1000}$, where rotation number $\boldsymbol{R} = \mathbf{500}$ is treated as constant in the range of $\boldsymbol{Da}$ between $\mathbf{0}.\mathbf{1}$ and $\mathbf{1000}$. Only significant results have been discussed in this study. Steady solution has been obtained by using Spectral method where the Chebyshev polynomial is used in horizontal and vertical directions. It has been observed that flow is rapidly converged and there is no significant effect of Darcy number in the flow behavior due to the large Dean number and Rotation parameter. Furthermore, the anomalous behavior of vortex is observed in the porous medium, although vortex towards the upper wall in the axial flow has been vanished at large rotation parameter while the vortex at the center in the duct become weakened. It also found that elliptical ring shape in the vicinity to the left wall in the case of non-porous media and we observed that the flow energy decreased as increasing the rotation parameter at constant Dean number in both porous and non-porous medium.

Source: http://www.jmest.org/wp-content/uploads/JMESTN42352868.pdf

Pressure gradient effects on the fluid flow through a rotating straight square duct under magnetic field

Author: PRODIP KUMAR GHOSE et al.

Brief Description:

This paper describes the impacts of pressure gradient in a fluid flow through a straight square duct under the magnetic field and the duct is rotated counterclockwise about the − axis. It is an extended work of [10,11], which mainly aims at investigating pressure gradient effects with fixed magnetic () and rotation () parameter. Following two cases have been considered to analyze the flow behaviors at aspect ratio =. when pressure gradient () varied from 5 to 4000; Case 1: = and ≤ ≤. Case 2: = and ≤ ≤. Steady solutions have been obtained by using spectral method. It has been observed that the fluid density increases throughout the duct with the increment of pressure gradient and magnetic field while this effect is reduced significantly by enhanced rotation. At high pressure the streamlines of secondary flow become too compact to locate vortices in that flow due to increased fluid strength. Also, Centre of axial flow distribution gets shifted towards the right wall of the duct as strong pressure gradient is noticed on the left one Keywords-Dean number (D n); Rotation parameter (T r); Magnetic parameter (M g); Spectral method.

Source: http://www.jmest.org/wp-content/uploads/JMESTN42353630.pdf

Investigation of Security Challenges from the Perspective of Stakeholders in IoT

Author: Prof. Dr. Dip Nandi et al.

Brief Description:

Internet of Things (IoT) has become one of the major study concerns and prospects in recent times. The ecosystem that makes the interconnection between person, objects, device in a secured acceptable and useful manner is in the boundary of Internet of Things. One of the major concerns in IoT is its security and the technologies which are working behind. The security measures are taken under a vast amount of studies and applications. The concept of this research is to consider the existing technologies that are working for security assurance and the challenges which are faced by different angles of participants and manufacturers due to make IoT a secure electronic ecosystem. Basically, the focus over the security challenges are on the stakeholders and they are user, manufacturer and service provider.

Comparative Analysis of Three Improved Deep Learning Architectures for Music Genre Classification

Author: Prof. Dr. Dip Nandi et al.

Brief Description:

Among the many music information retrieval (MIR) tasks, music genre classification is noteworthy. The categorization of music into different groups that came to existence through a complex interplay of cultures, musicians, and various market forces to characterize similarities

between compositions and organize collections is known as a music genre. The past researchers extracted various hand-crafted features and developed classifiers based on them. But the major drawback of this approach was the requirement of field expertise. However, in recent times researchers, because of the remarkable classification accuracy of deep learning models, have used similar models for MIR tasks. Convolutional Neural Net- work (CNN), Recurrent Neural Network (RNN), and the hybrid model, Convolutional - Recurrent Neural Network (CRNN), are such prominently used deep learning models for music genre classification along with other MIR tasks and various architectures of these models have achieved state-of-the-art results. In this study, we review and discuss three such architectures of deep learning models, already used for music genre classification of music tracks of length of 29-30 seconds. In particular, we analyze improved CNN, RNN, and CRNN architectures named Bottom-up Broadcast Neural Network (BBNN) [1], Independent Recurrent Neural Network (IndRNN) [2] and CRNN in Time and Frequency dimensions (CRNN- TF) [3] respectively, almost all of the architectures achieved the highest classification accuracy among the variants of their base deep learning model. Hence, this study holds a comparative analysis of the three most impressive architectural variants of the main deep learning models that are prominently used to classify music genre and presents the three architecture, hence the models (CNN, RNN, and CRNN) in one study. We also propose two ways that can improve the performances of the RNN (IndRNN) and CRNN (CRNN-TF) architectures.

Smart Grid Implementation with Consortium Blockchain: A Proposed Model for Bangladesh

Author: Prof. Dr. Dip Nandi et al.

Brief Description:

The 21st century has seen a significant increase in worldwide electricity consumption with the invention of new technologies. Meeting the increasing power demand efficiently with the classic grid arrangement has become more challenging. To meet this energy demand, following the worldwide trend of grid modernization, Bangladesh is also looking forward to upgrading their existing grid infrastructure into the smart grid. To ameliorate that process, this paper proposes a model of a consortium blockchain from the perspective of Bangladesh. Unlike the existing grids, the proposed smart grid will be able to ensure user security with the help of state-of-the-art technologies. The proposed system will provide features like easier grid integration of different renewable sources, bidirectional power flow to the grid, and smart energy monitoring. To solve the data vulnerability issues and to defend against denial of services and malware attacks on the smart grid, the proposed grid will store its data in a consortium blockchain, which is one of the most secure technologies and only the grid authority will have full access over their user's data. Furthermore, a secure transaction method has been proposed in this paper, that will ensure the integrity of the transaction between the grid authority and the consumers.

Secured Blockchain Based Decentralised Internet: A Proposed New Internet

Author: Prof. Dr. Dip Nandi et al.

Brief Description:

Throughout this paper, we try to describe with blockchain technology the decentralization of the internet. A decentralized network that encourages the internet to operate from the smartphone or tablet of anybody instead of centralized servers. A decentralized implementation would be based on a peer-to-peer network that is dependent on a user community. Their machines connected to the internet will host the network, not a community of more powerful servers. Each site would be distributed across thousands of nodes on various devices. The data is therefore not contained, owned by private storage facilities. There is therefore no central point to hack, and no way for an oligarchy of entities to take control of it. A proposed alternative was formed based on a systematic literature review that demonstrates that Internet decentralization is what this modern technology needs in order to address not only the weaknesses of current servers including server down issue, hacking and data manipulation or single point of failure, but also to prevent companies from monetizing the data of citizens through their server and to market them to the advertisers.

Robust Underwater Object Detection with Autonomous Underwater Vehicle: A Comprehensive Study

Author: Prof. Dr. Dip Nandi et al.

Brief Description:

Underwater Object Detection had been one of the most challenging research fields of Computer Vision and Image Processing. Before Computer Vision techniques were used for underwater imaging, all the tasks associated with object detection had to be done manually by marine scientists making the task one of the most tedious and error prone. For this case, Underwater Autonomous Vehicles (UAV) has been developed to capture real time videos for specific object detection. Using different hardware improvements and using many varied forms of algorithms, classification of objects, mainly living objects had been carried with different AUVs and high-resolution cameras. Conventional object detection methods of Computer Vision fail to provide accurate detection results due to some challenges faced underwater. For such reasons, object detection underwater needs to be robust, real time and fast also being accurate, for which deep learning approaches are introduced. In this paper, all the works here all the trending underwater object detection techniques are discussed in details and a comprehensive comparative study is carried out.

An Empirical Comparison of Missing Value Imputation Techniques on APS Failure Prediction

Author: Prof. Dr. Dip Nandi et al.

Brief Description:

The Air Pressure System (APS) is a type of function used in heavy vehicles to assist braking and gear changing. The APS failure dataset consists of the daily operational sensor data from failed Scania trucks. The dataset is crucial to the manufacturer as it allows to isolate components which caused the failure. However, missing values and imbalanced class problems are the two most challenging limitations of this dataset to predict the cause of the failure. The prediction results can be affected by the way of handling these missing values and imbalanced class problem. In this paper, we have examined and presented the impact of five different missing value imputation techniques namely: Expectation Maximization, Mean Imputation, Soft Impute, MICE, and Iterative SVD in producing significantly better results. We have also performed an empirical comparison of their performance by applying five different classifiers namely: Naive Bayes, KNN, SVM, Random Forest, and Gradient Boosted Tree on this highly imbalanced dataset. The primary aim of this study is to observe the impact of the mentioned missing value imputation techniques in the enhancement of the prediction results, performing an empirical comparison to figure out the best classification model and imputation technique. We found that the MICE imputation and the random under-sampling techniques are the highest influential techniques for improving the prediction performance and false negative.

Enhanced Multiferroic, Magnetodielectric and Electrical Properties of Sm Doped Lanthanum Ferrite Nanoparticles

Author: Dr. Shovan Kumar Kundu et al.

Brief Description:

In this work, we observe an enhancement of multiferroic property correlated with magnetic, magnetodielectric and ferroelectric properties in lanthanum ferrite ($LaFeO_3$) nanoparticles by virtue of Samarium (Sm) doping in La site. The pure and doped lanthanum ferrite nanoparticle was synthesized by a simple solgel auto combustion route. We observe the positive magnetodielectric coupling in the samples and maximum 0.9% enhancement at the 1 T field in 10% Sm doped $LaFeO_3$ nanoparticles. Highest value of saturation magnetization (1.84 emu/gm) is achieved in Sm doped $LaFeO_3$ system. Particle size is decreased from 58 nm to 44 nm because of doping which is confirmed by transmission electron microscopy (TEM). The purity and nanocrystallinity nature of the prepared samples are confirmed by X-ray diffraction spectroscopy (XRD) pattern. DC and AC conduction mechanism and charge transport mechanism are illustrated

in association with Mott's variable range hopping (VRH) model and correlated barrier hopping (CBH) model respectively. The resistivity (DC & AC) is increased with a markable amount by virtue of Sm substitution. An improvement of dielectric properties is observed where dielectric loss is reduced due to the reduction of oxygen vacancies. The enhancement of magnetic properties is attributed to smaller crystallite size, inhomogeneous and disorder magnetic spin. The Sm doped $LaFeO_3$ has been presented here which has promising applications in spintronic devices.

Source: https://link.springer.com/article/10.1007/s10854-019-01415-9

Influence of Manganese on Multiferroic and Electrical Properties of Lanthanum Ferrite Nanoparticles

Author: Dr. Shovan Kumar Kundu et al.

Brief Description:

In the present work, we have successfully prepared pure and Manganese (Mn) doped single phase nanocrystalline $LaFeO_3$ by using an auto combustion route. X-ray diffraction (XRD) study ensures the purity of phase whereas the transmission electron microscope (TEM) measurement confirms the nanocrystalline nature. The details of the DC and AC conduction mechanism are studied to illustrate the dielectric behavior and charge transfer mechanism. The DC resistivity increases with the doping concentration which has been illustrated by Mott's variable range hopping (VRH) model. The AC conductivity mechanism as a function of frequency ($20Hz \leq f \leq 1MHz$) and temperature ($303K \leq T \leq 573K$) is explained by correlated barrier hopping (CBH) model. The dielectric constant and activation energy (AC) increase with Mn concentration whereas dielectric loss decreases. So, the leakage behavior decreases within the samples. The XPS spectra confirm that there is a rise of Fe^{2+} and Mn^{4+} ions in the samples with the doping concentration which may be responsible for the enhancement in magnetization. Mixed ferromagnetic (ferromagnetic and antiferromagnetic) order exists within the samples. As a result exchange bias arises. We have achieved the highest value of the coercive field (2.5 kOe) in Mn doped $LaFeO_3$ system. The room temperature ferroelectric and magnetodielectric measurements indicate that the polarization and magnetodielectric coefficient increases significantly by virtue of Mn doping. Therefore, an enhancement of multiferroic and magnetodielectric properties has been achieved for chemically prepared nanocrystalline lanthanum ferrite (LaFeO3) system by virtue of Mn doping. All the observations indicate that these materials to be potential candidates in the emerging field of spintronics.

Source: https://iopscience.iop.org/article/10.1088/2053-1591/ab1db6/meta

Observation of Room Temperature Multiferroic and Electrical Properties in Gadolinium Ferrite Nanoparticles

Author: Dr. Shovan Kumar Kundu et al.

Brief Description:

The formation and characterization of multiferroic Gadolinium Ferrite ($GdFeO_3$) nanoparticles has been demonstrated in detail. The structural, magnetic, magnetodielectric, ferroelectric, optical and electrical properties are studied at different temperature ranges. Dielectric properties, DC and AC transport properties and dielectric relaxation behavior are analyzed in electrical characterization. XRD pattern confirms the phase formation where crystallite size, lattice strain, etc. are carried out by Rietveld refinement and Williamson–Hall plot. Average particle size is 64 nm, which is calculated from TEM image. Mixed ferroic order of ferromagnetism and antiferromagnetism along with exchange bias are detected in the nanoparticles. Ferroelectric nature of the sample is confirmed by the P-E hysteresis loops. Positive magnetodielectric coupling is observed in $GdFeO_3$ nanoparticles, which is a signature of multifunctionality nature. Charge transport mechanism of DC and AC applied electric field is successfully analyzed with Mott's variable range hopping (VRH) and correlated barrier hopping (CBH) theoretical models, respectively. Non-Debye type relaxation behavior is observed with activation energy of 0.37 eV. Optical band gap is calculated from the Tauc plot (2.98 eV) which confirms the semiconducting nature of the sample. Existence of ferromagnetic/antiferromagnetic (FM/AFM) and ferroelectric along with magnetodielctric coupling ensures the multiferroic property of $GdFeO_3$ nanoparticles, which may enhance potentiality in spintronic device applications.

Source: https://www.worldscientific.com/doi/abs/10.1142/S0217984919502439

Electrical and Room Temperature Multiferroic Properties of Polyvinylidene Fluoride Nanocomposites Doped with Nickel Ferrite Nanoparticles

Author: Dr. Shovan Kumar Kundu et al.

Brief Description:

Flexible multiferroic polyvinylidene fluoride (PVDF) nanocomposites doped with nickel ferrite (NFO) nanoparticles were synthesized successfully by using a simple wet chemical method. A two-stage synthesis method is used to develop PVDF–NFO nanocomposite films. In the first stage, the NFO nanoparticles are synthesized, then the NFO nanoparticles are incorporated into the PVDF matrix to form polymer nanocomposites. X-ray diffraction pattern analysis confirms the formation of polar β-phase which is responsible for the ferroelectricity in PVDF nanocomposites. The detailed analysis of electron transport properties suggests the correlated barrier hopping (CBH) conduction mechanism in the nanocomposites. The dielectric constant of the nanocomposites increases with the increase the NFO filler concentration in PVDF matrix as

compared to pure PVDF film. The asymmetrical electric modulus spectrum of the nanocomposites is analyzed with the help of modified Kohlrausch–Williams–Watts (KWW) function. Magnetic, ferroelectric and magneto-dielectric coupling measurements confirm the room temperature multiferroic properties of PVDF–NFO nanocomposites, enhancing their application potential in the field of flexible electronics.

Source: https://pubs.rsc.org/en/content/articlelanding/2019/nj/c8nj04755c/unauth

Enhancement of Electrical and Magnetodielectric Properties of $BiFeO_3$ Incorporated PVDF Fexible Nanocomposite Films

Author: Dr. Shovan Kumar Kundu et al.

Brief Description:

Polyvinylidene fluoride (PVDF) with bismuth ferrite ($BiFeO_3$) (BFO) flexible nanocomposite films by varying the concentration of BFO nanoparticles are successfully synthesized by *in situ* sol-gel process. X-ray diffraction (XRD) pattern confirmed the phase purity of BFO nanoparticles and different crystalline phases of PVDF in PVDF-BFO nanocomposites. The average particle size of BFO nanoparticles is estimated as 34 nm from the fitting of the log-normal distribution function with particle distribution pattern obtained from the transmission electron microscopy (TEM) image analysis. The frequency dependence of ac conductivity confirmed the correlated barrier hopping (CBH) conduction mechanism follows by charge carriers in nanocomposites. The higher value of dielectric permittivity is observed in nanocomposite due to the increase of dipole-dipole interaction at the interface of PVDF and BFO by increasing the BFO concentration. The room temperature M-H and P-E hysteresis loop confirmed the nanocomposites exhibit both magnetic and ferroelectric ordering at the room temperature. The energy storage density of the nanocomposites is increasing with the concentration of BFO nanoparticles. Variation of room temperature magnetodielectric coupling confirmed the multiferroic nature exist in PVDF-BFO nanocomposites, which can be more useful in flexible electronics, energy storage or spintronics devices in multifunctional area.

Source: https://iopscience.iop.org/article/10.1088/2053-1591/ab26de/meta

Development of Organic-Inorganic Flexible PVDF-$LaFeO_3$ Nanocomposites for the Enhancement of Electrical, Ferroelectric and Magnetic Properties

Author: Dr. Shovan Kumar Kundu et al.

Brief Description:

The development of organic-inorganic PVDF-$LaFeO_3$ (PVDF-LFO) flexible nanocomposite films has been synthesized by in-situ sol-gel method. The structural, electrical, ferroelectric and magnetic properties are investigated to explore its possible device applications. The existences of polar β-phase in nanocomposites are confirmed through the XRD pattern and FTIR spectra. Frequency dependence (100 Hz–1 MHz) electrical properties of the

nanocomposites suggest the CBH conduction mechanism is followed by the charge carriers. The dielectric constant increases with the incorporation of LFO nanoparticles into the nanocomposites. The remanent polarization of the nanocomposites increased from 0.0014 to 0.012 μC/cm^2 with LFO concentration from 0 to 15 wt% at 50 kV/cm and 100 Hz, which is the indication of enhancement of ferroelectricity in the nanocomposites. The room temperature remanent magnetization also increased from 0.006 to 0.02 emu/g of 5–15 wt% of LFO concentration and which confirmed the existence of weak ferromagnetic ordering of the nanocomposites.

Source: https://www.sciencedirect.com/science/article/abs/pii/S0254058419313033

Investigation of Magnetic and Electrical Properties of Multiferroic Gadolinium Ferrite Nanoparticles

Author: Dr. Shovan Kumar Kundu et al.

Brief Description:

Multiferroics are the combination of more than one ferroic characteristics (ferroelectric, ferromagnetic/antiferromagnetic and often ferroelastic) in the same phase. There is a coupling between spontaneous polarization and large magnetization. Research interest in multiferroic has increased in recent days because of their potential application in microelectronic and nano-electronic devices like transducers, spintronics, sensors, actuators. Interestingly, it was found that gadolinium ferrite ($GdFeO_3$), a member of the centrosymmetric rare earth ortho-ferrite ($RFeO_3$) family (having a distorted orthorhombic perovskite structure), possesses magnetically tunable ferroelectricity due to the exchange striction mechanism.

$GdFeO_3$ (GFO) nanoparticle was prepared by soft chemical method. Phase formation of the $GdFeO_3$ was confirmed by XRD (JCPDS card No. 00-047-0067). The crystallite size has been calculated 33nm from the XRD pattern using the Debye Scherer formula. Average particle size was calculated using lognormal fitting from TEM image. It is observed that $GdFeO_3$ has an antiferromagnetic nature which is confirmed from the M-H loops. Good looking P-E hysteresis loops were observed in the study of the ferroelectric property. The frequency variation of real part of dielectric permittivity is shown in within frequency window $20Hz \leq f \leq 1MHz$. It is very clear for the figure that the intrinsic dipoles present within the materials are freely rotate in presence of electrical field at low frequency but with increase in frequency the dipoles are no longer follow the applied field. For this reason, we find a constant value at high frequency region. DC and AC conductivity of GFO was also studied. Different types of thermal analysis like differential thermal analysis (DTA) and Thermogravimetric analysis (TGA) are also studied. So $GdFeO_3$ can be a good candidate of multiferroics which has tremendous application in spintronics devices.

Temperature Magnetic and Electrical Properties of $NdFeO_3$ Nanoparticles

Author: Dr. Shovan Kumar Kundu et al.

Brief Description:

Multiferroics are the combination of more than one ferroic characteristics (ferroelectric, ferromagnetic/antiferromagnetic and often ferroelastic) in the same phase [1]. Research interest in multiferroic has increased in recent days because of their potential application in microelectronic and nano-electronic devices like transducers, spintronics etc. Neodymium ferrite ($NdFeO_3$) is a member of the centrosymmetric rare earth ortho-ferrite family (having a distorted orthorhombic perovskite structure), possesses magnetically tunable ferroelectricity.

Phase formation of the $NdFeO_3$ was confirmed by XRD pattern (JCPDS card No. 00-008-0168). Average particle size was calculated 51nm using lognormal fitting from TEM image. Magnetic property of $NdFeO_3$ has been demonstrated by magnetization verses magnetic field (M-H) curve at room temperature. The sample was showing hysteresis behavior. Inset shows the enlarged view of the central part of the loop. The well-shaped polarization verses electric field (P-E) loop confirms the presence ferroelectric nature in the sample. The data was recorded at 300K temperature and 50Hz frequency. Weak ferroelectric characteristic was observed due to the canted antiferromagnetic ordering of Fe^{3+} cations. DC resistivity has been analysed by Mott's variable range hopping (VRH) model. AC conductivity mechanism as function of frequency ($20Hz \leq f \leq 1MHz$) and temperature ($303K \leq T \leq 573K$) was explained by correlated barrier hopping (CBH) model. Different types of thermal analysis like differential thermal analysis (DTA) and Thermogravimetric analysis (TGA) are also studied.

Electrical Modulus and Impedance Spectroscopy of $CoFe_2O_4$ Nanoparticles Embedded into the PVA Matrix

Author: Dr. Shovan Kumar Kundu et al.

Brief Description:

Polyvinyl alcohol-Cobalt ferrite ($CoFe_2O_4$) (PVA-CFO) flexible nanocomposite films with different concentration of CFO nanoparticles (i.e. 4 and 10 wt%) is successfully synthesized by wet-chemical and drop casting process. The asymmetric nature of the imaginary part of the electric modulus spectra with frequency represent the presence of dielectric relaxation behavior in the charge transport mechanism and follow the non-Debye type behavior. The presence of relaxation peaks also observed in frequency dependent impedance spectroscopy plot. The contribution of grain and the interfacial effect on the conduction mechanism is confirmed from the Nyquist plot. The detailed dielectric relaxation phenomena of charge transport conduction mechanism study here.

Source: https://aip.scitation.org/doi/abs/10.1063/5.0017213

Synthesis, Characterization and Electrical Transport Properties of co-doped $YCrO_3$

Author: Dr. Shovan Kumar Kundu et al.

Brief Description:

In the present study, samarium and iron co-doped Yttrium chromates were investigated. Synthesis of co-doped $YCrO_3$ powder was synthesis using sol-gel method. Samples have been characterized by different techniques (X-ray diffraction, TEM, SEM, LCR meter). Powder XRD of the samples exhibit the formation of orthorhombic monophasic $YCrO_3$ nanoparticles. DC conductivity increases with the increase of temperature for all the samples. The variation of ac conductivity with frequency shows that if follows CBH model.

Source: https://aip.scitation.org/doi/abs/10.1063/5.0016647

Investigation of Charge Transport Mechanism and Multiferroic Property of Rare Earth Ferrite Nanoparticles Synthesized by Auto Combustion Method: Bi Substitution in La Site of $LaFeO_3$

Author: Dr. Shovan Kumar Kundu et al.

Brief Description:

Multifunctional and nano-dimensional devices have become a center of attention to the scientific community because of their potential applications in sensors, transducers, memories, and spintronics. Rare earth ferrites having general formula $RFeO_3$ (R= rare earth ions) are canted spin antiferromagnets with a distorted orthorhombic structure which generally exhibit uniaxial anisotropy. Among all $RFeO_3$, lanthanum ferrite ($LaFeO_3$) has become the most dealing material because its promising application. Interestingly, it was found that $LaFeO_3$, a member of the centrosymmetric rare earth ortho-ferrite ($RFeO_3$) family which possesses magnetically tunable ferroelectricity due to the exchange striction mechanism. The XRD with Rietveld refinement analysis and TEM characterization techniques have been incorporated for phase detection and nanocrystalline nature confirmation, respectively. It is observed that crystallite size along with the lattice parameters decrease whereas lattice strain increases with the doping. The DC and AC charge transport mechanism are illustrated based on Mott's variable range hopping (VRH) model and correlated barrier hopping (CBH) model, respectively. An enhancement in spontaneous magnetization, remanent magnetization, and magneto-dielectric coefficient by virtue of Bi substitution is observed, and the details are reported. Ferromagnetic and ferroelectric ordering, as well as positive magneto-dielectric coupling is observed, which confirms the multiferroic property of the samples at room temperature where the coupling is increasing with the dopant.

Taken together, these findings illustrate the fundamental importance of Bi doping in enhancing the multiferroic properties, which will open the possibility of $LaFeO_3$ as spintronic devices.

Effect of Yttrium on Magnetic and Electrical Properties of Neodymium Ferrite Nanoparticles;

Author: Dr. Shovan Kumar Kundu et al.

Brief Description:

The materials having multifunctional characteristics are considered as the principal base materials in multifunctional and nano-dimensional devices industries. Multiferroics are the combination of more than one ferroic characteristics (ferroelectric, ferromagnetic/antiferromagnetic and often ferroelastic) in the same phase. There is a coupling between spontaneous polarization and large magnetization. Research interest in multiferroic has increased in recent days because of their potential application in microelectronic and nano-electronic devices like transducers, spintronics, sensors, actuators. Interestingly, it was found that Neodymium Ferrite ($NdFeO_3$), a member of the centrosymmetric rare earth ortho-ferrite ($RFeO_3$) family (having a distorted orthorhombic perovskite structure), possesses magnetically tunable ferroelectricity due to the exchange striction mechanism.

The structural properties are analyzed by XRD pattern using Rietveld refinement. TEM images confirm that average particle decreases from 70 nm to 54 nm. The DC and AC charge transport mechanism are analyzed, and the experimental data is well supported with the theoretical model, i.e. Mott's VRH model, and CBH model. M-H hysteresis loops reveal the antiferromagnetic ordering of the samples. Positive magneto-dielectric coupling is observed in the samples where coupling increases with doping which states that the Y doped $NdFeO_3$ can be good candidate in in magneto-electric industries.

Antimagic Labelling of any Perfect Binary Tree

Author: MOHAIMEN-BIN-NOOR et al.

Brief Description:

Graph labelling is a very popular and high caliber research topic in graph theory. There are numerous variant of graph labelling. Some are categorized as edge labelling and some are categorized as vertex labelling. Our paper focuses to proof one kind of edge labelling known as antimagic labelling of any perfect binary tree. First we have shown that antimagic labelling is possible by sequential labelling of the edges of any perfect binary trees except for some particular ones. Later we proved that antimagic labelling is also possible for those particular perfect binary trees by swapping the labels of only two egdes.

Source: https://dl.acm.org/doi/abs/10.1145/3377049.3377109

Design and analysis of an off-grid PV plant for higher utilization efficiency in the field of pharmaceutical industry considering global pandemic state.

Author: Kazi Firoz Ahmed et al.

Brief Description:

According to the concern of WHO the less association of people in an office may restrict the likelihood of spreading this COVID-19 infection. And it applies to all kinds of organizations. On the other hand, the pharmaceutical companies are working hard to maintain uninterrupted production of vaccine and medicines. This paper focuses on the main layer which is the power system management and its utilization through the less involvement of any individual. Automation and controlling the system remotely can be a good solution. In the design process the FDA proposed structure for the Pharmaceuticals needs to be maintained as well. One of the significant necessities is most of the energy should come from environment friendly system and in Bangladesh sunlight-based energy is the best solution right now. Solar energy utilization efficiency can be increased using the data logging system and machine learning algorithms from that archived data. In this paper, a SCADA operated Off-Grid Solar PV Automation System has been proposed to increase the utilization efficiency. To predict solar power availability over time and perform efficient energy trafficking, the automation system will analyze previous data and perform situational awareness operations for uninterrupted solar power generation. The proposed automation system has been designed focusing on pharmaceutical manufacturing utilities. A comprehensive analysis of the proposed automation system for pharmaceuticals industry applications has also been presented in this paper. The continuous monitoring system for this Off-Grid Solar PV power generating unit preserves multiple data entries, which increases with time and subjected to energy trafficking. And this energy trafficking based on machine learning increases the overall solar energy utilization efficiency.

Source: http://ajse.aiub.edu/index.php/ajse/article/view/144

Image Based Automatic Traffic Surveillance System Through Number-Plate identification And Accident Detection

Author: Kazi Firoz Ahmed et al.

Brief Description:

The unpredictability and blockage of current transportation frameworks frequently produce traffic circumstances that endanger the security of the individuals in question. A simple invention can make easy to control the traffic system. This paper presents a programmed traffic

observation framework to gauge significant traffic boundaries from video arrangements utilizing just captures from cameras. A traffic control kit is developed to detect over speeding cars on highways, number plates in Bengali, and initiating emergency call to 999 on detecting accidents. A GPS enabled traffic surveillance camera can detect the location of accident and send message to the traffic control room with location information of accident. A Python program is used to detect over speed which provides accurate speed of a vehicle very fast. OCR Tesseract is used to detect number plate which has very high performance in detecting noisy texts. To identify a case of accident, a simple Python code with Dens-net Architecture is used. A GSM module of the experimental kit initiate the call and message after analyzing the data through a code of C language. Machine Learning (ML) is used to train the program in identifying number plates. It is done by Anaconda.

Source: https://ieeexplore.ieee.org/document/9331102/

Reliability Analysis of Different Cell Configurations of Lithium ion battery Pack

Author: Kazi Firoz Ahmed et al.

Brief Description:

To infer and predict the reliability of the remaining useful life of a lithium-ion (Li-ion) battery is very significant in the sectors associated with power source proficiency. As an energy source of electric vehicles (EV), Li-ion battery is getting attention due to its lighter weight and capability of storing higher energy. Problems with the reliability arises while li-ion batteries of higher voltages are required. As in this case several li-ion cells are connected in series and failure of one cell may cause the failure of the whole battery pack. In this paper, Firstly, the capacity degradation of li-ion cells after each cycle is observed and secondly with the help of MATLAB 2016 a mathematical model is developed using Weibull Probability Distribution and Exponential Distribution to find the reliability of different types of cell configurations of a non-redundant li-ion battery pack. The mathematical model shows that the parallel-series configuration of cells is more reliable than the series configuration of cells. The mathematical model also shows that if the discharge rate (C-rate) remains constant; there could be an optimum number for increasing the cells in the parallel module of a parallel-series onfiguration of cells of a non-redundant li-ion battery pack; after which only increasing the number of cells in parallel module doesn't increase the reliability of the whole battery pack significantly.

Source: http://ajse.aiub.edu/index.php/ajse/article/view/40

Simulation Based Comparative Stability Analysis Between Conventional and Hybrid Power System to Observe the Point of Stability

Author: Kazi Firoz Ahmed et al.

Brief Description:

The proposed research work interfaced traditional grid with renewable microgrid system where renewable sources are working as backup during overload. A Matlab function is developed as controller unit or decision maker for the switching purpose. With the various loads it was observed how grid voltage and frequency acted with respect to time and the stability point difference was analyzed for conventional grid model and hybrid model.

Source: https://ieeexplore.ieee.org/document/9068103/

Analysis and Prediction of COVID-19 Pandemic in Bangladesh by Using ANFIS and LSTM Network.

Author: Anjir Ahmed Chowdhury et al.

Brief Description:

The dangerously contagious virus named “COVID-19” has struck the world strong and has locked down billions of people in their homes to stop the further spread. All the researchers and scientists in various fields are continually developing a vaccine and prevention methods to aid the world from this challenging situation. However, a reliable prediction of the epidemic may help control this contiguous disease until the cure is available. The machine learning techniques are one of the frontiers in predicting this outbreak’s future trend and behavior. Our research is focused on finding a suitable machine learning algorithm that can predict the COVID-19 daily new cases with higher accuracy. This research has used the adaptive neuro-fuzzy inference system (ANFIS) and the long short-term memory (LSTM) to foresee the newly infected cases in Bangladesh. We have compared both the experiments’ results, and it can be forenamed that LSTM has shown more satisfactory results. Upon study and testing on several models, we have shown that LSTM works better on a scenario-based model for Bangladesh with mean absolute percentage error (MAPE)—4.51, root-mean-square error (RMSE)—6.55, and correlation coefficient—0.75. This study is expected to shed light on COVID-19 prediction models for researchers working with machine learning techniques and avoid proven failures, especially for small imprecise datasets.

Source: https://link.springer.com/article/10.1007%2Fs12559-021-09859-0

4P Model for Dynamic Prediction of COVID-19: a Statistical and Machine Learning Approach.

Author: Anjir Ahmed Chowdhury et al.

Brief Description:

Around the world, scientists are racing hard to understand how the COVID-19 epidemic is spreading and growing, thus trying to find ways to prevent it before medications are available. Many different models have been proposed so far correlating different factors. Some of them are too localized to indicate a general trend of the pandemic while some others have established transient correlations only. Hence, in this study, taking Bangladesh as a case, a 4P model has been proposed based on four probabilities (4P) which have been found to be true for all affected countries. Efficiency scores have been estimated from survey analysis not only for governing authorities on managing the situation (P(G)) but also for the compliance of the citizens ((P(P)). Since immune responses to a specific pathogen can vary from person to person, the probability of a person getting infected ((P(I)) after being exposed has also been estimated. And the vital one is the probability of test positivity ((P(T)) which is a strong indicator of how effectively the infected people are diagnosed and isolated from the rest of the group that affects the rate of growth. All the four parameters have been fitted in a non-linear exponential model that partly updates itself periodically with everyday facts. Along with the model, all the four probabilistic parameters are engaged to train a recurrent neural network using long short-term memory neural network and the followed trial confirmed a ruling functionality of the 4Ps.

Source: https://link.springer.com/article/10.1007%2Fs12559-020-09786-6

Design and Development of Citizen Surveillance and Social-Credit Information System for Bangladesh

Author: Anjir Ahmed Chowdhury et al.

Brief Description:

Most of the areas of Bangladesh face a wide range of threats, ranging from terrorism and civil unrest to kidnapping, rape and murder. To reduce the impact of these threats, it is critical for the authorities to capture real-time information on what is happening in and around the city. Therefore, there is a growing requirement for utilizing the new and emerging technologies to make our cities safer. The development of the monitoring system in the technological field has become a blazing topic in the milieu of scholars and AI techniques have become an essential part of the future era. With the help of AI & deep learning, we can evaluate the social behavior (Action Recognition) of people, and by implementing the social credit score system, we can mark the citizen's activities & analyze them. To detect and recognize the actions of a human we used YOLOV2 architecture and also incorporated the SQL database (SQLite) to record the social credit score. A citizen can visualize their credit score from an HTML based website.

Source: https://ajse.aiub.edu/index.php/ajse/article/view/133/100

YOLO-Based Enhancement of Public Safety on Roads and Transportation in Bangladesh

Author: Anjir Ahmed Chowdhury et al.

Brief Description:

In order to upgrade the efficiency level of multiple tracking like face, actions, characters, a deep learning method is introduced to reduce the accidents occurred in roads for carelessness and also to capture the criminals in Bangladesh. This paper presents a faster processing multiple detection method with the best possible outcome under the framework of YOLOv2 algorithm in the event of car accident, crossing foot over bridge and using the zebra crossing in Bangladesh. Different layers were added to the YOLOv2 algorithm to pass the information in various convolutional layers to detect multiple objects with actions. In this paper YOLOv2 algorithm under DarkFlow framework is used to achieve higher ratio of confidence value as the max convolutional layers reorganize the feature map so that other layers feature map can be matched with the bottom layers to achieve the expected output of the indicated events. By removing the noise from the unrelated area, the detections of the training video and test video adopt quite parallel confidence ratio.

Source: https://ajse.aiub.edu/index.php/ajse/article/view/91/70

Implementation of Cost-Effective Bomb Defusing Robot with Live Streaming Dual Camera Interface.

Author: Anjir Ahmed Chowdhury et al.

Brief Description:

Robot automation technology is increasing day by day to adapt to the world's demand for controlling disasters, rescuing operations, and minimizing human risk. To perform these tasks a user-friendly robot is required which can be controlled precisely from a remote area. The described project focuses on the design and implementation of a remotely controlled bomb disposal robot with locally available hardware resources to minimize cost. The implemented robot features a robotic arm with 4 degrees of freedom which can pick and carry any sophisticated object (up to 5kg) very precisely and smoothly. The body and the arm of the robot were custom designed and built with Aluminum alloy. To maximize the capability, the robot was equipped with Gas, fire, and obstacle detection sensors. In the chassis, it can collect and carry dismantled bomb parts (up to 10kg) as evidence. The mechanical design of the robot was validated with solid works software. Proteus was used for PCB and schematic design. In the control system Raspberry pi was used as a processor and for sensing and communication Arduino mega was introduced. The robot can be controlled via the internet. An additional python script has been used to control the robot through a web server.

Source: https://ieeexplore.ieee.org/document/9331203

"LEACH-S2: A Brief Approach on a Proposal of an Energy Efficient LEACH Routing

Author: Dr. Afroza Nahar et al.

Brief Description:

Wireless Network consists of several sensors and data communication among them in a cluster basis. This report focusses on the comparison and description of several Low Energy Adaptive Clustering Hierarchy (LEACH) routing protocol with the reason of their energy efficient routing activity. In wireless network implemented with sensors, it is required to develop an energy efficient routing protocol for making the lifetime of the network longer. The comparison of these protocols with the base LEACH and then identifying the advantage and some issues regarding energy efficiency is the core concern of this work. After comparison and description of the LEACH protocols, a new approach is proposed along with the workflow of its routing activity and cluster head formation to make a more energy efficient LEACH approach in the future days.

Design prototype of a smart household touch sensitive locker security system based on GSM technology.

Author: Susmita Ghosh et al.

Brief Description:

This paper illustrates a portable domestic locker security system which is based on GSM (Global System for Mobile Communications) technology. A handcrafted low-cost touch sensitive box is designed (using Vero board) for the project which is one of the most attractive features of the system. The system will operate in a way that if there is any unexpected user, tries to touch any portion of the touch sensitive box, a feedback system will be turned on immediately. The feedback system will alert the property holder about the unexpected user by sending SMS (Short Message Service) and turning on an alarm system. The alarm system will be turned off only if it receives a specific SMS from the property holder. This system not only has the advantages of high sensitivity, small size and lightweight, but also it is easy to use. This system is featured with an uncomplicated design, convenient use, strong flexibility and reliable performance. Since the circuit in the system is simple and easy to contrivance, the system can be installed without any difficulty at homes & offices. It will also provide a good security in the vehicles and Automated Teller Machine (ATM) booths.

Link: http://ijpeds.iaescore.com/index.php/IJPEDS/article/view/17245

An Integrated Real-Time Water Quality and Usage Monitoring and Control Syste

Author: Argho Das et al.

Brief Description:

Fresh water is a vital resource for the survival of our population. In countries like Bangladesh where clean water is scarce, overusing or wasting household water limits the availability of it for other communities to use for drinking, cleaning, cooking or growing and thus contributes to disease, illness, or agricultural scarcity/starvation. In relation to this the key concern is to develop an efficient, cost effective and real-time system that monitors leakage in the tank, water overflow and the turbidity of the water. Additionally, the system does not require any user interaction.

Source: https://icmi.aiplustech.org/assets/docs/Proceedings.pdf

Study of Dynamic Behavior of a Three-Story Model Frame

Author: Dr. Md. Tarek Hossain et al.

Brief Description:

Recently earthquake has been occurred several times in many areas of Bangladesh at low to medium intensity. Major cities of Bangladesh are vulnerable to earthquake. It is necessary to develop effective technique for minimizing the severity and often tragic consequences of earthquake. The universities & research institutes of Bangladesh are interested to enhance studies in earthquake engineering. But no facilities were developed to let the students & researchers sound about real earthquake shaking. So in order to develop the knowledge regarding earthquake among the students & researchers it is necessary to introduce a tool which will help them in realizing the earthquake shaking intensity and its vulnerability on different types of civil structure. There are several experimental techniques that can be used to test the response of structure under certain shaking intensity and to verify their seismic performance. One of the popular and efficient techniques is use of an earthquake shaking table. Structural properties (damping ratio, stiffness, natural frequency, natural period, mode shape) of a three story model frame and its deflection behavior under repetitive strong shaking is investigated through shaking table tests. Further effectiveness of various bracing system under multidirectional seismic excitation is analytically investigated also.

Source: 10.11648/j.ajcbm.20180201.12

Design and Implementation of Smart Old Age Home

Author: Md. Saniat Rahman Zishan et al.

Brief Description:

In modern era, smart old age homes are identified as a proper medium for an independent and comfortable life of older and disable persons. In this project, the wireless home automation system allows voice control switching, location tracking, health monitoring and fall detection. The voice control switching system can do remote controlling of home appliance such as TV, light, fan etc. The health monitoring and location tracking system are used in clinical perspectives and intensive care. A System of fall detection is added to abstain from unintentional injury and death. This paper will focus on integration of automation system and health monitoring system to develop smart old-age home.

Source: https://ieeexplore.ieee.org/abstract/document/9528237

The Design and Implementation of an Autonomous Waste Sorting Machine Using Machine Learning Technique

Author: Md. Saniat Rahman Zishan et al.

Brief Description:

In a world where the population is inevitably increasing, waste produced is progressively increasing as well. In this project, an autonomous waste sorting machine was made which could detect multiple classes of waste materials, and then separate them accordingly. The waste products were taken as input in a funnel-shaped structure and dropped one by one to a conveyor belt where they would be detected by machine learning technique using Faster-RCNN, and then a servo motor would separate them according to the detection result. In rare cases, there are some misdetections of the waste materials, but the reliability of the detection was very high. Our project can facilitate human efforts to separate waste products and can make the waste sorting system completely automatic.

Source: https://ajse.aiub.edu/index.php/ajse/article/view/104

Design and Implementation of a Human Prosthetic Hand

Author: Md. Saniat Rahman Zishan et al.

Brief Description:

With an aging population and war veterans, the disabilities of a human being are increasing day by day. In particular, prosthesis is finding their way into the lives of many individuals. The aim of the paper is to find cheaper solution for robotic prosthetic hand than the product found in market. Human innovations for any problems or disability should serve both poor and rich person of the world. Lack of money should not restrict the people to use advance technology. In this paper, a detailed design of voice and muscle controlled prosthetic hand is proposed. This paper will mostly on the development and manufacturing of the prototype of the prosthetic hand.

Source: https://ieeexplore.ieee.org/abstract/document/9331202

Design and Development of Lane Management and Automatic Toll Collection System

Author: Md. Saniat Rahman Zishan et al.

Brief Description:

With the speedy development of the economy and the advancement of urbanization, the number of communication mediums and transportation is increasing instantaneously that's why Bangladesh needs a smart solution in every sector. In this paper, RFID and Image processing based automated toll collection system is introduced to monitor the toll plaza. A road zipper device is introduced for a proper lane management system that helps to reduce the traffic jam. Two step-based toll collection system ensured the specification of the vehicle then deduct the toll amount from their account without stopping the vehicles. For this proposed model, vehicles need to insert a digital number plate and the number plate information is embedded on the RFID tags. This paper presents a prototype of a road zipper and automatic toll collection device that gives proper results as expected. This system is automated, so it reduced human error. Thus, making an intelligent transportation system will become easier.

Source: https://ieeexplore.ieee.org/abstract/document/9331186

Design and Implementation of Assistive Robot for The Elderly and Impaired Person

Author: Md. Saniat Rahman Zishan et al.

Brief Description:

In this paper, the design of an autonomous robot is proposed which can detect, search, pick up and drop any object. A central processing unit using Raspberry Pi will take sonar sensor input and control the motor drivers to move freely. Artificial intelligence technology integrated with an

image processing unit that will be able to remember its owner and track objects. Four motorized wheels that can be controlled by the user or the robot itself make the robot move to any direction or place. The cameras and microphones will be equipped in the robot to help the robot recognize environments. This mechanism in the robot will allow helping elderly and impaired person inhouse work The proposed design is implemented and successfully verified through commanding to accomplish different work.

Source: https://ieeexplore.ieee.org/abstract/document/9331121

A Comprehensive Smart IoT Tracker for the Children, Elder, and Luggage with the Assistance of Mobile App

Author: Md. Saniat Rahman Zishan et al.

Brief Description:

This paper represents an IoT based tracking system, through which it is very easy to track the child, elder, or any type of luggage. This system has separate features for tracking each of these things, which have been completed by the IoT device and the Android app. It is possible to track anything manually or automatically with this device. NodeMCU, GPS, and GSM have been used as hardware to build the system, and Firebase Server and Google API services have been used for the Android app. Parcel exchange has become very common nowadays. With this system, in addition, the location of the parcel can be easily tracked, and administrative help can be taken for any unforeseen situation.

Source: https://ieeexplore.ieee.org/abstract/document/9307591

The Scenario of e-Health Systems in Developing Countries (Bangladesh and Malaysia)

Author: Md. Saniat Rahman Zishan et al.

Brief Description:

For any countries national interest healthcare system is one of the significant parts. Due to the potential and wider benefits as well as the recent advances in Information and Comunication Technologies (ICT) most of the countries are adopting ICT based electronic health (e-Health) system nowadays. Many developed countries have already established a well-developed e-Health system and it seems very beneficial for their healthcare system. The governments of developing countries are also taking initiatives to introduce ICT based e-Health system. Since they are facing a lot of challenges to provide equal treatment opportunity in both rural and urban areas. E-health system will help them to lessen the discrimination between health care system in the urban and rural area in their countries. Developing countries like Bangladesh and Malaysia are also introducing e-Health system. This paper discussed some of the major problems that

these countries are facing in their healthcare system and probable solution of these problems in terms of e-Health. The current scenario of e-Health system in Bangladesh and Malaysia are analyzed. Based on that some challenges of e-Health system and recommendation to overcome these challenges are provided in this paper.

Source: https://www.ijrte.org/wp-content/uploads/papers/v8i1C2/A12000581C219.pdf

Awareness on e-Health among Undergraduate Students in Bangladesh

Author: Md. Saniat Rahman Zishan et al.

Brief Description:

The concept of e-health was established to help the underprivileged citizens who live in the rural part of the country. Bangladesh is an over-populated country where more than 70% population live in rural areas, but unfortunately due to lack of knowledge and awareness among the citizen the telemedicine concept is becoming popular only for citizens of urban areas. This sort of unexpected outcome of e-health system has limited the efficiency of the whole concept. In our research, we have selected a group of students who are studying in undergraduate program of science field and analyzed their knowledge on telemedicine through questionnaire. Later on, we also suggested few possible outcomes based on our research findings. During the analysis, SPSS version 20 was used along with Likert Scale technique and Spearman's Co Relation were used to comment on the findings.

Source: https://www.researchgate.net/publication/331896842_Awareness_on_e-Health_among_Undergraduate_Students_in_Bangladesh

Design and Implementation of an IoT based Automated Agricultural Monitoring and Control System

Author: Md. Saniat Rahman Zishan et al.

Brief Description:

Bangladesh is an agricultural based country. With rapid population growth and increasing food demand, boosting farm productivity and yield is essential. To overcome this challenge, this paper proposes an automated control system of a farm using a cloud based IoT solution to monitor and control multiple areas of the farm which play crucial role in the entire farming process. The system uses a network of several NodeMCUs (ESP8266) micro-controllers to monitor and control multiple systems over the cloud. The NodeMCUs constantly monitor the respective states of various elements of the farm and report the data to the central control unit. The user can then take appropriate actions from analyzing this data, i.e. assign their desired tasks to each of the micro-controllers separately.

Source: https://ieeexplore.ieee.org/abstract/document/8644212

Design and Implementation of Smart Security System for Human Safety

Author: Md. Saniat Rahman Zishan et al.

Brief Description:

Security has become an important issue everywhere. When it comes to human safety, the proposed system can be applied to make it smarter, safer and automated. Using two sensors Flex and PIR the system was made both manually and automatically activated. Based on the sensor the system turns on and tracks victim's location. Then the location is sent it to some selected numbers as well as saved in the server. This work includes data collection by using sensors. To transmit to a centralized server and upload to the website Raspberry pi and GSM is used. Through this system people of all ages can be benefitted. The system can be upgraded and improved by further additions of features. When a human will bend his fixed finger after facing any kind of danger, the resister value of flex will be changed and system will be on. At that moment not only SMS including location will be sent to the fixed numbers but also it will be uploaded and saved as still images to the website.

Source: https://ieeexplore.ieee.org/abstract/document/8644204

Domicile - An IoT Based Smart Home Automation System

Author: Md. Saniat Rahman Zishan et al.

Brief Description:

We are living in the fourth industrial revolution. Our life is becoming more comfortable and smarter with the help of rapid upgrade of technology. Internet of things (IoT) is playing a massive role in this. One of the major sides of IoT is a smart home. As we are in the era of never-ending growth of the internet and its application, smart home system or home automation system is highly increasing to provide comfort in life and improving the quality of life. In this paper, we present an IoT based low-cost smart home automation system. This system is based on a web portal which controlled by an ESP32 Wi-Fi module. Also, a custom-made private home web server is developed for maintaining the current states of home appliances.

Source: https://ieeexplore.ieee.org/abstract/document/8644349

Health Monitoring System for Elderly and Disabled People

Author: Md. Saniat Rahman Zishan et al.

Brief Description:

A great demand of modern earth is to get everything within a very short time. At present situation, people want to realize their current health condition and also want proper care rapidly.

But older and disabled people are very incapable without someone's help. Even they have to face so many difficulties to inform someone about their health condition. To solve this problem a smart and automobile system has proposed. The proposed system consists of health monitoring systems with body temperature and heartbeat measurement. This health monitoring system displayed temperature and heart rate data on an LCD, it also sends an automatic notification to caretakers or doctors. A fall detection system is added to abstain from unintentional injury and death for old and disabled persons. When the data crossed the normal value and the fall detector detects the fall that times the system send an automatic notification. This paper will focus on basic health monitoring and caring system for older and disabled people.

Source: https://ieeexplore.ieee.org/abstract/document/8644452

Analysis of Centralized Payment Eco-System: A Systematic Review on E-Payments

Author: Md.Al-Amin et al.

Brief Description:

Nowadays the increasing number of e-commerce systems and online services raises the need for online payment systems. In the future, the number of internet businesses will increase drastically. In recent times because of the outbreak of COVID 19, Online purchase has increased rapidly and we can guess that, in future these increments will remain as high present if not more. Future online businesses will require more efficient and secured payment systems. There are already a large number of payment Methods & Gateways available. The most popular ones are using the traditional centralized approach. Centralized payment gateways use central database for all the records and need a central authority for controlling it. Our primary goal is to analyze the feasibility of these kind of popular online payment gateways. In this paper, we have analyzed the features of centralized payment gateways as well as provide an overview of the cost and reliability of the current payment system. We found how these kind of popular centralized payment gateways are overall helpful and beneficial for the internet businesses and there are opportunities to improve it.

Source:
https://www.researchgate.net/publication/344223983_Analysis_of_Centralized_Payment_Eco-System_A_Systematic_Review_on_E-Payments

An Empirical Survey on Crowdsourcing-Based Data Management Technique

Author: Md.Al-Amin et al.

Brief Description:

Crowdsourcing platforms are an efficacious approach to connect the abilities of people to relate with human estimation for distinctive tasks like sentiment analysis and image recognition etc. Accompanying the expansion of various crowdsourcing platforms like Toluna, Ushahidi, Microworkers, Google crowdsourcing platform or for other crowdsourcing platforms a large workforce and a large knowledge base needed. Automated processes cannot completely address any important analytical duties and data management tasks. These tasks, such as recognizing images and sentiment analysis can be enhanced by using human intellectual capability. Crowd-sourced management of data has therefore become an ever-greater research field and business attention. We study four distinctive platforms in this paper and conduct a broad variety of crowdsourcing data management studies. Based on this research, we then identify three primary considerations for improving data management in crowd sources.

Source:
https://www.researchgate.net/publication/340081099_An_Empirical_Survey_on_Crowdsourcing-Based_Data_Management_Techniques

A Pragmatical Study on Blockchain Empowered Decentralized Application Development Platfor

Author: Md.Al-Amin et al.

Brief Description:

Blockchain has been a latest trend and many of its applications show promising results in terms of transactions, validations, finances etc. and recently it has become an apple of eye for the tech industry and investors. The concept of decentralized application (commonly known as dApp) and the blockchain platform itself can help to reform many unresolved solutions for the betterment of services and generate new opportunities for the developers to focus on creating applications in a decentralized environment with ease. The adaptation of blockchain technology through dApps is increasing drastically; thus opportunity for the developers and entrepreneurs are growing rapidly. Considering the impactful revolution of dApps, the developer communities are getting more interest to the dApps development tools, frameworks and platforms. This paper is presenting a comprehensive study on some popular blockchain powered decentralized or distributed dApp platforms. In this paper we made analysis of these platforms based on different factors and parameters. This analysis provides an impactful direction to the developer and enterprise community in adopting of the development platform.

Source:
https://www.researchgate.net/publication/340068146_A_Pragmatical_Study_on_Blockchain_Empowered_Decentralized_Application_Development_Platform

BanglaNet: Towards a WordNet for Bengali Language

Author: Md.Al-Amin et al.

Brief Description:

Despite being a popular language in the world, the Bengali language lacks in having a good wordnet. This restricts us to do NLP related research work in Bengali. Most of the today's wordnets are developed by following expand approach. One of the key challenges of this approach is the cross-lingual word-sense disambiguation. In our research work, we make semantic relation between Bengali wordnet and Princeton WordNet based on well-established research work in other languages. The algorithm will derive relations between concepts as well. One of our key objectives is to provide a panel for lexicographers so that they can validate and contribute to the wordnet.

Source:
https://www.researchgate.net/publication/322519043_BanglaNet_Towards_a_WordNet_for_Bengali_Language

Comprehensive analysis of reliability and availability of sub-station automation system with IEC 61850

Author: Dr Mohammad Hasan Imam et al.

Brief Description:

IEC 61850 standard has been used in recent years for modern sub-station automation system (SAS) which enabled the interoperability among communication devices from different vendors. However, it is not specified in the IEC standard for any certain type of communication architecture for a certain type of substation. Certainly, it demands zero points of failure with a particular time limit of transferring the message. So, it is very important to find a comprehensive analysis of reliability and availability of the communication architectures for modern digital SASs. In this paper, a mathematical approach is used to analyze the reliability and availability in detail and finally propose a suitable design for efficient operation. For simulation, an Optimized Network Engineering Tool (OPNET) has been used.

Source:
https://scholar.google.com/citations?view_op=view_citation&hl=en&user=N2DHysAAAAAJ&sortby=pubdate&citation_for_view=N2DHysAAAAAJ:_FxGoFyzp5QC

Development of a Secured and Low-budget Biometric Electronic Voting Machine for Bangladesh

Author: A N M Shahebul Hasan et al.

Brief Description:

One of the fundamental goals of `Digital Bangladesh ' is ensuring people's democracy, human rights, transparency, and delivering government services through the maximum use of modern technologies. However, Bangladesh Election Commission is still striving to implement Electronic Voting Machines (EVM) in the parliamentary general election on an extended scale due to the lack of acceptance concerning EVM accuracy, easy accessibility, and security. This paper describes an implementation of a low-budget and securely accessible solution for the Electronic Voting Machine feasible for Bangladesh with the benefit of verifying the registered voters with a central database through a biometric identification process and maintaining the secrecy of the voters. The proposed system uses low profile microcontrollers (Arduino Uno), which reduces the device's cost to approximately half of the price of other available versions of EVM. The system can communicate with the database to store voter information and vote counts that make the system secure against any fraudulence during the election process and eliminate manual vote tallying problems.

Source: 10.1109/ICREST51555.2021.9331137

Silicone-enriched surface of immersed polyurethane-POSS antifouling coating

Author: Dr. Mohammad Mahbub Rabbani et al.

Brief Description:

A series of waterborne polyurethane-polyhedral oligomeric silsesquioxane (WBPU-POSS) dispersions were synthesized. Different POSS contents were used to evaluate the effect of POSS content on silicone enrichment under both nonimmersed and immersed conditions. The impact of silicone enrichment under immersed conditions on antifouling properties was also evaluated. The structure of the WBPU-POSS coating was identified by FT-IR and 29Si-NMR. X-ray photoelectron spectroscopy (XPS) analysis confirmed a silicone-enriched surface with a certain composition of the WBPU-POSS coating under both nonimmersed and immersed conditions. The mechanical properties, hydrophilicity and hydrolytic degradation of the coating all varied with POSS content. The long-term antifouling performance of immersed coatings depends on surface silicone enrichment, which was found to be above 0.0021 mole POSS content in WBPU-POSS coatings.

Source: https://link.springer.com/referenceworkentry/10.1007%2F978-3-319-92067-2_7-1

Polyurethane and Its Derivatives

Author: Dr. Mohammad Mahbub Rabbani et al.

Brief Description:

Polyurethane (PU) is one of the widely used materials with great potential for multipurpose applications due to their excellent physical, chemical, and mechanical properties. PU materials are widely being used in many applications all over the world. The targeted PU properties for different applications can be achieved by changing the base monomers and their ratios as well as different synthesis process. This chapter highlights the PU application, its chemistry, and its base monomers. The latest modification and new application of PU and its derivatives are also considered.

Source: https://link.springer.com/referenceworkentry/10.1007%2F978-3-319-92067-2_7-1

Modulated heavy nucleus-acoustic waves and associated rogue waves in a degenerate relativistic quantum plasma system.

Author: MD SAIFUL ISLAM et al.

Brief Description:

A theoretical and numerical investigation has been carried out on amplitude modulated heavy nucleus-acoustic envelope solitons (HNAESs) in a degenerate relativistic quantum plasma (DRQP) system containing relativistically degenerate electrons and light nuclei, and non-degenerate mobile heavy nuclei. The cubic nonlinear Schrödinger equation, describing the nonlinear dynamics of the heavy nucleus-acoustic waves (HNAWs), is derived by employing a multi-scale perturbation technique. The dispersion relation for the HNAWs is derived, and the criteria for the occurrence of modulational instability of the HNAESs are analyzed. The localized structures (viz., envelope solitons and associated rogue waves) are found to be formed in the DRQP system under consideration. The basic features of the amplitude modulated HNAESs and associated rogue waves formed in realistic DRQP systems are briefly discussed.

Source: https://aip.scitation.org/doi/abs/10.1063/1.5005605?journalCode=php

N-Methylation of amines and nitroarenes with methanol using heterogeneous platinum catalysts

Author: Dr. Mohammad Anisur Rahman Jamil et al.

Brief Description:

We report herein the selective *N*-methylation of amines and nitroarenes with methanol under basic conditions using carbon-supported Pt nanoparticles (Pt/C) as a heterogeneous catalyst. This

method is widely applicable to four types of *N*-methylation reactions: (1) *N,N*-dimethylation of aliphatic amines under N_2, (2) *N*-monomethylation of aliphatic amines under 40 bar H_2, (3) *N*-monomethylation of aromatic amines under N_2, and (4) tandem synthesis of *N*-methyl anilines from nitroarenes and methanol under 2 bar H_2. All these reactions under the same catalytic system showed high yields of the corresponding methylamines for a wide range of substrates, high turnover number (TON), and good catalyst reusability. Mechanistic studies suggested that the reaction proceeded via a borrowing hydrogen methodology. Kinetic results combined with density functional theory (DFT) calculations revealed that the high performance of Pt/C was ascribed to the moderate metal–hydrogen bond strength of Pt.

Source: https://doi.org/10.1016/j.jcat.2019.01.027 [*Journal of Catalysis*, **2019**, 371, 47-56]

An Effective Modification of Play Fair Cipher with Performance Analysis using 6X6 Matrix

Author: Abhijit Bhowmik et al.

Brief Description:

Researchers have shown great interest in expanding and modifying the Playfair Cipher algorithm to overcome its pre-existing demerits. An explosion of research in cryptography for Playfair cipher occurred the last decade. While the inability of encrypting numeric characters exists in traditional Playfair Cipher, the algorithm is incompatible with many present technologies. Even for the encryption of a proper information in the form of human expressions, encryption of spaces between the words is needed as post processing of the decrypted message remains confusing without the feature. This paper proposes a modification of Playfair Cipher which is able to encrypt alphanumeric characters as well as spaces. The paper reaches the goal by modifying the dimension of the key matrix from 5 by 5 to 6 by 6 and introducing a method to replace spaces with configured digraphs from the generated key matrix. It is believed that introducing the mentioned features can prevent frequency attacks in Playfair Cipher. In this era of Internet of Things, the small devices need algorithms with lower memory consumption. Updated Playfair cipher can be implemented to aid to that.

Source: https://doi.org/10.1145/3377049.3377085

Genre of Bangla Music: A Machine Classification Learning Approach

Author: Abhijit Bhowmik et al.

Brief Description:

The necessity for designing autonomous indexing tools to establish expressive and efficient means of describing musical media content is well recognized. Music genre classification systems are significant to manage and use music databases. This research paper proposes an enhanced

method to automatically classify music into different genre using a machine learning approach and presents the insight and results of the application of the proposed scheme to the classification of a large set of The Bangla music content, a South-East Asian language rich with a variety of music genres developed over many centuries. Building upon musical feature extraction and decision-making techniques, we propose new features and procedures to achieve enhanced accuracy. We demonstrate the efficacy of the proposed method by extracting features from a dataset of hundreds of The Bangla music pieces and testing the automatic classification decisions. This is the first development of an automated classification technique applied specifically to the Bangla music to the best of our knowledge, while the superior accuracy of the method makes it universally applicable.

Source: https://doi.org/10.53799/ajse.v18i2.42

Location, Context and Device aware Framework (LCDF): A unified Framework for Mobile Data Management

Author: Abhijit Bhowmik et al.

Brief Description:

The objective is to propose an unified framework to manage and optimize the data being generated by the mobile devices we regularly use, specially the smart cell phones, tablet pc, wearable devices after studying the current practiced frameworks. This study proposes a top-level framework for data consuming and sharing between mobile devices as well as the data collection and data management methods. This study has addressed some issues with the current data management frameworks and proposed the way how those issues can be avoided in future.

Source: https://doi.org/10.1145/3377049.3377134

Modeling and Analysis of Different Nano-gratings to Enhance Light Absorption in MSM-PDs.

Author: Mr. Mehedi Hasan et al.

Brief Description:

The main purpose of this research is to analyze the light absorption in metal-semiconductor-metal-photodetectors (MSM-PDs) that are assisted with different nano-grating/ nano-corrugated structures. These types of photodetectors are useful in applications where faster optical fiber communication is required. Also, these MSM-PDs are suitable candidates for high-speed chip to-chip interconnects as well as high-speed sampling. The modeling of these nano-structured MSM-PDs was done by simulating them in the Opti wave simulation tool, using the finite difference

time domain (FDTD) method. The corresponding light absorption enhancement factor (LAEF) of each model was then calculated. In this study, a new type of nano-grating shape, hemispherical nanostructure, is introduced. Based on the simulation results, found from the modeling of different nanostructured MSM-PDs, a comparative analysis was made between the newly developed hemispherical nano-structured MSM-PD with trapezoidal nano-structured, triangular nano-structured, and rectangular nano-structured MSM-PDs. The proposed hemispherical shaped nano-structured MSM-PD was able to achieve 19-times higher light absorption enhancement factor when compared to conventional MSM-PDs which are not assisted by nano-grating structures.

Source: https://ieeexplore.ieee.org/abstract/document/8644236

Temperature Comparison of GaAs/AlGaAs Based Double Barrier Resonant Tunneling Diode Considering NEGF.

Author: Mr. Mehedi Hasan et al.

Brief Description:

The present and projected trends of semiconductor electronics are low power consumption, high speed, small in size and high-level reliability. To continue this trend, we need a new technology over conventional CMOS technology. The Resonant Tunneling Diode (RTD) has very impressive characteristics, such as a high intrinsic cut-off frequency (theoretical value in the approximate THz range), low voltage operation and current peaks associated with Negative Differential Resistance (NDR) regions which can overcome this type of matters and take an important role in the field of nanoscale digital and analog applications. In this paper, Gallium Arsenide/ Aluminium Gallium Arsenide (GaAs/AlGaAs) based Double Barrier Resonant Tunneling Diode (DBRTD) is studied for two different models: semi-classical Thomas-Fermi model and Hartree quantum charge model to evaluate the performance of those model in different temperature.

Source: https://ieeexplore.ieee.org/document/8255324/

Designing of GaAs Based Resonant Tunneling Diode and Nano Scale Applications with Considering NEGF

Author: Mr. Mehedi Hasan et al.

Brief Description:

Present situation of electronic area in the world required small devices as well as low power dissipation and ultra-high-speed application. At this moment the presence of resonant tunneling diode can overcome this type of problem and take a big role in nanoscale digital and analog applications. In this research article is to demonstrated effect of asymmetric barrier with respect

to symmetric barrier and digital inverter and THz analog oscillator applications for Thomas-Fermi and Hartree model by introducing Hspice simulation and NEMO5 (Nano Electronic Modelling) by considering NEGF (non-equilibrium Greens function). And 2-DEG HEMT (two-dimensional electron gas, high-electron-mobilitytransistors) concept to understanding variation of RTD (Resonant tunneling diodes) parameter effect of sheet charge density at interface of RTD to be demonstrated. Also studied comparative analysis between single barrier and double barrier performance. In this article obtained Double barrier RTD dominated compared to single barrier RTD.

Source:
http://stmjournals.com/index.php?journal=JoVDTT&page=article&op=view&path%5B%5D=5398

Mechanomyography: An Insight to Muscle Physiology

Author: Prof. Dr. Md. Asraf Ali et al.

Brief Description:

The aim of this review article is to highlight an important application of mechanomyography as a tool to study muscle physiology related issues. Skeletal muscles are of vital significance in our body and contribute well towards all type of movements. Although, there are other techniques in vogue used for non-invasive assessment of muscle. But mechanomyography (MMG) do offer shear benefits for reliable muscle study. So, a substantial number of related articles were searched for this technical review from various databases including SCOPUS, PubMed, ScienceDirect, IEEE Xplore and springer link. Records were screened according to the selection criteria. The studies related to muscle physiology aspects analyzed using MMG were only selected for detailed analysis. During in depth analysis of records finally selected for this article, physiology aspects investigated via MMG were divided into seven sections including muscle stiffness, Parkinson disease, effect of dehydration, muscle contractile properties, muscle contraction mechanics, muscle temperature and muscle hypertrophy. The findings of this review suggest that MMG is a useful and reliable tool to investigate muscle physiology and it has significant applications in sports and medicine. Muscle contractile properties can be employed for future investigation on muscle fatigue, stiffness, atrophy and even functional mechanics of muscle. This review might fill the gap in knowledge in understanding of muscle physiology using MMG.

Source: https://link.springer.com/chapter/10.1007/978-981-13-9539-0_13

Ensemble-Based Machine Learning Algorithms for Classifying Breast Tissue Based on Electrical Impedance Spectroscopy

Author: Prof. Dr. Md. Asraf Ali et al.

Brief Description:

The initial identification of breast cancer and the prediction of its category have become a requirement in cancer research because they can simplify the subsequent clinical management of patients. The application of artificial intelligence techniques (e.g., machine learning and deep learning) in medical science is becoming increasingly important for intelligently transforming all available information into valuable knowledge. Therefore, we aimed to classify six classes of freshly excised tissues from a set of electrical impedance measurement variables using five ensemble-based machine learning (ML) algorithms, namely, the random forest (RF), extremely randomized trees (ERT), decision tree (DT), gradient boosting tree (GBT) and AdaBoost (Adaptive Boosting) (ADB) algorithms, which can be subcategorized as bagging and boosting methods. In addition, the ranked order of the variables based on their importance differed across the ML algorithms. The results demonstrated that the three bagging ensemble ML algorithms, namely, RF ERT and DT, yielded better classification accuracies (78–86%) compared with the two boosting algorithms, GBT and ADB (60–75%). We hope that these our results would help improve the classification of breast tissue to allow the early prediction of cancer susceptibility.

Source: https://link.springer.com/chapter/10.1007/978-3-030-20454-9_26

Empirical Study of Computational Intelligence Approaches for the Early Detection of Autism Spectrum Disorder

Author: Prof. Dr. Md. Asraf Ali et al.

Brief Description:

The objective of the research is to develop a predictive model that can significantly enhance the detection and monitoring performance of Autism Spectrum Disorder (ASD) using four supervised learning techniques. In this study, we applied four supervised-based classification techniques to the clinical ASD data obtained from 704 patients. Then, we compared the four machine learning (ML) algorithms performance across tenfold cross-validation, ROC curve, classification accuracy, F1 measure, precision, recall, and specificity. The analysis findings indicate that Support Vector Machine (SVM) achieved the uppermost performance than the other classifiers in terms of accuracy (85%), f1 measure (87%), precision (87%), and recall (88%). Our work presents a significant predictive model for ASD that can effectively help the ASD patients and medical practitioners.

Source: https://link.springer.com/chapter/10.1007/978-981-15-5566-4_14

Breast Cancer Risk Prediction based on Six Machine Learning Algorithms

Author: Prof. Dr. Md. Asraf Ali et al.

Brief Description:

Breast Cancer is the second most important cause of death among women. As per the clinical expert, breast cancer is one of prominent cancers after lung cancer. However, early detection of this type of cancer in its initial stage helps to save lifes and increases lifespan. The survival chance of a patient can increase if there is a classifier that helps with a quick prediction of breast cancer. Therefore, a smart framework is required that can effectively detect and predict with high accuracy early stage of breast cancer. In this article, six machine learning classification algorithms, namely Logistic Regression (LR), K-Nearest Neighbours (kNN), Decision Tree (DT), Support Vector Machine (SVM), Naive Bayes (NB), and Random Forest (RF) are implemented in order to evaluate the performance and the prediction power of the model. The main target of this work is to compare these algorithm performances using the Wisconsin Breast Cancer (original) dataset. The number of performance metrics such as accuracy, precision, recall, f-1 score, and specificity are taken into consideration Our analysis of the results shows that the Support Vector Machine achieved the highest accuracy of 97.07% with the least error rate and Naive Bayes gives the lowest accuracy of 96%. All these experiments were carried out using SciKit.

Source: https://ieeexplore.ieee.org/document/9411572

The Future Of Electronic Voting System Using Blockchain

Author: Prof. Dr. Md. Asraf Ali et al.

Brief Description:

Blockchain is cutting-edge technology and it has been gaining popularity for cryptocurrency and financial transactions. The transaction process is maintained by the blockchain, which can be used to verify the reliability of the transactional contract. The main effort in this study is the significant accessibility of block-chain based on other technologies including the electronic voting (e-voting) system. In particular, the traditional e-voting system has various limitations and challenges for a very long time. For building a secure e-voting system we have proposed a blockchain-based distributed application that offers fairness, transparency, and flexibility than the existing system. The paper presents a novel secured distributed database of the voter's information, and voter information will be deposited against their private key and digital signature in the central database. Finally, the block-chain based application allows solid robustness, privacy, and transparency which improves the system reliability, secure and reductions the expenditure of hosting a countrywide election.

Source: http://www.ijstr.org/final-print/feb2020/The-Future-Of-Electronic-Voting-System-Using-Blockchain.pdf

EMG-Based Classification of Forearm Muscles in Prehension Movements: Performance Comparison of Machine Learning Algorithms

Author: Prof. Dr. Md. Asraf Ali et al.

Brief Description:

This paper aimed to classify two forearm muscles known as Flexor Carpi Ulnaris (FCU) and Extensor Carpi Radialis Longus (ECRL) using surface Electromyography (sEMG) signal during different hand prehension tasks, such as cylindrical, tip, spherical, palmar, lateral and hook while grasping any object. Thirteen Machine Learning (ML) algorithms were analyzed to compare their performance using a single EMG time domain feature called integrated EMG (IEMG). The tree-based methods have the top performance to classify the forearm muscles than other ML methods among all those 13 ML algorithms. Results showed that 4 out of 5 tree-based classifiers achieved more than 75% accuracies, where the random forest method showed maximum classification accuracy (85.07%). Additionally, these tree-based ML methods computed the variable importance in classification margin. The results showed that the lateral grasping was the most important moving variable for all those algorithms except AdaBoost where tipping was the most significant movement variable for this method. We hope, this ML- and EMG-based classification results presented in the paper may alleviate some of the problems in implementing advanced forearm prosthetics, rehabilitation devices and assistive biomedical robots.

Source: 10.1007/978-3-030-52856-0_24

The Impact of Software Fault Prediction in Real-World Application: An Automated Approach for Software Engineering

Author: Prof. Dr. Md. Asraf Ali et al.

Brief Description:

Software fault prediction and proneness has long been considered as a critical issue for the tech industry and software professionals. In the traditional techniques, it requires previous experience of faults or a faulty module while detecting the software faults inside an application. An automated software fault recovery models enable the software to significantly predict and recover software faults using machine learning techniques. Such ability of the feature makes the software to run more effectively and reduce the faults, time and cost. In this paper, we proposed a software defect predictive development models using machine learning techniques that can enable the software to continue its projected task. Moreover, we used different prominent evaluation benchmark to evaluate the model's performance such as ten-fold cross-validation techniques, precision, recall, specificity, f 1 measure, and accuracy. This study reports a significant classification performance of 98-100% using SVM on three defect datasets in terms of f1 measure. However, software practitioners and researchers can attain independent understanding from this study while selecting automated task for their intended application.

Source: https://doi.org/10.1145/3379247.3379278

The Use of Wearable Sensors for the Classification of Electromyographic Signal Patterns based on Changes in the Elbow Joint Angle

Author: Prof. Dr. Md. Asraf Ali et al.

Brief Description:

Upper limb elbow movement in terms of flexion-relaxation is a complex physical phenomenon in human daily life, particularly during synchronized activities, such as exercising, reaching, pointing, and manipulating. Improper elbow movement might cause musculoskeletal injury, fatigue, pain, or disorders in the upper limb muscles. This study aimed to identify subject-specific electromyographic (EMG) signal patterns based on changes in five elbow joint angles (at 0°, 30°, 60°, 90° and 120°) during maximum (100%) voluntary isometric (static) contraction. Surface electromyographic (sEMG) signals were recorded from the upper arm biceps brachii muscle using a three-channel wearable sensor. A non-parametric machine learning algorithm called k-nearest neighbors (k-NN) was used to build a model that can determine the EMG characteristics and thus discriminate between elbow joint angles. Fifteen time domain features were extracted from the recorded EMG signal and those were used for classification purposes. Two cross validation (CV) methods, namely, leave-one-out (LOO) and k-fold, were used to examine and validate the model. The results showed that k-fold CV showed higher mean classification accuracies (89.68%) than the LOO method (82.49%). Our classification-based results from sEMG signals acquired with five elbow joint angles could aid the development of more advanced rehabilitation assistive devices and further improve the neuromuscular activities of the upper arms. Additionally, this result showed that wearable technology has potential application for remotely monitoring and controlling motor rehabilitation exercises.

Source: https://doi.org/10.1016/j.procs.2021.05.043

An Empirical Investigation on the Quality Assurance Practices in Software Industries : Bangladesh Perspective

Author: Kaniz Fatema et al.

Brief Description:

Software companies often follow a planned and systematic process to ensure that the end product is error free and performs as per the requirements, often termed as Software Quality Assurance (SQA) process. However, it has been reported that these companies (especially, mid-size and start-up companies) in developing countries often cut corners to the SQA process due to time and budget limit, and to rush into the market, compromising the quality. This research empirically investigated the SQA process followed in the software companies in Bangladesh. A survey with nine established companies is carried out with qualitative and quantitative data analysis. According to the assessment more than half of the companies fall short in adhering SQA practices within their SDLC. The rest, either fully or partially comply to it. This study further

proposed an SQA model based on inspection process and provide guidelines for continuous quality improvement. The model and guidelines are derived to best support these software companies to improve SQA practices.

Source:
https://www.researchgate.net/publication/343671722_An_Empirical_Investigation_on_the_Quality_Assurance_Practices_in_Software_Industries_Bangladesh_Perspective

Demography of Open Source Software Prediction Models and Techniques

Author: Kaniz Fatema et al.

Brief Description:

Open source software (OSS) is currently a widely adopted approach to developing and distributing software. Many commercial companies are using OSS components as part of their product development. For instance, more than 58% of web servers are using an OSS web server, Apache. For effective adoption of OSS, fundamental knowledge of project development is needed. This often calls for reliable prediction models to simulate project evolution and to envision project future. These models provide help in supporting preventive maintenance and building quality software. This chapter reports on a systematic literature survey aimed at the identification and structuring of research that offers prediction models and techniques in analysing OSS projects. The study outcome provides insight into what constitutes the main contributions of the field, identifies gaps and opportunities, and distils several important future research directions. This chapter extends the authors' earlier journal article and offers the following improvements: broader study period, enhanced discussion, and synthesis of reported results.

Source:
https://www.researchgate.net/publication/353792636_Demography_of_Open_Source_Software_Prediction_Models_and_Techniques

Measuring Perceived Trust in Open Source Software Communities

Author: M M Mahbubul Syeed, PhD et al.

Brief Description:

We investigate the different aspects of measuring trust in Open Source Software (OSS) communities. In the theoretical part we review seminal works related to trust in OSS development. This investigation provides background to our empirical part where we measure trust in a community (in terms of kudo). Our efforts provide further avenues to develop trust-based measurement tools. These are helpful for academics and practitioners interesting in quantifiable traits of OSS trust.

Source: https://link.springer.com/chapter/10.1007/978-3-319-57735-7_5

Pluggable Systems as Architectural Pattern: An Ecosystemability Perspective

Author: M M Mahbubul Syeed, PhD et al.

Brief Description:

In this paper we review the use of plug-in architectures as a technological platform for software ecosystems. Our observation is that the software community has viewed and used plug-ins as powerful extension mechanisms offering a wide range of quality properties. Beyond such low-level technical interpretation, we argue that pluggable systems should be perceived and treated as a higher level architectural pattern. In order to back our perspective we present the pattern following widely adopted documentation scheme, we show example usage of the pattern in the Eclipse ecosystem, and we discuss different implementation options of the pattern when building new technical solutions for ecosystems.

Source: https://www.researchgate.net/publication/278671959_Pluggable_Systems_as_Architectural_Pattern_An_Ecosystemability_Perspective

Who Contributes to What? Exploring Hidden Relationships Between FLOSS Projects

Author: M M Mahbubul Syeed, PhD et al.

Brief Description:

In this paper we address the challenge of tracking resembling open source projects by exploiting the information of which developers contribute to which projects. To do this, we have performed a social network study to analyze data collected from the Ohloh repository. Our findings suggest that the more shared contributors two projects have, the more likely they resemble with respect to properties such as project application domain, programming language used and project size.

Source: https://hal.inria.fr/IFIP-AICT-427/hal-01373052