American International University-Bangladesh (AIUB)

SDG Activity Report 2023

SDG 9: Industry, Innovation and Infrastructure

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

American International University-Bangladesh (AIUB) actively contributes to Sustainable Development Goal 9 by fostering innovation, supporting research, and promoting industry-academia collaboration. AIUB is committed to creating an environment that supports research from industry and commerce. The university encourages faculty involvement in research that has a direct impact on industries.

AIUB also plays an active role in industry partnerships, evidenced by collaborations such as the study visit to BBS Cables Limited and the workshop with Grameen Shakti on renewable energy. These partnerships not only provide students with practical industry exposure but also contribute to the university's spin-offs, promoting the commercialization of research outcomes.

The "Dr. Anwarul Abedin Lecture Series", including topics like "SMART Power Flow Controllers", is an example of how AIUB facilitates knowledge transfer between academia and industry. Furthermore, AIUB encourages students to develop innovative solutions through different activities, projects like projects on renewable energy and IoT-based smart systems.

By focusing on research and innovation in the renewable energy sector, AIUB supports the broader goal of sustainable infrastructure development and the fostering of a knowledge-based economy. These efforts contribute significantly to the advancement of SDG-9 by strengthening industry ties and encouraging technological advancements across various sectors.

#AIUB #SDG9 #Innovation #Industry #Infrastructure

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University Activities towards SDG 9

Study Visit to BBS Cables Limited at Gazipur

On 19th October 2023, AIUB Community of Engineering Students (ACES) arranged a study visit to BBS Cables Ltd. in Sreepur, Gazipur- a renowned cutting-edge technology-based high-quality cable production industry in the country. This visit was attended by a group of 23 students, accompanied by two faculty members of Faculty of Engineering, AIUB.

The faculty members and students were warmly welcomed upon their arrival at the factory. This visit commenced with an illuminating presentation offering an overview of the factory. Subsequently, the participants were granted access to the factory premises under the guidance of expert engineers. During the enlightening session, participants were afforded a close-up view of the indispensable components of the cable industry's infrastructure. This visit provided hands-on experience with critical systems, including PVC, copper, aluminum, domestic cable, LT and HT cables, and compounding plant sections. Besides, they visited the domestic cable testing, PD and HV testing, and optical emission spectrometer labs. The expert engineers explained in detail various issues of factory operations to give insights into this sophisticated cable manufacturing industry and thus improve the participants' knowledge and understanding level.

The program was ended with an interactive discussion session with Engr. Mohammad Badrul Hassan (Managing Director, BBS Cables Ltd.). Mr. Md. Aminur Rahman (General Manager, Plant), Engr. Md. Afjal Hossain (Deputy Manager, Maintenance), Mr. Rathindra Nath Mandal (Deputy Manager, Production), and Engr. Zakaria Parvage (Sr. Production Engineer) were also present and answered several questions asked by the visitors. The faculty members and students extended their appreciation for the outstanding support and assistance provided by the host. To show gratitude and thanks, token of appreciations was presented to Engr. Mohammad Badrul Hassan, on behalf of the AIUB by Prof. Dr. Muhibul Haque Bhuyan, Professor, EEE Department, FE, AIUB. Mr. Tamim Hossain, Lecturer, EEE Department, FE, AIUB.

https://www.aiub.edu/study-visit-to-bbs-cables-limited-at-gazipur

Seminar on "Optical sum frequency and second harmonic generation study of hydrogenated silicon surfaces"

On December 28, 2022, Department of Industrial and Production Engineering (IPE), AIUB organized a seminar titled "Optical sum frequency and second harmonic generation study of hydrogenated silicon surfaces" which was supported by AIUB Community of Engineering Students (ACES). The program started at 2:00 PM with 45 pre-registered participants at Room No. 3202, Annex 3, AIUB. The purpose of the seminar was to provide the students with a clear view about the hydrogenated silicon surfaces and its optical sum frequency and second harmonic generation study.

The program started with the inauguration speech by Prof. Dr. ABM Siddique Hossain (Dean, Faculty of Engineering, AIUB) where the important aspects of material science were discussed. Following that the honorable speaker of the seminar Prof. Dr. Goro Mizutani (Professor, Japan Advanced Institute of Science and Technology, Japan) briefly discussed about the overview of hydrogenated silicon surfaces. He highlighted the construction of an ultra-high vacuum SFG & SHG microscopy spectroscopy system. He concluded his remarks by emphasizing the prospects in this industry. After that, a brief Q&A session was held for the participants. Prof. Dr. Mohammad Abdul Mannan (Director, Faculty of Engineering, AIUB) concluded the seminar by thanking the speaker and presenting a token of appreciation to the speaker.

https://www.aiub.edu/seminar-on-optical-sum-frequency-and-second-harmonic-generation-study-of-hydrogenated-silicon-surfaces

Dr. Anwarul Abedin Lecture Series titled "Analog Circuit Design: Design out of Passion"

Faculty of Engineering (FE) of American International University – Bangladesh (AIUB) organized a seminar titled "Analog Circuit Design: Design out of Passion" included in the "Dr. Anwarul Abedin Lecture Series" by renowned researcher Mr. Ahmad S Mazumder (Director of Engineering, Analog & Mixed Signal IP Development, Silvaco Incorporated,USA) on October 25, 2023 (Thursday) in the AIUB Auditorium. The research talk was focused on the significance of analog circuit design in modern society and the technological innovations related to the industry's growth. Prof. Dr. Md. Abdur Rahman (Pro Vice-Chancellor, AIUB) inaugurated the seminar with a welcome speech where he emphasized the importance of analog design and its integration with digital and mixed signal systems. In the beginning of his engaging talk, Mr. Mazumder discussed the recent trends in the semiconductor industry such as Io cities, autonomous cars and artificial intelligence. After briefly covering the basics of semiconductor switching, he overviewed the process technologies that contributed to System on Chip (SOC) growth such as Strained silicon, High-K metal gate, FinFET and EUV lithography. He detailed how Moore's law, the observation that the number of transistors in an integrated circuit (IC) doubles about every two years, was realized over the years despite a temporary stall in lithographic innovation. The speaker explained how factors like mobility, dielectric permittivity, on current/off current ratio impact transistor performance. Noting how conventional transistor performance worsens with shrinking dimensions, he identified FINFET, a type of field-effect transistor (FET) that has a thin extended gate of a fin shape, as a promising technology that would become mainstream in upcoming years. FINFET allows three channels to exists with same footprint and helps solve the on current/off current ratio issue at only 2-3% extra cost, and shared his experience working for the first 22nm FinFET technology by Intel.

In the last part of his talk, Mr. Mazumder asserted the need for analog design by using an RF system as an example. He provided a brief refresher on CMOS technology and stated that the merit of semiconductor switches lies in their ability to manipulate the device current. To familiarize the audience with dominant analog circuitry, he performed some comparisons between the use of CMOS in analog and digital design, and also between Op-Amp and Common Source MOSFET amplifier voltage gains. He followed up on these observations by discussing the fundamentals of analog design and the unpredictability of the 8 parameters. At the very end, he inspired the audience to embrace the spirit of engineering leadership.

The chief guest of the event was Mr. Ishtiaque Abedin (Founder Member and Chairman, Board of Trustees, AIUB). At the end of the program, Prof. Dr. Md. Abdur Rahman presented the honorable speaker with a token of appreciation from AIUB for sharing his valuable time and insight. The seminar concluded with a group photo of all the participants of the seminar.

https://www.aiub.edu/dr-anwarul-abedin-lecture-series-titled-analog-circuit-design-design-out-of-passion
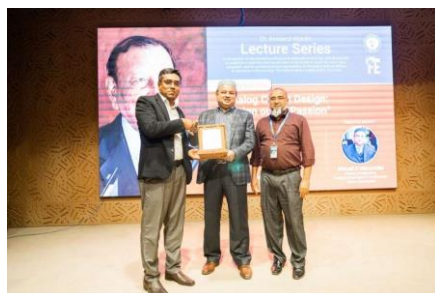
EEE Students of AIUB Secured 1st Runners Up Position in Digital Bangladesh Mela 2023

Digital Bangladesh Mela 2023 is one of the largest expositions aimed at showcasing IT and ITES products and services in Bangladesh held from Jan 26, 2023 - Jan 28, 2023, at Bangabandhu International Conference Center (BICC). In Digital Bangladesh Mela 2023, out of the fifty participating innovations, three innovations have been awarded at the Digital Bangladesh Fair. Among these three winners, EcoCharge a capstone project group formed with the students of Electrical & Electronics Engineering (EEE) Department of AIUB, secured 1st Runner Up position for their innovation. The members of this capstone project group are Syed Ashfaqul Jami, Mohammad Shahed Hossain, Arifa Akter & Md. Touhidul Islam. This capstone project group has been supervised by Prof. Dr. Mohammad Abdul Mannan (Director, Faculty of Engineering, AIUB). The team received the award form Mr. Mustafa Jabbar, Hon'ble Minister, Ministry of Posts, Telecommunications & Information Technology.

https://www.aiub.edu/eee-students-of-aiub-secured-1st-runners-up-position-in--digital-bangladesh-mela-2023

AIUB Hosted Space Robotics Camp

The South Asia's largest "Space Robotics Camp", was organized by the Bangladesh Innovation Forum and Space Innovation Camp on September 29-30, 2023, hosted at the American International University-Bangladesh (AIUB). This two-day event drew the participation of 200 students, aged 4-16, from various regions of Bangladesh. These young enthusiasts were divided into 30 groups, collectively undertaking the task of constructing approximately 30 robots, all centered around a space-themed design.

These robots were designed to perform a wide array of scientific experiments, with a particular focus on Mars and Chad. Their capabilities include functioning as space junk collectors, detecting carbon monoxide, oxygen, and methane, among other essential features.

The event featured Prof. Dr. Md. Abdur Rahman, the Pro Vice-Chancellor of American International University-Bangladesh, as the chief guest. He emphasized the significance of initiating education in early childhood through such activities. He highlighted how nurturing young talents from an early age can set the stage for propelling the nation forward in the future.

Mr. Ariful Hasan Opu, President of Bangladesh Innovation Forum and Crew Chief of Space Innovation Camp underscored the importance of captivating children's imaginations with stories of adventure, curiosity, and scientific discovery. He noted that such narratives serve not only as a source of fascination for children but also as valuable educational experiences. These stories allow children to explore the wonders of the universe and acquire essential problem-solving skills.

The American International University-Bangladesh (AIUB) was the venue partner for this event, with Creative Junior acting as the knowledge partner.

https://www.aiub.edu/aiub-hosted-space-robotics-camp

Dr. Anwarul Abedin Lecture Series "SMART Power Flow Controllers – A Necessity for Future Power Grid"

As a part of the "Dr. Anwarul Abedin Lecture Series", a regular development initiative of the American International University-Bangladesh (AIUB), a seminar titled " SMART Power Flow Controllers – A Necessity for Future Power Grid " was organized by Faculty of Engineering (FE). The seminar was presented by renowned researcher Dr. Kalyan Sen (Fellow of IEEE, Fulbright Scholar (US), GIAN Scholar (India), IEEE PES Distinguished Lec.). Dr.Kalyan Sen is also the President & Chief Technology Officer of Sen Engineering Solutions, Inc.

The seminar was held at AIUB Auditorium on February 1, 2023, from 12:30 PM- 2:00 PM with more than 150 participants. Prof. Dr. ABM Siddique Hossain (Professor and Dean, Faculty of Engineering, AIUB) inaugurated the seminar with a welcome speech. He emphasized the importance of power grid control and smart infrastructure in eradicating problems. Following that the honorable speaker of the seminar Dr. Kalyan Sen discussed the history of technology advancement and spoke of his research and academic experiences. He compared traditional power grids vs modern power grids and identified the challenges brought upon by the latter, such as lack of steady power sources, need for bidirectional controllers and complications related to rights-of-way. He clarified the consequences of free power flow by using the 2003 blackout incident that spanned from New York to Canada. He also briefly discussed the role of autotransformers and phase angle regulators. Finally, he discussed the role of SMART power flow controllers (SPFC) in future grids and emphasized the importance of cost-effectiveness, component non-obsolescence and interoperability in designing SPFCs.   Prof. Dr. Md. Abdur Rahman (Pro Vice-Chancellor, AIUB) delivered the closing speech and thanked the speaker for his inspiring talk. He also encouraged the students to pursue innovation as engineers. Lastly a token of appreciation was presented to the honorable speaker and a group photo was taken concluding the seminar.

https://www.aiub.edu/dr-anwarul-abedin-lecture-series--smart-power-flow-controllers--a-necessity-for-future-power-grid

Webinar on 3D Bioprinting: Exploring the Future of Medicine .

On Thursday, 23rd November 2023 the American International University-Bangladesh (AIUB) hosted the webinar in collaboration with the Faculty of Engineering and the Industrial and Production Engineering (IPE) department, with support from the IEOM AIUB Student Chapter. The event, titled "3D Bioprinting: Customization and Personalization" featured Dr. MD Ahsan Habib, Assistant Professor, Rochester Institute of Technology; as the distinguished speaker. Along with Dr. MD Ahsan Habib, present with us on this webinar were Prof. Dr. ABM Siddique Hossain (Dean & Professor, Faculty of Engineering, AIUB), Prof. Dr. Mohammad Abdul Mannan (Associate Dean, Faculty of Engineering, AIUB), Dr. MD. Ehasanul Haque (Senior Assistant Professor, Department Head of IPE, Faculty of Engineering, AIUB) and Mr. Mahamudul Hassan (Assistant Professor, Faculty of Engineering, AIUB). The webinar commenced with a warm welcome and introduction by the hosts, shedding light on AIUB's commitment to fostering knowledge exchange and innovation. The IEOM AIUB Student Chapter, known for its dedication in promoting industrial engineering and operations management, played a crucial role to support the event. The Honorable Dean of the Faculty of Engineering addressed the audience, emphasizing the significance of the webinar's theme and expressing the university's commitment to staying at the forefront of technological advancements. His words set the stage for an enlightening exploration of 3D bioprinting. Dr. MD Ahsan Habib then took the virtual stage, delivering an engaging presentation that began with an overview of 3D bioprinting. Drawing from his extensive experience, he shared insights into the world of bioprinting, highlighting how the scarcity of organ transplants drove his passion for advancing this field. The audience was captivated as he explained the intricate workings of bioprinters, showcasing his own noteworthy contributions and projects.The core of the presentation revolved around the customization and personalization aspects of 3D bioprinting. Dr. Habib delved into the co-printing of soft and hard biomaterials, illustrating how this technique allows the creation of tailored solutions to meet individual needs. He also discussed the integration of mathematical functions in bioprinting, demonstrating the interdisciplinary nature of this cutting-edge technology. Addressing the hardware design and manufacturing aspects of bio fabrication, Dr. Habib expressed gratitude to his dedicated team for their collaborative efforts. His presentation concluded with a glimpse into the future possibilities of 3D bioprinting, leaving the audience inspired and informed. Finally, the question-and-answer session provided participants, primarily students, with an opportunity to engage directly with Dr. Habib As a token of appreciation for his invaluable contribution, Dr. MD Ahsan Habib was presented with a virtual appreciation. The Associate Dean, Department Head of IPE, and the Faculty Advisor of IEOM expressed their gratitude, acknowledging the speaker's expertise and the seamless collaboration that made the webinar a success. This webinar successfully covered the following goals out of the 16 Sustainable Development Goals set forth by the UN: Good health and well-being (SDG 3), Reduced inequalities (SDG 10), Climate action (SDG 13), Life below water (SDG 14) and Life on land (SDG 15).

https://www.aiub.edu/webinar-on-3d-bioprinting-exploring-the-future-of-medicine-
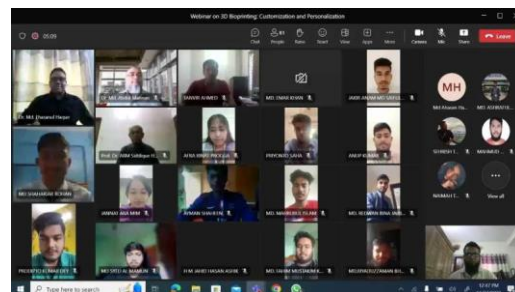
Study Tour to Felicity IDC Limited (FIDC) at Gazipur, Dhaka

On September 11th, 2023, AIUB Community of Engineering Students (ACES) organized a study tour for the students from Faculty of Engineering (FE), American International University-Bangladesh(AIUB) to Felicity IDC Limited (FIDC) at Bangabandhu Hi-Tech City (BHTC), Kaliakoir, Gazipur, Dhaka which is a TIER III, PCI-DSS, ISO9001, ISO27001 and ISO14001 certified Data Centre in Bangladesh. A group of 13 students along with 3 faculty members from AIUB visited the state-of-the-art data center.

The program started by demonstrating a short presentation on the installed power system and management of Felicity IDC Limited (FIDC). Then the participants were divided into three groups and visited the data center under the supervision of Mr. MANAS Sikder (Manager, Power System), Mr. Himan Mazumder (Deputy Manager, BMS) and Mr. Kashifur Rahman (Deputy Manager, HVAC, Felicity Internet Data Center). During this enlightening visit, participants had the opportunity to closely observe infrastructure of the data center. The tour provided hands-on experience with critical systems such as the special chiller unit, which ensures continuous cooling for data center equipment. The VESDA system, enabling automatic fire detection, was a highlight, emphasizing the facility's commitment to safety. Exploring the dynamic rotary UPS, diesel generator, and isolation transformer offered valuable insights into power redundancy and reliability. The expert guidance of the supervisors, enriched the experience, providing participants with in-depth explanations of each sector and enhancing their understanding of data center management operations.

The program was ended by a Q&A and discussion session with Mr. Feroz Ahmed (Head of Facility Operation). Md. Nazmul Hasan (Sr. Executive-HR) was also present in the session and shared his experiences with Felicity. The faculty members and students expressed their warm gratitude towards the authority of Felicity IDC Limited (FIDC) for their great support and assistance. A token of appreciation was presented to Mr. Feroz on behalf of AIUB. The study visit came to an end with a group photo. Dr. Md. Rifat Hazari (Senior Assistant Professor, FE, AIUB) , Dr. Shameem Ahmad (Assistant Professor, FE, AIUB), and Tamim Hossain (Lecturer, FE, AIUB) participated as faculty coordinators for this tour.

https://www.aiub.edu/study-tour-to-felicity-idc-limited-fidc-at-gazipur-dhaka

Webinar on "Securing the Bits and Bytes: Navigating through Classical and Modern Measures of Digital Security"

On Saturday, 16th September 2023, IEEE AIUB Student Branch, in collaboration with the IEEE Computer Society AIUB SB Chapter, successfully hosted a webinar titled "Securing the Bits and Bytes: Navigating through Classical and Modern Measures of Digital Security". The event was held with the purpose of providing some context on cryptography and computer security and developing its knowledge among the participants. It highlighted the significance and the need for cryptography and computer security in the modern era. The session also emphasized the importance of advancements in digital security technologies and infrastructure, ultimately in alignment with SDG 9 (industry, innovation, and infrastructure).

The webinar was inaugurated by Dr. Shameem Ahmad, Assistant Professor, Faculty of Engineering, Department of EEE, AIUB; Counselor, IEEE AIUB Student Branch. During his speech he briefly talked about cyber security and then welcomed the speaker. After this Ms. Cybele Ghanem, Implementation and Support Engineer, INVIGO OFFSHORE; Chair, IEEE DAY 2023; Social Media Lead, IEEE XTREME 17.0 took the floor as the speaker of the session. Initially, she began the session by delivering a clear and concise introduction about herself and the topic she would be discussing.

She proceeded with a discussion on networking and cybersecurity. Subsequently, she elaborated on the concept of computer security, delving extensively into the objectives of security using the "CIA TRIAD" model. She gave a thorough overview of several types of attacks and their distinctive targeting tactics. She also discussed passive and active forms of security attacks. She continued by showing a video of the worst threat, "Social Engineering." Finally, she concluded her lecture by expressing gratitude to the IEEE AIUB Student Branch for extending the invitation to the session. The event concluded as Dr. Shameem Ahmad gave the closing remarks and handed over the token of appreciation to the distinguished speaker.The webinar began at 7 PM and ended around 8:30 PM (GMT +6). Over 90 participants attended the webinar. Distinguished faculty members Dr. Mohammad Hasan Imam, Associate Professor, Department of EEE, Faculty of Engineering, AIUB; Advisor, IEEE EMBS AIUB Student Branch Chapter; Mr. Md. Ashiquzzaman, Assistant Professor, Faculty of Engineering, AIUB; Mr. Bishwajit Banik Pathik, Assistant Professor, Faculty of Engineering, AIUB; Mr. Abu Shufian, Lecturer, Faculty of Engineering, AIUB also attended the webinar.

https://www.aiub.edu/webinar-on-securing-the-bits-and-bytes-navigating-through-classical-and-modern-measures-of-digital-security
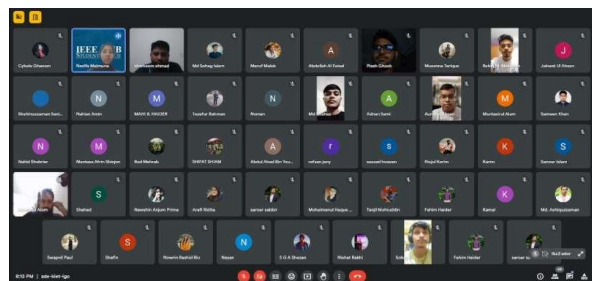
Celebration of "World Nanotechnology Day 2023"

On October 9, 2023, the Center for Nanotechnology Research (CNR) organized the "World Nanotechnology Day 2023" program which was supported by AIUB Community of Engineering Students (ACES). This momentous event took place in the Multipurpose Hall, Building-D of American International University-Bangladesh (AIUB) at 3 PM.

A poster competition was held on various sectors of nanotechnology, where a total of 12 teams presented their ideas on present and future opportunities of nanotechnology. Posters were evaluated by the AIUB faculty members. After the poster presentations, the event started with a cake cutting ceremony for the celebration of World Nanotechnology Day 2023. Later, a panel discussion was held on "Nanotechnology Revolution for The Benefit of Society". The honorable panelists were Prof. Dr. Al-Nakib Chowdhury (Head, Department of Chemistry, BUET, Former Vice Chancellor, Pabna University of Science and Technology), Prof. Tofazzal Islam (FBAS, Professor & Founding Director, Institute of Biotechnology and Genetic Engineering (IBGE), Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur), Dr. Khandaker Jakir Hossain (General Manager-Technical, Lub-rref (Bangladesh) Ltd.). Dr. Mohammad Mahbub Rabbani (Associate Professor, Department of Chemistry, Deputy Director, Dr. Anwarul Abedin Institute of Innovation, AIUB) acted as a moderator in panel discussion. During the session, all the panelists shared their thoughts & experiences on implementation of nontechnology for the improvement of our society. They also praised about the initiatives of American International University-Bangladesh (AIUB) in the field of nanotechnology. Then Dr. Saniat Rahman Zishan (Director, Faculty of Engineering, AIUB) declared winners of Poster Competition. The Honorable Pro-Vice Chancellor of AIUB, Prof. Dr. Md. Abdur Rahman delivered the closing speech. In his remarks, he expressed gratitude to all the panelist for their remarkable efforts in the field of nanotechnology in Bangladesh. He presented tokens of appreciation to all the panelists.

https://www.aiub.edu/celebration-of-world-nanotechnology-day-2023

Award Ceremony of Probhabok 4.0

Probhabok is an annual intra department student design competition organized by the Department of Architecture at the American International University – Bangladesh (AIUB) since 2018. It has grown to become a highly anticipated event within our academic community, attracting students, faculty members, and industry professionals. The competition serves as a platform for budding architects to showcase their creativity, exchange innovative ideas, and refine their skills. It fosters a spirit of innovation and collaboration, aligning with AIUB's commitment to promoting excellence in architecture.

This year, PROBHABOK 4.0 attracted 75 student participants in two categories – Category A for design studios VII – IX, and category B for design studios IV - VI. On Thursday, October 12, 2023, the final exhibition and award Ceremony was held at the Multipurpose Hall of Annex 7, AIUB. Mr. Md. Anisur Rahman Miah, BPAA, Chairman (Secretary), Rajdhani Unnayan Kartripakkha (RAJUK) was present at the award ceremony as the Chief Guest. The winners of both the categories were declared in the presence of the chief juror of the event, eminent sculpture of the country, Mr. Hamiduzzaman Khan. Ms. Nadia Anwar, Founder Member and Vice Chairman of AIUB's Board of Trustees was present as the special guest along with Prof. Dr. Abdur Rahman, Pro-Vice Chancellor, AIUB, and other officials and faculty members. Major (Retd.) Engr. Shamsuddin Ahmed Chowdhury, Member, Development, Rajuk was also present on the occasion as the special guest.

https://www.aiub.edu/award-ceremony-of-probhabok-40

Event News of Walton Industrial Visit

On Thursday (August 10, 2023), the Department of Operations and Supply Chain Management (OSCM) arranged an industrial visit at Walton Hi-Tech Industries PLC. factory, located at Kaliakair, Chandra, Gazipur for the student majoring in OSCM. In the dynamic world of education, where theoretical knowledge often forms the foundation of learning, the role of practical exposure cannot be underestimated. One of the most effective ways to bridge the gap between classroom teachings and real-world applications is through industrial visits. These visits provide students with an opportunity to witness the workflow of industries, gain insights into the processes, and understand the complexities of various sectors. An industrial visit not only enhances the students' understanding but also paves the way for a holistic learning experience. The objective of this event harmoniously aligned with the Sustainable Development Goal of ensuring quality education (SDG 4), Industry, Innovation and Infrastructure (SDG 9) and Responsible Consumption and Production (SDG 12).

Dr. Md. Tamzidul Islam (Dept. Head, OSCM), Ms. Shahnaz Zerin Haque (Assistant Professor, OSCM), Md. Hasibul Islam & Hussein Areefur Rahman (Lecturer, OSCM) were the faculty members to take 23 OSCM major students in this visit. Mr. Kaisarul Islam & Mr. Mamun from Walton were in-charge to receive the group. They first provided a small presentation on Walton's current condition and growth. Later, they took the students & teachers to refrigerator & air-conditioner production line where students got to see facilities and processes of these two production units. Students also got to understand the inventory management system & production flow inside the factory. Later in the afternoon, the group left Walton premises. FBA humbly appreciates the openhanded support extended by the AIUB management.

https://www.aiub.edu/event-news-of-walton-industrial-visit

OSCM Department, FBA Organized a Seminar on Freight Forwarding Industry

On October 2, 2023, the Department of Operations and Supply Chain Management (OSCM), Faculty of Business Administration (FBA), AIUB organized a seminar entitled "Freight Forwarding Industry: Process and Prospects". As we know, due to the COVID-19 pandemic and the Russia-Ukraine conflict the global logistics industry is disrupted, both academicians and practitioners are looking for ways to make the logistics industry more sustainable and resilient. The seminar was organized to share about the process and prospect of the freight forwarding industry, a critical component of the logistics sector.

The program was coordinated by Dr. Md. Tamzidul Islam, Assistant Professor & Head of the Dept. of Operations and Supply Chain Management, FBA under the direct supervision of Dr. Farheen Hassan, Associate Dean, FBA, AIUB. At the beginning, Dr. Mohammad Faridul Alam (Director, Graduate Program, FBA), on behalf of FBA, expressed sincere gratitude to the chief guest of the seminar for his valuable time and presence. The seminar program was enlightened by the presence of Md. Mohammad Sams E Tabriz, Managing Director, Schenker Logistics (Bangladesh) Ltd, as the guest speaker. From his experience of more two decades in Freight Forwarding, Supply Chain Management and International Logistics, he shared valuable insights on the global logistics operations at the program. He has shared how different levels of logistics service providers are operating internationally. Moreover, he talked about how outsourcing logistics is making business convenient for industrial managers increasing their market competitiveness and how the logistics industry is incorporating sustainability concerns through carbon reduction. He also spoke about how the recent infrastructural developments in Bangladesh show prospects for higher efficiency in logistics operations. In addition, career prospects of freight forwarding industry and the competencies required to pursue this track were also discussed by the key resource person. Ms. Sarzia Sharna, an employee of Schenker Logistics and alumnus of FBA also shared how the learning and experience of AIUB shaped her career and contributed to achieve success in her roles in various organizations. Lastly, Dr. Md. Faruque Hossain (Professor, OSCM, FBA) delivered the vote and thanks and concluding remarks. Dr. Mohammad Rashedul Hoque, Dr. Mohammad Rafiqul Islam Talukdar, Md. Hasibul Islam, Md. Zahidul Anam, Hussein Areefur Rahman, and other faculty members of FBA were also present at the seminar. The program ended with a Q&A session and many thoughtful questions from students and faculty members were addressed during that session. Lastly, FBA, AIUB and Shenker Logistics (Bangladesh) Ltd exchanged sincere commitment to continue to work together in this field in the future. This event highlighted SDG 4 (Quality Education and SDG 9 (Industry, Innovation, and Infrastructure). This event was a great success, featuring insightful discussions and expert speakers in the field of freight forwarding.

https://www.aiub.edu/oscm-department-fba-organized-a-seminar-on-freight-forwarding-industry

Capstone Project Completion: Summer 2022-23

On October 5, 2023, AIUB Community of Engineering Students (ACES) organized the "Celebration of Capstone Project Completion" program for the Summer 2022–23 semester, which was supported by the Faculty of Engineering at AIUB. This event took place in the Multipurpose Hall of Building D at American International University-Bangladesh (AIUB). A total of 32 groups presented their capstone projects in front of their respective supervisors, externals, and other faculty members. After the successful completion of the defenses, all groups engaged in the poster competition. The poster presentations were followed by an enchanting cultural program performed by the AIUB Performing Arts Club (APAC). The program was graced by the presence of industrial judges, who evaluated all the posters and provided their valuable insights.

Dr. Md. Abdul Mannan (Professor, Associate Dean, Faculty of Engineering, AIUB) inaugurated the event and congratulated the students on successfully completing the Capstone Projects. Then, all the participants were shown appreciation for their hard work through a wonderful video. Afterward, Prof. Dr. Md. Abdul Mannan and Dr. Md. Saniat Rahman Zishan (Associate Professor, Director, Faculty of Engineering, and AIUB) showed gratitude towards the honorable industrial judges, who evaluated the capstone project posters, by giving them tokens of appreciation from AIUB. The honorable judges who were present during the event are Engr. Md Hossen Mahbub (Manager, Bangladesh Office, Samsung C&T Corporation), Mr. Manas Sikder (Manager, Power System, Felicity IDC Limited), Mr. Nowajish Kibria Shishir (Senior Assistant Director, Remark HB Limited), Mr. Md. Rashedul Amin (Software Development Manager, Oxford Immune Algorithmics), Mr. Md Ashraf Uddin (Technology Program Management Chartered Engineer, Banglalink Digital Communications Ltd.), Ms. Arpita Hoque (Deputy Project Director, China National Technical Import And Export Corporation), Mr. Md Robiul Hasan (Manager, Robi Axiata Ltd), Engr. Md. Ettaker Siraj (Deputy Operative Director, Engineering Services Management,Walton Hi-Tech Industries Plc.), Mr. SK. Abu Rohan (Deputy Manager, Max Infrastructure Ltd., Max Group) and Ms. Kazi Aniqa Nawar (Digital Delivery Specialist, ICT Department, Syngenta Foundation).Dr. Md. Abdul Mannan, Mr. Nafiz Ahmed Chisty (Associate Professor, Head-In Charge [Undergraduate Program], Faculty of Engineering, AIUB), Dr. Md. Saniat Rahman Zishan and Dr. Md. Rifat Hazari (Deputy Director, Dr. Anwarul Abedin Institute of Innovation, AIUB) presented the certificates of acknowledgment to the top three groups in the Poster Competition. Finally, Dr. Md. Saniat Rahman Zishan announced the names of the three groups who are nominated for the Vice Chancellor's Award.The noteworthy program came to an end with a group photo. The entire program was a huge success due to the tremendous support from the Capstone Project Supervisors of the EEE and CoE departments.

https://www.aiub.edu/celebration-of-capstone-project-completion-summer-2022-23

Faculty Research and Publications on SDG 9

Porous Hybrid Electrode Materials for High Energy Density Li-Ion and Li-S Batteries.

DR. S. MOSADDEQ AHMED et el.

Hybrid materials play a key role in enhancing the electrochemical properties of electrode materials for lithium-ion and lithium-sulfur batteries. Porous hybrid materials offer high surface area and high conductivity. Moreover, they can store high energy with their large active site. In this chapter, we discussed the highly efficient porous electrode materials (cathode and anode) for the development of the practically used rechargeable lithium-ion and lithium-sulfur batteries. This chapter will open windows for designing next-generation energy storage.

https://doi.org/10.1007/978-3-031-23401-9_7

Lecture Notes in Networks and Systems (LNNS)

DR. SHAHRIYAR MASUD RIZVI et el.

The convolutional neural network (CNN) has gained widespread adoption in computer vision (CV) applications in recent years. However, the high computational complexity of spatial (conventional) CNNs makes real-time deployment in CV applications difficult. Spectral representation (frequency domain) is one of the most effective ways to reduce the large computational workload in CNN models, and thus beneficial for any processing platform. By reducing the size of feature maps, a compact spectral CNN model is proposed and developed in this paper by utilizing just the lower frequency components of the feature maps. When compared to similar models in the spatial domain, the proposed compact spectral CNN model achieves at least 24.11× and 4.96× faster classification speed on AT&T face recognition and MNIST digit/fashion classification datasets, respectively.

https://link.springer.com/chapter/10.1007/978-3-031-18461-1_7

Chemically Deposited Metal Chalcogenide-based Carbon Composites for ¬Versatile Applications

DR. MOHAMMAD MAHBUB RABBANI et el.

This book satisfies the interest and curiosity of beginners in thin film electrode preparations, characterizations, and device making, while providing insight into the area for experts. The considerable literature on 'metal chalcogenides based carbon composites and their versatile applications' reflect its importance for research and demonstrate how it's now reached a level where the timely review is necessary to understand the current progress and recent trends and future opportunities. In the book, the authors examine recent advances in the state-of-the-art fabrication techniques of metal sulfide based carbon composites along with their working mechanisms,

associated issues/solutions, and possible future are discussed. In addition, detailed insight into the properties and various applications including principles, design, fabrication, and engineering aspects are further discussed.

https://link.springer.com/book/10.1007/978-3-031-23401-9

Business Continuity- Malaysian Small Business and COVID-19 Resilience Strategies

DR. KHONDAKER SAZZADUL KARIM et el.

This book explores the financial behaviour of SMEs in Malaysia in response to Covid- 19. It investigate the relationship between response approach, operational damage and business continuity plan. The sample is selected via simple random sampling, and demographic question are included. The study bridge the gap between theory and practice, providing insight into the financial practice and preference of SMEs. The results highlights the need for the flexible response approach, a procedure response orientation, and a business continuity plan to mitigate operational damage caused by Covid-19. The findings could benefit SMEs, policimakers, and researchers in developing effective strategies to address financial challenges during and after the pandemic.

The Fourth Industrial Revolution and Beyond: Select Proceedings of IC4IR+

TAHSEEN ASMA MEEM et el.

As a consequence of rising urbanization and industrial growth, water contamination and degradation are developing at an alarming rate. The water scarcity around the world necessitates a long-term strategy to make the most of it. Traditionally, water quality is assessed by collecting water samples by hand and then testing and analyzing them in a laboratory setting. This paper examines how cutting-edge technology, such as the Internet of Things (IoT), can provide a sustainable and cost-effective method of monitoring multiple water parameters in real time. The proposed system was used to calculate the turbidity, TDS, pH level, and temperature of 30 different water samples with success. The turbidity level was measured in nephelometric turbidity units (NTU) and then transmitted via wireless fidelity (Wi-Fi) networks to an Internet of Things—cloud computing platform, where it could be viewed using an Android smartphone or PC. The experiments demonstrated that the monitoring system was capable of continuously monitoring the pH level, total dissolved solids (TDS), and temperature of water from various sources at different times, thereby providing safe water for industrial, agricultural, and commercial purposes. The cost and complexity of implementation are minimal due to the use of sensors and the Arduino Nano microcontroller, making it simple to validate the efficacy of the built system.

https://link.springer.com/chapter/10.1007/978-981-19-8032-9_51

Porous Hybrid Electrode Materials for High Energy Density Li-Ion and Li-S Batteries, Ed: 1st

DR. MOHAMMAD ANISUR RAHMAN JAMIL et el.

Hybrid materials play a key role in enhancing the electrochemical properties of electrode materials for lithium-ion and lithium-sulfur batteries. Porous hybrid materials offer high surface area and high conductivity. Moreover, they can store high energy with their large active site. In this chapter, we discussed the highly efficient porous electrode materials (cathode and anode) for the development of the practically used rechargeable lithium-ion and lithium-sulfur batteries. This chapter will open windows for designing next-generation energy storage.

https://link.springer.com/chapter/10.1007/978-3-031-23401-9_7

Nature-Inspired Self-Cleaning Surfaces in the Nanotechnology Era

DR. ABDULLAH AL NAHID et el.

Self-cleaning technology mimics the natural self-cleaning abilities of plants and animals such as lotus effect, to create a surface that is hydrophobic and oleophobic, meaning it repels water and oil. The resultant surface is resistant to dirt and grime, making it easier to clean and maintain, reducing labor costs and time consumption. However, it is not only limited to the superhydrophobic surface for making the water roll off instead of sliding but also modern research focuses on incorporating photocatalysts to break down organic compounds during daylight at outdoor applications. In addition, self-cleaning surfaces and coatings are attracting research attention due to their ability to self-disinfect. This review highlights the use of metal oxide-based nanocomposite for self-cleaning purposes. This chapter provides an outlook of different metal oxide and metal-metal oxide nanocomposites in advancing self-cleaning properties, durability, and other mechanical properties. This chapter aims to give a general overview of a variety of polymeric metal oxide-based systems and methods that enhance self-cleaning behavior as well as the projection toward future research.

https://www.intechopen.com/books/12397

Elderly Patient Monitoring and Fall Detection Using mmWave FMCW Radar System

DR. MD. HASAN IMAM et el.

Frequency Modulated Continuous Wave radar is nowadays considered as an important technology to monitor the health condition, fall condition and activities of elderly patients for their well-being and safety. Infrared Proximity (IP) and Passive Infrared (PIR) camera systems have traditionally been used for this purpose, but this system has crucial limitations, especially with regards to fast detection technique for such as preventing accident in the bathroom and indoor environment. The use of surveillance cameras not only struggles at nighttime detection but also can compromise patients'

privacy, such as bathroom activities. FMCW radar technology can operate effectively in no-light conditions making them particularly suitable for nighttime monitoring by addressing privacy concerns. The principles of FMCW radar, signal processing algorithms and methods are discussed in this paper. Depending on the type of motion activity, a patient's returning radar signal will exhibit varying Doppler effect properties. This technology not only enhances patient care but also relieves healthcare providers and families from the need for constant in-room surveillance. FMCW radar technology bridges the gap between patient privacy concerns and the necessity for improving patient healthcare. This paper explores the utilization of FMCW radar for monitoring elderly patients and fall detection, with the goal of developing a privacy friendly app-based solution for real-time remote patient activity tracking.

Design and Implementation of IoT-Based Load Monitoring and Outage Management System

DR. MOHAMMAD ABDUL MANNAN et el.

An essential instrument for the operation of a power system is to monitor and analyze the data to find the fault and rectify it before the System collapses completely. This paper intents to utilize the idea to create a control system that will fulfill three objectives, monitoring of vital parameters controlling the power distribution, outage management by fault detection based on the variation of voltage, frequency, and current & protection of the circuit against any significant incidents by isolating the load from utility and flagging the information through feedback to the utility authority. The method used in this project can provide necessary safety from total system outages by adequately monitoring the instant data and historic data, managing the outage system by detecting faults, and cutting loads required to avoid a widespread blackout of a power system. Implementation of the proposed project can solve the problem of system blackout due to overload, under/over voltage, or under/over frequency. This developed system can supply necessary timestamped monitored data that can be accessed remotely and can also archive to create a proper load profile to ultimately help the modeling of Load Forecasting for a smooth and economic grid operation and can be used for developing the Smart Grid network.

Fuzzy Logic-Based Design Optimization and Economic Planning of a Microgrid for a Residential Community in Bangladesh

DR. MOHAMMAD ABDUL MANNAN et el.

Hybrid renewable energy systems are becoming more predominant because of climate change and the overconsumption of natural fuels. Proper utilization of renewable resources can uplift energy-deprived regions while also contributing to a nation's economic growth. However, effective system planning and resource assessment are essential for effective utilization. In that regard, the study proposes a hybrid microgrid design for a remote island in Bangladesh. The proposed system comprises solar photovoltaics, wind turbines, and lithium-ion battery storage which is coupled to

the utility grid. For modeling and simulation of the optimal system design of the residential load in Urir char, Hybrid Optimization Multiple Energy Resources (HOMER) pro was utilized. The load profile for the system was created employing fuzzy logic and random probability, as well as meteorological data for the chosen location. Several instances with reliability factors such as short-term and long-term interruptions are also taken into consideration in the design. Additionally, the paper discussed a comparison between the proposed system and other considered scenarios as well as the utility grid. The proposed system is a viable approach for providing cleaner energy for the selected area in regards to energy cost (0.035$/kWh), a renewable fraction (90%), emission reduction (78%), and reliability.

Design and Implementation of IoT-Based Smart Energy Meter to Augment Residential Energy Consumption

DR. MOHAMMAD ABDUL MANNAN et el.

There is a constant push for automation, portability, and remote control in the management systems of all organizations. A new IoT-based multifunctional smart energy meter is presented in this paper for automated metering and billing system. Arduino Nano with GSM Short Message Service (SMS) connection provides a meter reading system with predefined automatic functions followed by ESP-8266 WiFi Module to monitor energy parameters. Proteus 8.0 was used to model the project before the hardware implementation was built. With the GSM module and embedded controller, the proposed system can transmit data such as kWh consumption and generated bills over the GSM network, which can then be fed into existing energy management systems at power companies or organizations to provide services to customers without the need for human intervention. As a result, consumer energy analysis is made considerably simpler and more manageable. This device aids in the detection of power theft as well. As a result, this smart meter facilitates wireless connection and home automation utilizing IoT, which is a significant step towards a Digital Bangladesh. Moreover, a prepaid mode is incorporated as part of billing system.

Design and Implementation of a Smart Wind Turbine with Yaw Mechanism

DR. MOHAMMAD ABDUL MANNAN et el.

In this paper, an intelligent low-cost wind turbine is designed which can rotate the rotor hub towards wind direction. The smart wind turbine technology has developed by using six rotor blades, squirrel cage induction generator (SCIG), and yaw mechanism. The yaw mechanism relates to two stepper motors through support tower. Based on the wind direction, the yaw mechanism will control the stepper motors. Finally, this stepper motors will move the wind turbine towards the wind direction. Conventionally, the hub of wind turbine is kept at fixed position. However, this kind of arrangement is not suitable where in some places (e.g. Bangladesh), the wind directions can be changed frequently.

Therefore, it is necessary to move the rotor hub continuously towards the wind direction so that it can capture maximum amount of wind power. So, a smart wind turbine with yaw mechanism is designed in this paper.

Detection of Cardiovascular Diseases (CVDs) With Federated Learning System

DR. MOHAMMAD NASIR UDDIN et el.

Cardiovascular diseases (CVDs) are the global major cause of death, claiming around 17.9 million lives each year [1]. These illnesses include problems that impact the function of human heart, such as coronary heart disease, vascular disease, stroke, peripheral vascular disease and cardiomyopathy. The most frequent symptoms of cardiovascular disorders include chest discomfort, dyspnea, dizziness, numbness in the face or legs and issues while talking, seeing or walking. Average adult (Age, 18+) has a heart rate of 60 to 100 beats per minute and the abnormal heart rate is above 100 or under 60 beats per minute. Besides that, the ideal weight of the cardiac is 230-280 g for women and 280-340 g for men. More than 75% of CVDs fatalities occur in poor and medium-income nations. They lack access to primary medical services for lower-income which might let them avoid cardiovascular disease. As a consequence, CVDs are often detected too late and patients die at a pretty young age. Especially keeping them in mind, this study developed a low-cost machine learning approach for detecting heart disease from a single data set. Throughout this scenario, federated learning is applied to generate a shared model from patient data that is divided into several data stores. The current state updates of numerous users scattered throughout a subnet can be summed together to create a shared model. On user devices, the Logistic Regression and Support Vector Machine techniques are implemented to develop this model. All of the updates are forwarded to the main system. According to testing results, the UCI dataset has a 90% accuracy. Electronic health records can be analyzed using a federated learning system to develop a single model while maintaining the information's distribution pattern. Only Bangladesh was utilized in this research to represent the poorest countries in Asia. In the future, more countries will be included in this investigation.

https://bdphso.org/national-conference-on-physics-2023/

Monitoring Pulse Rate and Detecting Atrial Fibrillation with a Non-Invasive MEMS Pressure

DR. MOHAMMAD NASIR UDDIN et el.

Continuous monitoring of cardiovascular health requires instruments that are both accessible and affordable [1]. To achieve these challenges, a flexible and wearable wristband was built based on an array of MEMS pressure sensor components, allowing for robust sensor-to-skin contact while ensuring long-term optimum comfort. The mean and standard deviation of man and women's data are regarded as: age (8 - 40 years), height (5 -180 cm), weight (20 - 90 kg) and BMI (6 - 30 kg/). The

device is capable of tracking the abnormalities in the heart rhythm and measuring the monitoring accuracy of the pulse rate. Silicon gel in the shape of a hemisphere was included in this 1.4 mm × 1.4 mm MEMS sensor device to filter the pressure wave from the dilating artery to the sensor module. Passive capacitive sensor inputs have very low energy demands; hence this model used a basic capacitive loss model indicating that the power consumption is just 5.5 W when a 3.5 V power source and 100 kHz output frequency are being used. This model also demonstrates that monitoring can be done for longer periods of time with small battery capacities, as well as the system can be adapted to operate wirelessly using limited Bluetooth. For healthy persons, the heart rate monitoring study demonstrated almost ideal beat-to-beat accuracy (sensitivity = 99 %, precision = 100%). In addition, the detection of beat-to-beat in coronary artery disease patients was successfully restored (95.5 % CI). Every reading was taken with the custom-made wristband, thus it was completely non-invasive. Finally, the results indicated that the device could be effective in the monitoring system of cardiovascular conditions as well as individualized medication

https://bdphso.org/national-conference-on-physics-2023/

An Experimental Study on Thermal Capacity Measurement for Metal-Based Packed Bed Latent Heat Energy Storage System

DR. MOHAMMAD NASIR UDDIN et el.

Latent heat storage systems are a potential approach to storing and delivering thermal energy with the least amount of space, density and financial constraints [1]. The purpose of this work is to investigate the behavior of a packed bed latent heat thermal energy storage system. A spherical latent heat storage tank of 0.06 m diameter and 1.5 m length fully loaded with PCM encapsulated capsules was investigated in this research for the production of energy obtained by a solar collector basis over a period of time every day. The solar heating power is taken 380 watts. Paraffin wax is used as a phase transition substance in a High-Density Poly Ethylene spherical capsule. It has a heat capacity of 2900 J/(kg-K) at constant pressure and a thermal conductivity of 7.1 W/(m-K). The starting temperature is 310.15 K here. When the paraffin wax is mixed with the heat exchange fluid (water) at 348.15 K, the tank's total storage capacity increases to 0.1504 W/(m-K). Numerous element and sample interval sizes with corresponding values of 1 mm and 21600 s were used in mathematical calculations. The overall charging time for the bed is 9 hours. The charging loop begins throughout the day when solar energy is absorbed and finishes with the full melting of PCM. After the PCM is fully solid, the discharging loop is over. This design is very beneficial in confined spaces like houses, schools and mosques, especially during the harsh winter months.

https://bdphso.org/national-conference-on-physics-2023/

Thermogram-based Regions with Convolutional Neural Network (RCNN) and Facial Biometrics for Safe Driving

DR. MOHAMMAD NASIR UDDIN et el.

A significant number of wrongful death cases involve motor vehicle accidents. In most car accidents, the driver is somehow at fault. This can be due to a lack of visibility, slow decision-making, or bad weather, among other things. The proposed system aims to create a safe driving assist technology consisting of thermal camera-based object detection and intelligent vehicle anti-theft measures to assist safe driving and provide vehicle security on top of the existing system. This proposed system not only can easily detect objects in low visibility under unsuitable weather conditions, with an average accuracy of 97% but also provides vehicle safety by using facial-biometrics-based vehicle authentication where the accuracy is 95%. This also has a 36-fault data-saving capacity in the database at a time. The authorized user doesn't always require Internet support to access the vehicle, whereas the unregistered user needs app-based permission from the user to access the car.

https://ieeexplore.ieee.org/xpl/conhome/10068861/proceeding

Design and Implementation of Regulated Oxygenation Based Ventilation System with Feedback Mechanism

NUZAT NUARY ALAM et el.

A multifunctional medical device for the aid of COVID affected patients are scarce. This paper proposes an automated medical device which is incorporated with a feedback mechanism and a GSM base emergency alarm system. The combined sensors in the prototype can acquire readings of a patient's temperature, heart rate, oxygen saturation (SpO2), respiratory rate (RR), and heart condition noninvasively and can send these vitals easily via SMS in real time. Based on the patient's SpO2 level and RR, the system can control the oxygen flow through a nasal canola with the aid of a servo motor mechanism. The system derives information from the sensors to operate automatically based on the degrading vitals of a patient. Due to its nature of user friendliness the protype can be operated without much prior medical knowledge.

Design and Development of E-Waste Monitoring, Segregation and Recycling System

DR. MD. SANIAT RAHMAN ZISHAN et el.

Electronic waste is increasing rapidly every year as the use of electronic devices grows. In Bangladesh, people are not that aware of the consequences of e-waste. This paper represents the design and implementation of e-waste detection, sorting, and segregation. The sorted e-waste goes through a segregation process so that it can be recycled. This paper also shows a digital e-waste collection system through a website. A conveyor is designed and implemented to detect electronic

waste automatically and collect both e-waste and other waste. Following collection, the sorted waste will go through a shredding process in which the e-waste will be shredded to extract reusable materials from the waste. A website is also being developed to introduce a new way of doing e-waste collection and monitoring. Finally, a new method of e-waste management is designed and implemented that is compared with the typical method of waste management in Bangladesh.

Action Recognition Based Real-time Bangla Sign Language Detection and Sentence Formation

DR. MD. SANIAT RAHMAN ZISHAN et el.

Sign language is a system of communication that uses visual motions and signs to communicate with persons who are deaf or mute due to a hearing or speech impairment. A real-time Bangla Sign Language (BdSL) detection system was proposed in this paper, which can generate Bangla sentences from a sequence of images or a video feed which can help those who are not familiar with sign language. Blazepose algorithm was used to identify the sign language body posture sequence. After detecting the body posture the data was gathered as a numpy file. A Long Short-Term Memory (LSTM) network was used to train the numpy files since this network can generate predictions based on sequential data. After 85 epochs of training, the model's training accuracy was 93.85%, and its validation accuracy was 87.14%, which indicates that the model's ability to recognize BdSL sentences in real-time is adequate.

Smart Wheelchair for COVID-19 Patients with Mobile Application Based Health Monitoring System

DR. MD. SANIAT RAHMAN ZISHAN et el.

This paper discusses an IoT -based smart wheelchair through which the elderly and those who are physically challenged i.e., those who cannot do the basic movement without the help of others, will be able to do their basic movement. This wheelchair will also allow COVID-19 patients to move from one place to another in a relatively contactless condition at the hospital or airport. This wheelchair comes with a smart band through which the basic physical condition of the body, such as body temperature, pulse rate, blood oxygen, etc. parameters can be known. If the level of any of these parameters is abnormal, the system will immediately send a notification to the user's family member or access person. Additionally, the system has location tracking through which family members can track the user's location whenever they want. NodeMCU, temperature sensors, pulse sensors, etc., have been used as hardware to build the system and a mobile application designed for remote monitoring.

Deep Learning-Based Prediction of Football Players' Performance During Penalty Shootout

DR. MD. SANIAT RAHMAN ZISHAN et el.

The goal of this study is to analyse football players' body positioning data during the penalty to predict the region of the goalpost where kickers will shoot. YOLOv4 was initially used on a custom-created video dataset to detect the goalkeeper, kicker, football, and goalpost. Following that, OpenCV was used to track the football and divide the goalpost into four zones. To track the kicker's body positioning data, pose estimation was used. After recording the data for posture estimation, an LSTM model was utilized to recognise a footballer's activity. The dataset contains 1560 numpy files with a total of 205920 pose landmarks from pose estimation. The LSTM model attained an accuracy of around 50 percent on the test dataset. Before 15 seconds, 10 seconds, 5 seconds and 1 second of the 20 penalty shoot clips, this study achieved mean accuracy of 9.6 percent, 26.2 percent, 52.80 percent and 79.05 percent, respectively.

Setting Up an Academic Research Clinic & Cancer Centre: An Approach to Industry-Academia Collaboration in Health Sector in Bangladesh

DR. HUMAYRA FERDOUS et el.

Industry-academia collaboration is the partnership between academic and industrial institutes where both types of knowledge and skills are gathered to solve different problems efficiently for the purpose of commercial and economical achievement. The reason for industry-academia collaboration is to find interactive elements such as teaching, research and care. These elements must be closely linked together in order to achieve maximal value for the collaborative. Bangladesh is a largely populated country (around 17 billion) where common peoples suffer from different diseases like cancer, diabetes, heart disease, kidney problem. Research and innovation in the health care sector is very negligible compared to other sectors like education, agriculture etc.The main aim of this work is to establish an academic research clinic & Cancer Centre. This paper demonstrates an approach of collaboration between health care clinics, university and industry. One of the key challenges of the sustainable development goal (SDG) are healthy life, well-being, sustainable industrialization, innovation and global partnership. To achieve SDG goal, collaborative approach between Rayhans Radiance Clinic & Cancer Centre (RRCCL), Centre for Biomedical Research (CBR) and American International University Bangladesh-(AIUB) were reviewed in this work. The vision of this collaboration is to devolve a business model in the area of medical physics, biomedical technology and cancer care by a collaboration between clinic, university and industry. RRCCL offer different fellowship to postgraduate student at different university to contribute research in the area of medical physics, biomedical physics, radiation oncology and public health. Centre for Biomedical Research (CBR) is one of the biomedical research labs at American International University Bangladesh-(AIUB) that focus on solving different research problems such as imaging of biological systems, biophysics, medical physics, biomedical engineering, theoretical and computational modeling of complex brain diseases. In the initial stage we start with services like consultation, diagnostic, telemedicine, contemporary

biomedical or clinical engineering research and development. Systematic plan and framework have been initiated to develop a public private partnership (PPP) model to set up academic clinics in different regions of Bangladesh. By applying our collaborating output, we want to provide modern healthcare tools to the common people in our country for better diagnosis and treatment

https://bicc2023.oncologyclub.org/

Developing an Advanced Smart Inhaler for Comprehensive Health Monitoring and Early Identification of Lung Cancer Risk

DR. HUMAYRA FERDOUS et el.

Introduction: Respiratory conditions such as asthma and chronic obstructive pulmonary disease (COPD) pose significant health challenges and are often associated with an increased risk of lung cancer. This project proposes the development of a smart inhaler that not only assists individuals in managing their respiratory health but also integrates data analysis techniques to assess the potential risk of lung cancer. The smart inhaler aims to provide a holistic approach to health management by monitoring patient health conditions, medication usage, symptoms, and environmental factors. Methods: The smart inhaler project involves the creation of a technologically advanced device that incorporates various sensors to collect data related to inhaler usage, lung function, symptom patterns, air quality, and geolocation. The collected data is then integrated into a centralized database for analysis. Machine learning algorithms are employed to identify correlations between inhaler usage, symptom severity, environmental pollution levels, and potential cancer risk. An early warning system is designed to alert users and healthcare professionals of significant changes in health indicators or environmental exposures. Results: The developed smart inhaler offers a comprehensive solution for health monitoring and cancer risk assessment. Users can track their inhaler usage, lung function, and symptoms in real time through a user-friendly mobile app or web portal. Environmental sensors provide insights into air quality and its impact on respiratory health. The machine learning algorithms successfully analyze the collected data, leading to the creation of predictive models for assessing the user's risk of developing lung cancer. Conclusion: The integration of smart technology into inhaler devices represents a significant advancement in respiratory health management. By monitoring patient health conditions, medication usage, symptoms, and environmental factors, the smart inhaler empowers individuals with respiratory conditions to make informed decisions about their health. Moreover, the incorporation of data analysis techniques for cancer risk assessment enhances early detection and intervention. This project bridges the gap between respiratory health and potential cancer risk, contributing to improved quality of life and proactive health management for individuals with lung diseases. Through this innovative approach, the smart inhaler offers a valuable tool for both patients and healthcare providers in optimizing respiratory care and assessing cancer risk in a synergistic manner.

https://bicc2023.oncologyclub.org/

Renewable Energy Base Ventilator Using Arduino

DR. HUMAYRA FERDOUS et el.

Ventilators have emerged as crucial life-support device during the COVID-19 pandemic, offering critical respiratory assistance to patients with severe breathing difficulties . We propose a system that have apioneering solution in the form of a Renewable Energy-Based Ventilator using Arduino, designed to address some challenges and revolutionize the healthcare sector. This system reduces dependancy on conventional energy sources and lower carbon emissionsby providing a sustainable and dependable source of electrivity from solar through battery as a vital energy storage component that enables the Renewable-Based ventilator to run continously and aunomously even when there is little or no sunlight available to power the system. Healthcare practitioners can manage respiratory conditions using real-time pressure and oxygen data on the integrated display. This project addresses the challenges of healthcare accessibility in remote and resource constrained arear, where reliable electricity supply may be limited.

Photo-induced micro-actuation in the disordered magnetic alloys and a prototype model of application

DR. HUMAYRA FERDOUS et el.

This investigation aims to study the structural properties and photo-induced micro actuation (PIMA) effect in a Co-Ni-Al ferromagnetic shape memory alloy (FSMA) and a Finemet® alloy with the composition $Fe_{73.5}Cu_1Nb_3Si_{13.5}B_9$. The unexplored PIMA properties of these two ferromagnetic systems have opened the scope of a laser controlled micro-mechanical engineering application producing useful surgical tools for medical applications. The ribbon-shaped alloys of ~6mm width and 20 to 22 μm thickness were synthesized by the rapid quenching of solid solutions with chilling rates of 105-106 K/s. The samples were then annealed at 600℃ for 30 minutes, and the crystalline grains were dispersed in the residual amorphous matrix. The structures of the synthesized samples were studied by X-ray diffraction and field emission scanning electron microscopy, and the magnetic properties of the samples were obtained by a vibrating sample magnetometer at 300K. The PIMA effect of the studied samples was observed under the application of a blue laser of 450nm wavelength, and the actuation was measured using a microscope interfaced with a computer. Both samples are exposed to the PIMA effect, and Co-Ni-Al shows a maximum actuation of 26μm, which is increased to 29.2μm for a 3.5 kAm-1 magnetic field. Therefore, a spatial gradient of voltage (Hall effect) along the ribbon might take place, and the structure of the samples is distorted by an unbalanced force that is more noticeable for the applied magnetic field. Finally, a prototype model of the surgical tool of the Co-Ni-Al system has been designed and executed for performance.

Performance Analysis of the AVR Using An Artificial Neural Network and Genetic Algorithm Optimization Technique

KAZI FIROZ AHMED et el.

The Automatic Voltage Regulator (AVR) is required to maintain a steady output voltage from the generator, and it relies heavily on the Proportional Integral Derivative (PID) controller. For the function of controlling industrial loops, a controller known as the PID controller is frequently used on account of its straightforward architecture, uncomplicated implementation, and excellent dependability. Traditional approaches to tuning the PID controller have their limits, but those limits may be overcome by incorporating more sophisticated tuning approaches. The main aim of this study is to provide the ideal design for tuning a PID controller using a Genetic Algorithm (GA) and an Artificial Neural Network (ANN) in order to further improve the PID-based AVR system. The performance of the suggested approach is afterward compared with one another. The results of a simulation carried out in MATLAB show that GA tuning techniques give better performance.

Surface Damage Detection of Line Insulators Using Deep Learning Algorithms to Avoid Insulation Failure

KAZI FIROZ AHMED et el.

The power system's reliability dramatically depends on the high voltage line insulators. However, the surface of these insulators is frequently damaged because of the outdoor environment, which includes complicated landforms and unpredictable weather. Damage to the insulator's surface can lead to short circuits, permanent damage to the transmission line, and even blackouts. To deliver quality service, it is essential to keep track of the condition of these insulators. As traditional fault-detection systems have become more time- and labor-intensive, a YOLOv4-based detection approach is proposed here to achieve fast and precise damage detection and classification of line insulators. YOLOv4 is a Deep Learning (DL) algorithm model that operates on the darknet framework. The research findings show that 97.711% is the maximum average, depending on detecting YOLOv4 for insulators. Insulator damage has a maximum AP value of 98.17%, and discolored Insulator has a maximum AP value of 97.07%. When the system is trained on the insulator data set, the overall m-AP (mean Average Precision) value is 97.65%. The detecting speed in virtual environments for YOLOv4s is 43 FPS, and it has a greater detection rate.

Computational fluid dynamics (CFD) analysis of thermoelectric generator for Regenerative Braking of the Hybrid Electric Vehicle

DR. CHOWDHURY AKRAM HOSSAIN et el.

Electric automobiles are a vital, dynamic, and quickly growing issue that touches on a range of topics, including increased energy demand and consumption, reduced environmental emissions, ensuring the use of renewable energy sources, and so more. Electric vehicles are also becoming more affordable. With

the rising amount of research and development being done on electric cars on a worldwide basis, regenerative braking is becoming more and more significant. Using the vehicle's waste heat energy, it is hoped to extend the range of the battery, so providing an additional source of benefit. The goal of this publication is to propose of a Thermoelectric Generator (TEG) model based on an analysis of gas velocity pressure and turbulence kinetic energy at peak temperature to increase the operating range of hybrid electrical vehicles (HEVs) by storing the electrical power output in the battery. According to the regenerative braking system concept, kinetic energy from automobiles that was released into the environment as waste heat energy is converted into electricity using this method.

Performance Analysis of the AVR Using An Artificial Neural Network and Genetic Algorithm Optimization Technique

ABU HENA MD. SHATIL et el.

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Surface Damage Detection of Line Insulators Using Deep Learning Algorithms to Avoid Insulation Failure

ABU HENA MD. SHATIL et el.

The power system's reliability dramatically depends on the high voltage line insulators. However, the surface of these insulators is frequently damaged because of the outdoor environment, which includes complicated landforms and unpredictable weather. Damage to the insulator's surface can lead to short circuits, permanent damage to the transmission line, and even blackouts. To deliver quality service, it is essential to keep track of the condition of these insulators. As traditional fault-detection systems have become more time- and labor-intensive, a YOLOv4-based detection approach is proposed here to achieve fast and precise damage detection and classification of line insulators. YOLOv4 is a Deep Learning (DL) algorithm model that operates on the darknet framework. The research findings show that 97.711% is the maximum average, depending on detecting YOLOv4 for insulators. Insulator damage has a maximum AP value of 98.17%, and discolored Insulator has a maximum AP value of 97.07%. When the system is trained on the insulator data set, the overall m-AP (mean Average Precision) value is 97.65%. The detecting speed in virtual environments for YOLOv4s is 43 FPS, and it has a greater detection rate.

Detection of Myocardial Infarction Using Hybrid CNN-LSTM Model

RETHWAN FAIZ et el.

Electrocardiograms, or ECGs, are used by medical professionals to identify whether or not a patient has been experiencing myocardial infarction. In the medical field, myocardial injury detection procedures are not usually automated. A deep learning-based model can automate this manual procedure. The proposed model is a deep learning-based predictive model capable of detecting myocardial infarction from 15 ECG leads. The PTB database was used in this model. This database contains data from 15 ECG leads, which include 12 standard leads and 3 frank leads. The objective of the work is to identify MI with high and stable accuracy, F1 score, precision, and recall using an imbalanced PTB dataset. The proposed model is a combination of the dilated CNN(ConvNetQuake) and an LSTM network. The validation F1 score, precision, recall, and accuracy for the model are 1.0, 1.0, 1.0 and 100%, respectively. Regarding the test set, the F1 score, precision, recall, and accuracy for the model are 0.94, 0.88, 1.0 and 97.7%, respectively.

Design and Implementation of Regulated Oxygenation Based Ventilation System with Feedback Mechanism

RETHWAN FAIZ et el.

A multifunctional medical device for the aid of COVID affected patients are scarce. This paper proposes an automated medical device which is incorporated with a feedback mechanism and a GSM base emergency alarm system. The combined sensors in the prototype can acquire readings of a patient's temperature, heart rate, oxygen saturation (SpO2), respiratory rate (RR), and heart condition noninvasively and can send these vitals easily via SMS in real time. Based on the patient's SpO2 level and RR, the system can control the oxygen flow through a nasal canola with the aid of a servo motor mechanism. The system derives information from the sensors to operate automatically based on the degrading vitals of a patient. Due to its nature of user friendliness the protype can be operated without much prior medical knowledge.

Brain tumor detection by Kapton Polyimide based on-body patch antenna in K band

RAJA RASHIDUL HASAN et el.

This paper is all about to design an antenna for brain tumor detection using a novel material Kapton polyimide. A brain tumor, which has the potential to spread throughout the body and result in cancer, is one of the worst disorders. Using a novel material and observing variation in the S1,1 parameter to spot brain cancers is the main objective of this paper. An on-body microstrip patch antenna constructed in the K band and a three-size brain tumor in a brain phantom model were employed to identify the existence of brain tumor. This antenna can operate between 4 and 14 GHz. The resonance frequency of the proposed antenna was discovered to be 12.96 GHz in free space. A VSWR of 1.00

and −92.06 dB S1,1 was also measured in this area. S1,1 is −49.93 dB at 8.58 GHz in the Normal Brain and −40.51 dB at 11.87 GHz in the Tumor Affected Brain.

https://ieeexplore.ieee.org/document/10070083

SWCNT based On Body patch antenna for lung tumor detection in X band

RAJA RASHIDUL HASAN et el.

In this paper, a single-wall carbon nanotube is used to design an on-body patch antenna for biotelemetry. One of the worst diseases is a lung tumor, which has the potential to spread throughout the body and cause cancer. This paper's primary goal is to use a novel material and observe variation in the S1,1 parameter to identify lung tumors. To detect the presence of lung tumors, an on-body microstrip patch antenna designed in the X band and a three-size lung tumor in a lung phantom model were used. The proposed antenna's resonant frequency was found to be 8.354 GHz. Here we also found - 49.26 dB s1,1 a VSWR of 1.00 in free space. In the normal lung, s1,1 is-39.55 dB at 8.258 GHz frequency and -39.61 dB at 8.258 GHz found in the tumor affected lung. The operating frequency of this antenna is 5 to 11 GHz.

Predicting Carboxymethyl Cellulase assay (CMCase) production using Artificial Neural Network and explicit feature selection approach

DR. MD. SAEF ULLAH MIAH et el.

This paper presents a method for predicting carboxymethyl cellulase (CMCase) production using artificial neural networks (ANNs) and an explicit feature selection approach. A dataset of CMCase production experiments was collected, and an explicit feature selection approach was applied to select the most relevant features for CMCase production prediction. The ANN model was trained using both the selected features and all available features of the CMCase production data. The results showed that the explicit feature selection approach improved the performance of the ANN model in terms of prediction accuracy compared to using all the features available in the dataset. The main effect analysis (MEA) was found to be the best method for selecting the explicit features for predicting CMCase production. The ANN model trained using the MEA identified features, achieved 96.3% R 2 score and a MAE of 0.057 and a MSE of 0.035. The proposed method is an effective approach for predicting CMCase production and can be used to optimize CMCase production and reduce costs in various industries.

Material Named Entity Recognition (MNER) for Knowledge-Driven Materials Using Deep Learning Approach

DR. MD. SAEF ULLAH MIAH et el.

The scientific literature contains an abundance of cutting-edge knowledge in the field of materials science, as well as useful data (e.g., numerical values from experimental results, properties, and

structure of materials). To speed up the identification of new materials, these data are essential for data-driven machine learning (ML) and deep learning (DL) techniques. Due to the large and growing amount of publications, it is difficult for humans to manually retrieve and retain this knowledge. In this context, we investigate a deep neural network model based on Bi-LSTM to retrieve knowledge from published scientific articles. The proposed deep neural network-based model achieves an F1 score of 97% for the Material Named Entity Recognition (MNER) task. The study addresses motivation, relevant work, methodology, hyperparameters, and overall performance evaluation. The analysis provides insight into the results of the experiment and points to future directions for current research.

Impact of COVID-19 Lockdowns on Air Quality in Bangladesh: Analysis and AQI Forecasting with Support Vector Regression

DR. MD. SAEF ULLAH MIAH et el.

Over the past few decades, air pollution has emerged as a significant environmental hazard, causing premature deaths in Southeast Asia. The proliferation of industrialization and deforestation has resulted in an alarming increase in pollution levels. However, the COVID-19 pandemic has significantly reduced the amount of volatile organic compounds and toxic gases in the air due to the decrease in human activity caused by lockdowns and restrictions. This study aims to investigate the air quality in various geographical areas of Bangladesh, comparing the air quality index (AQI) during different lockdown periods to equivalent eight-year time spans in 10 of the country's busiest cities. This study demonstrates a strong correlation between the rapid and widespread dispersion of COVID-19 and air pollution reduction in Bangladesh. In addition, we evaluated the performance of Support Vector Regression (SVR) in AQI forecasting using the time series dataset. The results can help improve machine learning and deep learning models for accurate AQI forecasting. This study contributes to developing effective policies and strategies for reducing air pollution in Bangladesh and other countries facing similar challenges.

Predicting the Success of Suicide Terrorist Attacks using different Machine Learning Algorithms

DR. MD. SAEF ULLAH MIAH et el.

Extremism has become one of the major threats throughout the world over the past few decades. In the last two decades, there has been a sharp increase in extremism and terrorist attacks. Nowadays, terrorism concerns all nations in terms of national security and is considered one of the most priority research topics. In order to support the national defense system, academics and researchers are analyzing various datasets to determine the reasons behind these attacks, their patterns, and how to predict their success. The main objective of our paper is to predict different types of attacks, such as successful suicide attacks, successful non-suicide attacks, unsuccessful suicide attacks, and unsuccessful non-suicide attacks. For this purpose, various machine learning algorithms, namely Random Forest, K Nearest Neighbor, Decision Tree, LightGBM Boosting, and a feedforward Artificial Neural Network called Multilayer Perceptron (MLP), are used to determine the success of suicide

terrorist attacks. With an accuracy rate of 98.4% and an AUC-ROC score of 99.9%, the Random Forest classifier was the most accurate among all other algorithms. This model is more trustworthy than previous work and provides a useful comparison between machine learning methods and an artificial neural network because it is less dependent and has a multiclass target feature.

Target and Precursor Named Entities Recognition from Scientific Texts of High-Temperature Steel Using Deep Neural Network

DR. MD. SAEF ULLAH MIAH et el.

Named Entity Recognition (NER) is an essential task in natural language processing, especially in the domain of scientific texts. This paper presents a study of NER for scientific texts in high-temperature steel, a type of alloy used in various applications where high temperatures prevail. We propose a NER system using Bi-LSTM with a domain-specific embedding approach and evaluate its performance on a test dataset. The study results show that the proposed NER system achieves an F1 score of 0.99, indicating that it can accurately identify and classify named entities in scientific texts about high-temperature steel with high precision and recall. The proposed approach was more effective than the classical machine learning-based approach. Our results suggest that the domain-specific embedded Bi-LSTM technique can be an effective approach for NER in scientific texts, especially in specialized domains such as high-temperature steel.

Understanding the Dynamics of Dengue in Bangladesh: EDA, Climate Correlation, and Predictive Modeling

DR. MD. SAEF ULLAH MIAH et el.

Dengue, a mosquito-borne viral infection, poses a significant threat, especially in warm, tropical climate countries like Bangladesh, India, Thailand, Malaysia, Laos, etc. This study is solely focused on the dengue data of Bangladesh as it explores the historical dengue data spanning 23 years (2000 to 2022) for EDA purposes, with a focus on 9 years (2014–2022) divisional data for model performance analysis. Additionally, climate data was collected for the same period to examine the potential correlation between dengue cases and climate factors. Machine learning (ML) and Deep learning (DL) models, including Random Forest Regression (RFR), Long Short-Term Memory (LSTM), and LSTM with Artificial Neural Networks (ANN), were implemented and validated against ground truth data. The results reveal notable differences in performance between ML and DL models when handling imbalanced datasets with outliers, with RFR outperforming LSTM when compared to the ground truth data. The study uncovers significant correlations between dengue cases and climate factors like humidity, temperature, and precipitation. The insights gained from this research have practical implications for dengue prevention and control efforts in Bangladesh and beyond, paving the way for more effective strategies and interventions.

Analytical Comparison of the Impact of Si and GaAs as Materials in Designing 3D Density Gradient Nanowire MOSFET for Low Power Applications

DR. M. TANSEER ALI et el.

Semiconductor industry has been one of the most promising industries and MOSFET is its main component. Extensive research is going on ever since it started to provide better performance and low-cost effective devices in the market. The study is done on a 3D density gradient nanowire MOSFET for showing the impact of using varied materials on the device performance. A comparison has been made between Silicon (Si) and Gallium Arsenide (GaAs) as semiconductor materials. DC and AC analysis have been done on both models and their results have been compared. The drain current in the I_d-V_g and I_d-V_d curve for GaAs used model is higher than the Si used model by about 10 times which is useful for analog applications. The threshold voltage for both models is 0.7V. Besides that, the electron concentration forming a potential well of the depth of about 10^4 for GaAs used material than the model made using Si as material. In the case of AC analysis, the transconductance range for the model using GaAs is almost double of the model designed using Si.

https://ieeexplore.ieee.org/abstract/document/10070082

Analysis of Layered Shielding for Capacitive Wireless Power Transfer Application

DR. M. TANSEER ALI et el.

Capacitive wireless power transfer (CPT) offers the potential for a variety of applications, ranging from consumer electronics to military applications because of the use of electric fields instead of magnetic fields for power transfer. In this work, three distinct shielding materials (Cu, Al, and Zr) were investigated for solid shielding and multi-layered shielding anal-ysis to reduce radiation exposure to electronics and humans. Despite the fact that typical single-layer shielding can work well, three-layer shielding performed better in this investigation in terms of decreasing the field values on the receiving side. With two proposed layered shielding techniques, the field values were lowered to 151.28 V/m and 169.71 V/m from 309.56 V/m and 279.50 V/m for solid shielding with copper and aluminum. Ansys HFSS finite element analysis was utilized to calculate the field for four shields, two of which consist of Cu and Zr layered shielding. The study demonstrates that layered shielding is superior in terms of field distribution and field exposure outside the shielding. Concerning the efficacy of this various shielding strategies, additional research is required with a focus on Specific Absorption Rate (SAR) estimation.

CO2 Discharges, Consumption of Energy, and Growth of GDP in KSA: A Pragmatic Analysis

DR. M. MOSTAFIZUR RAHMAN et el.

In this study, we inspect the consequences of energy utilization and CO2 discharges on GDP growth in Kingdom of Saudi Arabia (KSA) during the period 1971–2014. The Granger causality test is employed to assess the short-run and long-run relationships among these variables. The result shows that a strong bi-directional association between utilization of energy and financial growth at the 5% level of significance in KSA. The other variables have independent relationships to each other. The results of our experiments clearly indicate that consumption of energy performs a noteworthy role in the basis of GDP growth in KSA. The Kingdom of Saudi Arabia could improve GDP growth by increasing energy consumption but reducing CO2 emissions.

https://link.springer.com/conference/icdai

Anti-Fraud Mechanism Based Voting Machine with Three Stage Authentication Methods

MD. SAJID HOSSAIN et el.

A digital voting system can be the beginning of an effective, transparent, and secure voting process with the integration of technology into every aspect of our society. This study proposed a reliable and user-friendly voting system that would count votes securely using an Arduino microcontroller board. To ensure that only allowed voters can cast a ballot at a time, the system employs a three-step verification process including password, fingerprint and RFID (Radio Frequency Identification) authentication. An alert is activated in the event of unwanted access or tampering and can be silenced using the admin password. The administrator may also log in using his or her password to view the outcome of the voting. In comparison to the conventional Electronic Voting Machine (EVM), the proposed system has a number of benefits including quick and accurate vote counting, the removal of human intervention errors, increased transparency and reduced possibility of election fraud.

https://ieeexplore.ieee.org/document/10441462/

Comparative Simulation of GaAs and AlGaAs Based On Triple Barriers-Resonant Tunneling Diode

MEHEDI HASAN et el.

This research shows the comparison of GaAs and AlGaAs Based triple Barrier Resonant Tunneling Diode. In this paper, the proposed model includes GaAs primarily based on a triple Barrier-Resonant Tunneling Diode (TBRTD) mannequin and it is compared with AlGaAs totally based on Quantum TBRTDs at room temperature. Two specific models are introduced in the proposed system. Firstly,

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the semi-classical Thomas-Fermi model and secondly, the Hartree quantum cost model to consider the performance of this mannequin in one-of-a-kind temperature. The RTD's performance at extreme low temperatures can be improved with the help of this examination. The results suggest high-height modern technology equipped with AlGaAs RTD and accomplish a high peak to valley ratio in comparison to GaAs RTD. They are based entirely on non-equilibrium Green's characteristic formalization inside ballistic limits. Additionally, contrast aids in comparing each model's higher system. The system was simulated using nanoHuB.org and a related tool that supports the numerous implications discussed in this study.

Rubab Ahmmed, Md. Humayun Kabir, "Performance Analysis of MIMO NOMA based Wireless Network for 5G and beyond under Rayleigh Fading Channel"

DR. MD. HUMAYUN KABIR et el.

The amalgamation of Multiple-Input Multiple-Output (MIMO) and Non-Orthogonal Multiple Access (NOMA) technologies   emerges as a triumphant remedy to the challenges posed by the 5G cellular system and its futuristic counterparts. In this groundbreaking research endeavor, we embark on a journey to unravel the secrets concealed within the intricate fabric of wireless networks operating under the spellbinding influence of a Rayleigh fading channel. With relentless determination, we decipher the mystifying equations that yield the elusive closed-form expression for outage capacity and the probability equation for Down Link (DL) NOMA. Beyond the realms of 5G, our quest transcends to the uncharted territory of 6G wireless technology, where we dare to explore the impact of dynamic bandwidth variations. Venturing further, we delve into the depths of system performance evaluation, traversing the treacherous landscape of Bit Error Rate (BER), to shed light on the prowess of 5G and its evolutionary successors.

https://www.tencon2023.org/

Shatil Imtiaz, Rahman Humyra, Md. Rad Sharar Kashem, Md. Fardin Khan, Md. Sajid Hossain, Md. Humayun Kabir, "Rehabilitation for Stroke Survivors : the Development of a Smart Glove"

DR. MD. HUMAYUN KABIR et el.

This research presents the development of a portable arm rehabilitation device designed to continuously monitor and enhance rehabilitation activities. The device incorporates flex sensors, force-sensitive resistors, and accelerometers interfaced with an ESP32 microcontroller to collect data on arm movements. This data is crucial for therapists to fine-tune treatment plans and provide patients with an effective home-based rehabilitation solution. Recent findings have shown the potential of home-based rehabilitation, yet existing technologies are often costly and complex to operate independently. The device aims to bridge this gap by offering a user-friendly and affordable

solution. The system integrates various sensors, including flex sensors, force-sensitive resistors, and accelerometers, which are interfaced with an Arduino microcontroller. These sensors capture data related to arm movements, which is essential for therapists to tailor treatment plans and for patients to track their progress. The device aims to bridge the gap between costly and complex rehabilitation technologies and the need for accessible, home-based solutions. The study's novelty lies in its integration of sensor technology into a smart glove and its commitment to providing an affordable and effective rehabilitation solution. The continuous monitoring capabilities of the device offer valuable insights into patients' progress, improving the quality of rehabilitation programs. This work aligns with recent advancements in wearable technology and sensor systems for healthcare applications, emphasizing the importance of accessible rehabilitation solutions.

https://iccit.org.bd/2023/

Anti-Fraud Mechanism Based Voting Machine With Three Stage Authentication Methods

DR. SHAMEEM AHMAD et el.

A digital voting system can be the beginning of an effective, transparent, and secure voting process with the integration of technology into every aspect of our society. This study proposed a reliable and user-friendly voting system that would count votes securely using an Arduino microcontroller board. To ensure that only allowed voters can cast a ballot at a time, the system employs a three-step verification process including password, fingerprint and RFID (Radio Frequency Identification) authentication. An alert is activated in the event of unwanted access or tampering and can be silenced using the admin password. The administrator may also log in using his or her password to view the outcome of the voting. In comparison to the conventional Electronic Voting Machine (EVM), the proposed system has a number of benefits including quick and accurate vote counting, the removal of human intervention errors, increased transparency and reduced possibility of election fraud.

Automated Car Parking Using Advanced Image Recognition and License Validation

DR. SHAMEEM AHMAD et el.

This study presents a novel approach in the form of a fully automated car parking management system, integrating IoT, computer vision, and database technologies to alleviate urban mobility challenges. Employing vehicle presence sensors and computer vision techniques for Bengali number-plate detection, the system enables real-time monitoring and management of parking spaces. Upon vehicle detection, the system cross-checks the license plate against a centralized database to confirm parking eligibility. Additionally, the integration of a mobile app and website interface provides drivers with instant updates on parking slot availability. This dual-layered IoT system not only restricts unauthorized access, minimizing illegal parking but also significantly

reduces the time spent searching for parking, enhancing user experience. Consequently, this innovative solution contributes to reduced traffic congestion, fostering seamless urban mobility. By amalgamating automation, user-centric design, and efficient management, this system promises a transformative parking experience for both drivers and facility operators, revolutionizing urban parking paradigms.

Identification of Human Movement Through a Novel Machine Learning Approach

DR. SHAMEEM AHMAD et el.

This study aims to identify human movement activities using machine learning, focusing on a novel ensemble approach. The objectives are twofold: to apply a new machine learning method for activity recognition and to outperform recent approaches in accuracy. A standard dataset from Kaggle contained six activities: standing, sitting, lying, walking, walking downstairs, and walking upstairs. The study used an SVM and Logistic Regression ensemble alongside other standard classifiers. The proposed ensemble achieved an accuracy of 95.45% on the test data, surpassing other models. This research shows the potential of the ensemble approach for accurate human movement identification with potential uses in various domains.

Design and Implementation of IoT-Based Smart Energy Meter to Augment Residential Energy Consumption

DR. MD. RIFAT HAZARI et el.

There is a constant push for automation, portability, and remote control in the management systems of all organizations. A new IoT -based multifunctional smart energy meter is presented in this paper for automated metering and billing system. Arduino Nano with GSM Short Message Service (SMS) connection provides a meter reading system with predefined automatic functions followed by ESP-8266 WiFi Module to monitor energy parameters. Proteus 8.0 was used to model the project before the hardware implementation was built. With the GSM module and embedded controller, the proposed system can transmit data such as kWh consumption and generated bills over the GSM network, which can then be fed into existing energy management systems at power companies or organizations to provide services to customers without the need for human intervention. As a result, consumer energy analysis is made considerably simpler and more manageable. This device aids in the detection of power theft as well. As a result, this smart meter facilitates wireless connection and home automation utilizing IoT, which is a significant step towards a Digital Bangladesh. Moreover, a prepaid mode is incorporated as part of billing system.

Design and Implementation of IoT-based Indoor Air Purifier

DR. MD. RIFAT HAZARI et el.

At present, air pollution is considered to be the most sensitive one, as air is the indistinguishable part of every living organism in the world. As the quality of the air around us gets worse each year, it is high time to be conscious of the quality of the air around us and try to purify it for a better and healthier life. This proposed and designed system tries to solve the air pollution problem and increase people's awareness. The system monitors the quality of air with sensors like temperature, humidity, dust, liquefied petroleum (LPG) gas, and carbon monoxide (CO) gas. The Internet of Things (IoT) is also included with the system to send all the measured data to the smartphone. The system also has layers of air purification systems to purify the indoor air. A thermoelectric-based aircooling system will also be implemented with the air filter system, which will make sure the exhaust air coming from the air filter system is cooled.

Performance Analysis Rice Yield Model based on Historical Weather Dataset in Bangladesh

MD. MEHZABUL HOQUE NAHID et el.

The study's aim is to evaluate the efficacy of the Rice Production Model in Bangladesh by applying the Historical Weather Dataset and a sustainable Machine Learning (ML) model that is compatible with Industry 4.0. In order to extract high-level information from enormous meteorological datasets, machine learning models are increasingly widely used for rice yield production projections. Throughout the course of this research, a number of different machine learning models, such as Radial basis function, Multiple Linear Regression, Support Vector Regression and Multilayer Perceptron were constructed in order to make predictions about the production of rice. Maximum and Minimum temperature, rainfall, and humidity are the climatic factors considered to develop and evaluate the frameworks. The model was developed using climatic and rice yield data from Bangladesh's fifteen regions between 2006 and 2016. The result indicate that the Support Vector Machine Regression (SVR) exceeds other existing frameworks for reliably predicting future rice yields in Bangladesh leveraging the developed framework, as shown by the findings.

https://fse.green.edu.bd/sti-2022/

FACTORS AFFECTING ERP ADOPTION: A STUDY OMNICHANNEL SME'S BANGLADESH

MD. MEHZABUL HOQUE NAHID et el.

Background - MSMEs in Bangladesh that are specialized in home-made food make a significant contribution to the country's economy by providing employment opportunities, producing money, maintaining food security, conserving cultural heritage, and encouraging sustainable development. According to previous research diffusion of social media by micro, small, and medium enterprises

(MSMEs) positively impact many Sustainable Development Goals (SDGs) by fostering economic development, generating job opportunities, and supporting sustainable practices, specifically in the area of decent work and economic growth.

Aim – This study aimed to explore the determining factors that drive the adoption of Facebook adoption in Micro-Small and Medium Enterprises (MSME) in attaining sustainable growth, as assessed by enterprise owners.

Methodology – The study issue pertains to the analysis of the organizational phenomena of Facebook adaptation within the home-made food industry, facilitated by f-commerce technology. The research technique comprises two sequential parts. The first phase included identifying the obstacles associated with the implementation of e-commerce technologies in MSMEs. This was accomplished by conducting a comprehensive analysis of existing literature on the technology acceptance framework within organizational settings. Subsequently, interviews are carried out with proprietors and directors of 42 locally produced food businesses in Bangladesh to investigate their inclination towards using Facebook to effectively support their operations. Diffusion of Innovation Technology theory is applied to guide the development of interview questions and the analysis of interview data.

Findings – The majority of MSME home-made food enterprises use an Omnichannel business strategy to cater to client expectations across several channels, such as in-store, online, and mobile. The primary motivations highlighted as significant motivators for the Facebook adaptation of MSMEs are enhancing operational efficiency, improving customer experience, accessing new markets, achieving cost savings, and enhancing data management. The primary characteristics identified as key contributors to the Facebook adaptation of MSMEs are relative advantage, technology's simplicity of use, compatibility, trialability, technology pricing, management support, previous technology expertise, and help from technology suppliers. However, this research did not uncover sufficient data to support the notion that competitive pressure, government restrictions, and government assistance significantly influenced the digitalization of micro, small, and medium enterprises (MSMEs) in the home-made food industry.

Research limitations & implications – These results are very significant and have immense importance for the scientific community, policy makers, and information and communication technologies (ICT) providers.

https://www.easternuni.edu.bd/conferenceBBA

An Efficient Fuzzy Colored Petri-Nets-Based Ubiquitous Framework for Diversified Culture of Building Automation in India

MD. MORTUZA AHMMED et el.

Due to the cultural and traditional diversity of the Indian environment, the successful implementation of self-automated and smart architectures is very challenging. As the IoT expands the network of devices, it also increases the hazards with increasing demands. The proposed fuzzy-

colored Petri-nets-based ubiquitous framework utilizes the capabilities of ubiquity for the diversified culture of Indian Building Automation systems. The proposed algorithms establish the Wi-Fi component connectivity and the working of the LED pin. Further, the modules of the Wi-Fi component connectivity, set up function and get values function to illustrate the working principle of the proposed model. Lastly, the integrated system is verified and validated using the FCPN tools. The significance of developing the proposed model is in its usefulness, usage of maximum ideas of different modeling techniques, cultural support, and its conversion into a formal qualitative and quantitative model.

https://isgta-conf.org/

Comparative Simulation of GaAs and AlGaAs Based On Triple Barriers-Resonant Tunneling Diode

TAHSEEN ASMA MEEM et el.

This research shows the comparison of GaAs and AlGaAs Based triple Barrier Resonant Tunneling Diode. In this paper, the proposed model includes GaAs primarily based on a triple Barrier-Resonant Tunneling Diode (TBRTD) mannequin and it is compared with AlGaAs totally based on Quantum TBRTDs at room temperature. Two specific models are introduced in the proposed system. Firstly, the semi-classical Thomas-Fermi model and secondly, the Hartree quantum cost model to consider the performance of this mannequin in one-of-a-kind temperature. The RTD's performance at extreme low temperatures can be improved with the help of this examination. The results suggest high-height modern technology equipped with AlGaAs RTD and accomplish a high peak to valley ratio in comparison to GaAs RTD. They are based entirely on non-equilibrium Green's characteristic formalization inside ballistic limits. Additionally, contrast aids in comparing each model's higher system. The system was simulated using nanoHuB.org and a related tool that supports the numerous implications discussed in this study.

Electro-Deposition of Trivalent Chromium on The Mild Steel Substrate

DR. MD. EHASANUL HAQUE et el.

Electrodeposition of trivalent chromium on mild steel substrate is a promising alternative to traditional hexavalent chromium plating baths due to its non-toxicity and environmental friendliness. Electrodeposition of trivalent Chromium is more challenging than hexavalent Chromium due to the lower reduction potential of trivalent chromium ions. In this research, we studied the current efficiency and microhardness on Cr deposited mild steel substrate. We observed that the current efficiency and microhardness 3.2% and HRC 3595 respectively when we used 80g/L $Cr_2(SO_4)_3$ in the bath solution. We studied surface morphology by scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDX). The SEM results exhibit smooth and bright surface morphology with almost uniform atomic distribution having some clusters on the surface. The EDX result confirmed the presence of deposited Cr on the mild steel substrate.

https://bangladeshcrystallographicassociation.org/8th-bca-conference-2023/

Fabrication and Characterization of Composite Materials (Nylon- Mesh, Epoxy Resin, Jute, Polyethylene and Aluminum Foil Paper)

DR. MD. EHASANUL HAQUE et el.

In this study, we employed the hand lay-up method to fabricate a composite material comprising nylon mesh as the reinforcing element and epoxy resin as the matrix material, along with the incorporation of jute, polyethylene, and aluminum foil paper. Extending beyond standard characterization, our research encompasses a range of tests, including tensile strength, strain, hardness, and flexural strength comparisons with blank epoxy sheets. While these tests revealed notable improvements, Young's modulus exhibited fewer promising results. Additionally, we explored water absorption properties. These multi-faceted observations promise to unlock novel applications and elevate composite material quality across a spectrum of industries. Furthermore, we conducted additional tests, including hardness assessments, UV absorption analysis, water absorption tests contributing to a comprehensive understanding of the composite's performance and applications.

https://bangladeshcrystallographicassociation.org/8th-bca-conference-2023/

Smart System To Monitor and Control Transformer Health Condition in Sub-Station

ABIR AHMED et el.

A substation is the most important component of transporting or distributing electricity in any region or industry. To control and monitor the substation, different automation structures are developed in our country and around the world. The proposed system is to develop an IoT-based smart solution for monitoring and controlling the transformer in a substation. The control unit serves as the hub for all the system equipment and activities. Using an ultrasonic sensor and the DHT11, this smart solution can monitor transformer oil and temperatures. When the temperature of the transformer climbs over the specified value, the cooling fan turns on and provides sufficient air to lower the temperature. The voltage and current sensors' collected data determine whether the circuit is open or closed. This eliminates the expense at the substation by minimizing operating costs. As a result, both observational and operational effectiveness will undoubtedly improve.

Design and Development of E-Waste Monitoring, Segregation and Recycling System

ABIR AHMED et el.

Electronic waste is increasing rapidly every year as the use of electronic devices grows. In Bangladesh, people are not that aware of the consequences of e-waste. This paper represents the design and implementation of e-waste detection, sorting, and segregation. The sorted e-waste goes

through a segregation process so that it can be recycled. This paper also shows a digital e-waste collection system through a website. A conveyor is designed and implemented to detect electronic waste automatically and collect both e-waste and other waste. Following collection, the sorted waste will go through a shredding process in which the e-waste will be shredded to extract reusable materials from the waste. A website is also being developed to introduce a new way of doing e-waste collection and monitoring. Finally, a new method of e-waste management is designed and implemented that is compared with the typical method of waste management in Bangladesh.

A Framework for Real-Time Orientation Detection

SAZZAD HOSSAIN et el.

A web-based face orientation recognition system allows virtual platforms to track the facial orientation of individuals accurately. This technology is valuable for organizations and educational institutions, enabling them to supervise employees and students during online meetings and classes effectively. In this research, the researchers employed the MediaPipe Facemesh solution to detect and map facial features and landmarks, allowing them to extract detailed facial geometry data. Utilizing this geometric data, the researchers calculated Euler rotational angles, which served as crucial indicators of facial orientation. By analyzing these Euler rotational angles, the team successfully recognized and determined the orientation of the face. The suggested approach achieves an 86.5% accuracy in detecting face orientation when the camera is positioned within a maximum distance of 4 feet from the subject's face.

Real-Time Emotion Detection in Online Viva Evaluation

SAZZAD HOSSAIN et el.

Web based Face orientation recognition enables virtual platforms to track facial orientation which can be helpful for organizations and educational institutions to monitor the employees and students during online meetings and classes. The researchers of this paper used MediaPipe Facemesh solution to detect face and facial landmarks with facial geometry. From the facial geometry, Euler rotational angle is calculated. Finally, Face orientation recognition was performed based on Euler rotational angle. The proposed solution provides on average 86.5% face orientation detection from maximum 4 ft. distances between camera and face.

Success History Moth Flow Optimization for Multi-Goal Generation Dispatching with Nonlinear Cost Functions

DR. MOHAMMAD KHURSHED ALAM et el.

Combined Economic Emission Dispatch (CEED) is resolved by combining Success History Moth Flow Optimization (SHMFO) and valve-point loading of thermal generators. This SHMFO the valve-point loading problem is a multi-objective nonlinear optimization problem including generator capacity limits and power balance. The valve-point loading causes oscillations in the input-output

characteristics of generating units, hence rendering the CEED problem an imperfect optimization problem. As a benchmark test system for validating the efficacy of SHMFO, IEEE 30-bus systems are studied. Comparing the SHMFO method to other optimization strategies revealed its superiority and proved its capacity to resolve the CEED issue. The numerical findings indicate that the SHMFO algorithm can provide cost-efficiency, diversity, and convergence in a single run. Here, the price of power generation produced by SHMFO and Grew Wolf Optimization (GWO) for IEEE 30-bus is 48.6827 \$/h and 49.16332 \$/hr, respectively, which indicates a cost savings of 1.05% per hour when compared to the lowest values obtained by the methods under consideration. SHMFO performs better than the other algorithms and is an excellent choice for addressing the OPF problem, as shown by the results. On non-dominated solutions, a method adapted from the Technique for Ordering Preferences by Similarity to Ideal Solution (TOPSIS) is used to establish the Best Compromise Solution (BCS).

Emission and Valve Point Loading Cost Using Superiority of Feasible Solutions-Moth Flame Optimization

DR. MOHAMMAD KHURSHED ALAM et el.

The optimal power flow (OPF) the most crucial instrument for power facility design and performance is analysis, load scheduling, and cost-effective dispatch. To determine the evidence of a steady state for a power system network, an optimal power flow analysis is required. This study introduces a novel optimization method called Superiority of Feasible Solutions-Moth Flame Optimization (SH-MFO) to answer the optimal power flow problem. As part of the MATLAB development, SH-MFO is implemented on the IEEE-30 bus standard experiment structure network. When compared to the reliable outcomes produced by other algorithms, the current study employing SH-MFO estimates a Generation and Emission Costs \$ 48.6827 \$/h for minimizing the different fuels, which ultimately proves to be the best value. Analyze the poorest options suggested by the comparison algorithm, it saves money by 0.9873 % per hour. Based on simulation results, the SH-MFO method provides an improved and effective optimization algorithm for optimal power flow problems.

Replacement of H2 Gas in a Pipeline Using Ultrasonic

DR. MAHJABIN TASKIN et el.

H2 (or He) gas replacement from air (or N2) in a new gas pipeline was observed using ultrasound from exterior of a pipe. It was found that the gas replacement in the pipe depends on the inclination of the pipe, and the flowing resistance of the pipe outlet, and it is possible that air or N2 could remain in the pipe. Measurement of gas concentration using ultrasound is based on the difference of sound velocity in various gases. In practice, air in the new pipe is replaced with N2, and then with H2 in sequence. Using this ultrasonic method, the flowing gas concentration in the pipe can be safely monitored from the exterior of the pipe without making a hole. This study will be useful for establishing a safe H2 gas replacement with real time concentration measurement for the gas pipeline.

Fractal Pattern Identification from Wearable Inertial and Electromyographic Signals Data during Walking

DR. MD. ASRAF ALI et el.

Acceleration, angular velocity and electromyographic (EMG) signal at the lower limb muscles, specially over both leg's Tibialis Anterior muscles are highly non-stationary, even if no perturbing influences can be identified during walking at any speed. This study analyzed the fractal dynamics (i.e., complexity of gait time series) in the walking gait time series of four types of signals obtained from wearable sensors such as IMUs (inertial measurement units), i.e., accelerometer signals which represents the acceleration experienced by the body, gyroscope signals which is the angular velocity, and magnetometer signals which is magnetic field vector, and Electromyographic (EMG) signal from both leg's Tibialis Anterior muscles. Gait time series from twenty-two healthy participants were analyzed while they performed walking at their comfortable speed. The scaling exponents (i.e., α-values) of the gait dynamics were accomplished by evaluating their fluctuation through detrended fluctuation analysis (DFA), which is most common and widely used non-linear technique for any non-stationary time series. DFA (the scaling exponents α) results established an anti-persistent in EMG and acceleration signal, less persistent pattern in angular velocity and persistent (i.e., long-range or fractal-like correlations) in magnetometer signal. This fractal complexity or noise patterns obtained from the EMG and inertial signals might provide new approaches for assessing and forecasting sudden injury risk during walking.

An Open-source Voice Command-based Human-Computer Interaction System using Speech Recognition Platforms

DR. KAMRUDDIN MD. NUR et el.

An open-source voice command application has been developed using various speech-recognition platforms in Python. The application primarily features hands-free interactions of mouse and keyboard input with voice commands only without any active internet connection. The usefulness of the application is demonstrated by testing the application thoroughly keeping in mind for motor disabled person as well as for a normal person. Several participants evaluated the application and found that the application worked reliably and helped them complete the task with voice commands only. In this research, we identified common voice tokens a person would speak to accomplish a human-computer interaction, then we program the tokens to work with speech-recognition platforms such as CMU PocketPhinx, DeepSpeech, VOSK etc. Different results were obtained for each platform based on detection rate, accuracy, inference time, CPU usage, system memory usage, and various age group users' accuracy. After analyzing all the results, we concluded that a speech recognition model using VOSK performed better results than any other platform for a motor impaired user. The average successful task completion rate for the VOSK was 91%, indicating the usability of the system for near real-time applications.

https://confbim.com

An EfficientNet to Classify Monkeypox-Comparable Skin Lesions Using Transfer Learning

NAZIA ALFAZ et el.

Monkeypox is an infectious illness caused by the DNA-based monkeypox virus, which has raised public health concerns due to its rapid transmission to over 50 countries. Direct physical interaction with infected humans or infected animals is the main reason behind the spread of this virus. The appearance of skin problems such as smallpox and rashes are the most frequently reported symptoms of this virus. Since cases of monkeypox are increasing rapidly around the world, stopping the spread of this zoonosis by providing early diagnosis and treatment is crucial before the emergence of a pandemic similar to COVID-19. In this study, we aim to propose a transfer learning-based approach using the EfficientNet-B0 architecture to identify monkeypox subjects by using skin lesion image samples. However, distinguishing monkeypox from other comparable infectious skin illnesses like chickenpox and measles is challenging. Therefore, additionally, this study identifies other diseases that also cause blisters and rashes on the skin, like chickenpox, and measles. During the data distribution phase, 5-fold cross-validation is used to validate the work's reliability by assuring that every sample is utilized for training and validation. For the evaluation of the model's classification performance, accuracy and loss are recorded for each training epoch. Moreover, precision, recall, F1-score, and confusion matrix are generated upon completion of the model training. This proposed approach is experimented on a public dataset and has shown remarkable performance by providing an overall 96.53% classification accuracy, 96.57% precision, 96.53% recall, and 96.52% F1-score.

https://coinsconf.com/2023/

A vision transformer-based approach for recognizing seven prevalent mango leaf diseases

NAZIA ALFAZ et el.

Plant diseases, particularly affecting fruit crops, pose a significant challenge to the worldwide supply of fresh food due to their direct impact on the quality of fruits, resulting in an overall decline in agricultural production. The traditional approach of detecting leaf diseases in fruit plants requires farmers to undertake manual inspection which exhibits a lack of reliability and consistency. Moreover, the manual inspection procedure is prone to errors due to its reliance on the farmer's knowledge and skill. Mango referred to as the "king of all fruits", is renowned for its rich composition of various vitamins and vital nutrients. Mangoes are susceptible to many diseases that adversely damage their visual appeal, and flavor, and have significant implications on the overall economy. The identification of diseases affecting mango plant leaves using automated recognition remains a challenge due to the diverse range of symptoms and limited availability of data. There have been several deep learning-based research studies focused on identifying diseases in mango leaves; however, the majority of these studies have employed a convolutional neural network (CNN) trained on a small

number of data. This study presents a Vision Transformer (ViT) based approach to detect diseases in mango leaves using publicly available data namely MangoLeafBD. The ViT model has been selected as the detection model due to its parameter efficiency compared to deep CNN models. The ViT has produced remarkable overall classification accuracy of 100%, precision of 100%, recall of 100%, and f1-score of 100% for disease detection on mango leaves which is better than the existing CNN approaches on the MangoLeafBD dataset. This demonstrates that our approach has the potential to assist farmers in the field by providing automated, simple, and more reliable mango leaf disease diagnosis.

https://iccit.org.bd/2023/

Detection of Parkinson's Disease from T2-Weighted Magnetic Resonance Imaging Scans Using EfficientNet-V2

NAZIA ALFAZ et el.

Parkinson's disease (PD) is a multifaceted neurode-generative disorder that primarily disrupts voluntary motor movements by causing an excitation-inhibition imbalance in the brain. Approximately 10 million people worldwide are affected by PD. However, accurate diagnosis of PD is still challenging in the early stages of this disease due to the similarity of the phenotypes of the neurological disorders. Magnetic resonance imaging (MRI) has played an important role in understanding brain function and disease in neuroimaging. In particular, it can detect structural abnormalities in the brain caused by dopamine deprivation in PD patients leading to excitation-inhibition imbalance. Besides, the utilization of deep learning has emerged as a crucial factor in the identification of Parkinson's disease due to its ability to identify irregularities, and structural changes at a specific location of brain. This study investigates the effectiveness of the deep learning model EfficientNet-V2 in combination with transfer learning for the purpose of identifying the presence or absence of Parkinson's disease in individuals. In contrast to the arbitrary scaling employed by conventional CNN, the EfficientNet-V2 employs a straightforward and efficient compound factor to modify the network dimensions, which facilitates the identification of the optimal set of parameters. The identification is made by analyzing MRI samples obtained from the Parkinson's Progression Markers Initiative, an openly accessible dataset. To reduce bias while analyzing the detection performance and to stabilize the overall performance of the architecture, this study has employed 4-fold cross-validation method during data split. This method has obtained an overall 99.13% accuracy, which is substantially higher than the accuracy of earlier works.

https://iccit.org.bd/2023/

ReChain-A Blockchain Network for Review and Rating System

MD. MAZID-UL-HAQUE et el.

Review and rating is a very important movement for online purchases and also it's an overview of a company's service. The most popular online platform provides a section called reviews and ratings. In this research, a blockchain based technology has been proposed that is fully decentralized but can be implemented inside a centralized system. It has been noticed for a long time that because of the company's image, some people are using it negatively, and fake or paid reviews are very common among them. There are many flaws in conventional systems for review and rating. After finding the flaws, a totally new blockchain network is designed to overcome them. This is a consortium blockchain network that contains hybrid blockchain features. In this proposed model, complexity has been reduced, and it is going to be cost-efficient as well because this decentralized system can be used in any centralized system.

https://ieeexplore.ieee.org/xpl/conhome/10068861/proceeding

Comparison of Performance Parameters of basic NAND and NOR Gates using Cadence Simulation Tool for VLSI Circuits

DR. MUHIBUL HAQUE BHUYAN et el.

Logic gates are vital components of any digital circuit. Logic gates are implemented using MOS transistors for various complicated integrated circuits, such as SRAM cells, encoders or decoders, multiplexers, flip-flops, counters, registers, and numerous other circuits. This paper investigates the design, simulation, and analysis of basic logic gates- NAND and NOR gates. We have modeled the basic NAND and NOR gates using 45 nm technology. In this research, schematic design, layout design, and layout vs schematic (LVS) run of the aforementioned gates is all included in the modeling. The gates were implemented using CMOS, NMOS pass transistor, PMOS pass transistor, transmission gate, pseudo-NMOS, dynamic, and domino logic technologies. Additionally, the single node yields the simulation results for both gates, including rise time, fall time, area, delay, and power dissipation. The outcomes of the analysis demonstrate that the NAND gate is superior to the NOR gate in every way. The Cadence Virtuoso tool was used to complete the design and simulation tasks.

Design and Simulation of a CMOS-based S-R Flip-Flop using Cadence Simulation Tool

DR. MUHIBUL HAQUE BHUYAN et el.

This research report provides an illustration of the CMOS-based S-R flip-flop design and simulation process using the Cadence Virtuoso simulation tool. The current technological growths are aiming to reduce the integrated circuit's geometric feature size and power consumption in VLSI circuit designs to save power and boost up speed. Therefore, we studied the traditional CMOS design and simulation of an S-R flip-flop using the Cadence Virtuoso simulation tool at the transistor level. We

have modeled the basic NAND and NOR gates using the 45 nm technology available in the gpdk045 kit. In this research, schematic circuit design, layout design, and symbol design were performed. Then the designed circuit was simulated in the analog design library of the Cadence virtuoso tool. The simulation was performed for a duration of 140 ns with a minimum time period of 20 ns and a pulse duration of 10 ns. The time simulation results demonstrate that the designed flip-flop can work even at the 45 nm technology node very well.

Design, Simulation, and Characterization of a Pocket Implanted Nano-Scaled n-MOSFET using COMSOL MultiPhysics

DR. MUHIBUL HAQUE BHUYAN et el.

This paper reports on the design, simulation, and characterization of a pocket-implanted nano-scaled n-MOSFET using COMSOL MultiPhysics software. For the design, we used p-type silicon and silicon dioxide as the gate material. We used an oxide thickness of 2 nm, a gate width of 0.5 mm, a pocket length of 100 nm, a channel length of 1 μm, and drain or source thicknesses of 0.05 mm. After completing the design, various simulations were performed to check the validity of our design. We get the gate and drain bias curves for the different values of drain and gate voltages, respectively. We also calculated the sub-threshold drain current using the COMSOL simulator. Our analysis demonstrated the expected results when we change the device parameters and bias voltages.

SmartPoultry: Early Detection of Poultry Disease from Smartphone Captured Fecal Image

MD. MAHMUDUR RAHMAN et el.

The outbreak of chicken disease has been a major concern around the world, as the poultry industry supplies a significant portion of t he global protein needs. Such an outbreak can cause enormous financial loss to the poultry farmers and induce food insecurity. The COVID-19 lessons have taught us that chicken disease outbreak can be a threat to human lives as well if not detected in time. Currently, Poultry farmers rely on their experience to detect diseases and to seek professional's help, which occasionally fails, resulting in widespread chicken death. Thus, early detection of chicken disease is of great importance for sustainable poultry farming, reducing poultry losses and preventing the spread of zoonotic diseases to humans. Several methods proposed previously for this purpose have failed to achieve sufficient a ccuracy and practical usability. In this paper, we present an AI-assisted automated system for detecting chicken diseases at an early stage from smart-phone captured fecal images. The proposed method utilized an ensemble network of four fine-tuned convolutional neural networks that were selected through an exhaustive literature search. The proposed method outperformed existing methods, achieving 99.99% accuracy and we demonstrated its practical usability in terms of time, robustness, user friendliness and cost.

Development of a Low-Cost Real Time Color Detection Capable Robotic Arm

DR. SHUVRA MONDAL et el.

As the era of fourth industrial revolution approaches automation via robotic arms in the industrial and daily work routine are getting more attention. Robotic assistance can play a major role in efficient production and assembly lines by eliminating human error and producing more precise tasks. Moreover, such robots can help to reduce the accident risk for humans in hazardous conditions. In this research a low-cost, feasible, and easy to build robot arm has been presented which can distinguish colors and can pick and place light objects autonomously. The gripper and two wheeled robots were controlled by an Arduino UNO microcontroller to move and pick and place function with four degrees of freedom. A pixy2 camera sensor was used for object color detection which works independently with an internal microprocessor that uses a color-filtering algorithm based on hue. The fully automated prototype robot utilizes real-time image processing and path learning to successfully detect objects with six different colors and do pick and place operation within its pre-trained path or task. The prototype robot showed over 75% accuracy and an average of 15 seconds of operation time while picking and placing different colored objects autonomously.

A Deep Learning-Based Approach for Detecting Bangla Spam Emails

SHARIFA RANIA MAHMUD et el.

Abstract—The field of wireless communications is expanding quickly in this 21st century. One of the most important communication tools available today is Email. Billions of emails are sent everyday throughout the world, that make people more vulnerable to dangers. Spam emails can be used for phishing, blackmail, and extortion from our digital equipment. Phishing emails are those that beg recipients for personal or financial information through different advertisements and offers from any e-commerce websites. Such spam emails are quickly identified by spam filters, which must work harder to block emails with no links or with few links. Despite multiple studies, some valid emails are still labeled as phishing and vice versa by spam filters. There are various methods for identifying spam emails in English and other significant languages. Nevertheless there aren't many of these spam email detection tools accessible in Bangla. This study aims to categorize emails in Bangla language using deep learning approaches. In this research, a number of algorithms are investigated, additionally, we have developed a dataset and it is eventually concluded that the Bi-LSTM (Bidirectional Long Short-Term Memory) method has the greatest accuracy (97%) for the identification of Bangla phishing mail.

http://www.iceccme.com/

Design and Modelling of LCL and LC Filters for Symmetric Five-Level Inverter

TAMIM HOSSAIN et el.

Electricity generation from renewable energy sources is one of the eye-catching topics for researchers. Because the administration authorities are providing adequate support to develop the research projects on it. One of the major problems with renewable energy source is that it creates a fluctuation in frequency and provides an unpredictable amount of energy to generate electricity. Considering this, we have developed a power converter to regulate solar energy into electrical energy in a smooth way. In detail, the voltage source inverter (VSI) is the optimal one to get the energy from the solar panel. The filters are also an unavoidable part of the electronics circuit to get harmonics-free outputs. In fact, the frequency for switching for the electronics component is an important part and the filters are carefully designed accordingly. In addition, it is applied to get sufficient attenuation without producing system-wide oscillations. In this research, we have proposed LCL and LC filters for a symmetric five-level inverter, where the overall efficiency is increased compared to other research works, and the cost is sufficiently optimized. Simulation software is used to check the fundamental value of voltages, currents, and ripple factors of the DC outputs. In addition, the RMS value of output voltage and current, and total harmonic distortion (THD) of the specified filter are also measured and reduced significantly. By considering the electrical parameters, the superior performance of the designed LCL filters was achieved. In addition, this analysis shows the effect of damping resistors also. Furthermore, a prototype has also been made for the validity of simulation results. In fact, the resonance frequency peak can be lowered by using the dampers. We have examined the outputs of the filters that could be lowered THD reduction and confirmed the resonance frequency also.

Structure, microstructure and magneto-elastic property study on Co40Ni29Al31 ferromagnetic shape memory alloy ribbon

DR. MD. SAROWAR HOSSAIN et el.

Ferromagnetic shapememory Alloys having huge magnetic field and stress-induced strain are suitable materials for sensors and actuators. Ni2MnGa being the prototype of these materials and because of its brittleness alternative systems CoNiAl/Ga were recently developed. CoNiAl being a ductile material because of its two-phase microstructure and the large range of transformation temperatures. In this line, a ribbon with nominal composition Co40Ni29Al31 was prepared using melt-spun technique. The structure and microstructure of the sample was determined using XRD and SEM. The transformation temperatures were determined using four probe method using a cryocooler within the temperature range of 4 K to 350 K. The elastic and magneto-elastic properties were studied using a Vibrating reed method within the temperature 80 K to 300 K. A constant magnetic field of 300 Oe is applied with a coil wound on the cryostat of the vibrating reed setup. As was expected the sample has two phases of microstructure, from the XRD data, a high amount of

phase with a few amounts of phase was found and it was also replicated in SEM photographs. The phase fractions were found by fitting the XRD data with Reitveld refinement. The transformation temperatures of the sample were obtained from the four probe resistivity measurements, and they are TMs = 133 K, TMf = 83 K, TAs = 130 K and TAf = 179 K. From the sound velocity and internal friction study without and with the magnetic field interesting results were found. The martensitic and inter martensitic transformations were suppressed with the application of magnetic field. It was clearly seen in the sound velocity change plots as a function of temperature and the same was replicated in the internal friction plots. Such studies through light on the magneto-elastic coupling-related issues and are quite useful for the application of these materials for the Micro Electromechanical Systems at different operating conditions.

https://icmm.gcet.edu.in/#:~:text=Geethanjali%20College%20of%20Engineering%20and%20Technology%2C%20Cheeryal%2C%20Keesara%2C,Telangana-501301%20When%20Thursday%20to%20Saturday%2022-24%20December%2C%202022

A Novel Contactless Middle Finger Knuckle Based Person Identification Using Ensemble Learning

NOBORANJAN DEY et el.

In Modern times, automated security for identifying a person is one of the main concerns. There is a significant need for a trustworthy and secure identity verification solution. A reliable way to identify someone can be using a biometric identification system. The finger knuckle pattern offers excellent discriminatory features for biometric identification with indirect touch, including the advantages of long-range visibility. Existing models are failing to handle the depth information in finger knuckles that are highly relevant to understand the identification patterns. Therefore, we elaborate on the significance of utilizing the middle finger knuckle for biometric identification. We propose an ensemble approach that appropriately captures the rich features to identify a person based on their finger knuckle. The proposed model performance is evaluated on a standard dataset (HKPolyU 3D photometric stereo knuckle image dataset). Experimental results illustrate that the proposed model outperforms the existing results. Further, this approach would be advantageous in forensic investigations, security, and surveillance.

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Intelligent Chatbot Assistant in Agriculture Domain

RAHUL BISWAS et el.

Agriculture is known as the economic game changer of India. It is the primary driver of GDP growth because of India's robust agricultural industry, and proper knowledge about agriculture techniques help increase crop yield. So, answering the different types of crop-related queries is essential. We proposed the intelligent chatbot application in the agriculture domain so that farmers can get the correct information about farming practices. Our system is farmer-friendly and capable enough to

instantly answer farm-related queries from the knowledge base, such as plant protection, fertilizer uses, government schemes, and many others. We used the agriculture-related data in question-answer format and implemented the pre-trained model of the Sentence-Transformer approach to answer providing. We also deployed the TF-IDF and Bag-of-Words method but achieved a reasonable accuracy rate for the test data in the sentence transformer pre-trained model. With the help of API services, our system also shows the crop's latest mandi (market) rate and current weather information. So, the proposed chatbot system will keep the contribution for farmer's cost savings. Overall, our chatbot system is straightforward and more efficient for the farmer to make better decisions.

https://cse.iitrpr.ac.in/mrig/ica23/

Achieving uRLLC with machine learning based vehicular OCC

DR. AMIRUL ISLAM et el.

Achieving ultra-reliable and low latency communication (uRLLC) in vehicular networks is challenging because of their time-varying and dynamic nature. In this paper, we propose a deep reinforcement learning (DRL) based vehicular optical camera communications (OCC) system that aims at maximizing the transmission rate. In doing so, we optimize the speed of vehicles, the channel code rate, and the modulation order while respecting the uRLLC requirements. We define reliability by satisfying a predefined bit error rate and latency as transmission latency. To improve the transmission rate and ensure reliability and low latency, we use low-density parity-check codes and adaptive modulation. We then solve the optimization problem using the actor-critic DRL framework with Wolpertinger architecture. We deal with the continuous action spaces by employing a deep deterministic policy gradient algorithm. The evaluation verifies that our proposed optimization scheme can achieve superior performance than the comparison schemes. Finally, the results further confirm that the proposed solution can maximize the communication rate while guaranteeing the uRLLC requirements.

Digital Border Surveillance System: Towards Illegal Migration and Trafficking Free Borders.

NUZHAT TABASSUM et el.

A nation's global security is significantly impacted by border security. A significant number of human and illegal items are trafficked between countries across borders, creating a source of concern in many nations. Avoiding tariff duties and the business of illegal goods are the common issues in ensuring border security. Traditional security forces are insufficient to deal with the intruders with their ever-changing ideas of intrusion. Therefore, this research proposed a digital border surveillance system to help the border security forces for enhancing the command and control of the borders. The proposed system utilized YOLOv7 architecture to detect movement in real-time and monitors the real-time movement of individuals in uniform, civilians (without uniform), and animals within the proximity of the responsible area as well as detects longitudinal movements through sensors. The

system is also capable of sending different forms of notifications depending on the types of movements. Finally, the system showed an average success rate of 89\% and 85\% for sending alarms and notifications, respectively while detecting any movements.

https://iccit.org.bd/2023/

Footwear 3D Model Generation from Smartphone 2D Images Utilizing Photogrammetry

NUZHAT TABASSUM et el.

3D modeling in the shoe industry is growing as the technology becomes more widely available. 3D modeling lets companies customize shoes for individual customers, making manufacturing more flexible and efficient. In the shoe industry of Bangladesh, using smartphone images for 3D modeling is a fairly new idea. This allows designers and manufacturers to collaborate and quickly share designs with customers for feedback. A photogrammetry pipeline is a cost-effective and efficient way to create 3D models. This study proposes a potential and affordable method for using photogrammetry to create 3D representations of footwear. The major goal was to determine whether photogrammetry, as opposed to RGB depth camera photos, can more conveniently construct 3D models of footwear from a small number of smartphone images. In order to assure correct reconstruction, the pipeline required taking a collection of photos from 6–9 distinct perspectives and augmenting the dataset. Then, from these images, point clouds are produced, and from these aligned point clouds, the 3D mesh is produced. The mesh is then textured and smoothed to give color. In Bangladesh's shoe industry, this 3D modeling pipeline can be used for AR shoe try-on.

Automated Agriculture News Collection, Analysis, and Recommendation

SHAIKAT DAS JOY et el.

A country like India mainly depends on the sector of agriculture. Most people's economies are intensely engaged in the field of agriculture. So, developing the agriculture sector will be an excellent benefit for any country. Nowadays, People can immediately find any solution regarding agriculture through technology's modernization. We can get any news from online articles anytime without any movement. Agriculture news should also be available in online news articles so that people who are intensely engaged with the agriculture field and economy can quickly get their valuable news. People must go through many online news sites to gather all the agriculture-related news. We have proposed an NLP-based solution so people can get all agriculture-related news in one place combining multiple features. In this process, we have collected many articles from multiple online newspapers and classified the agriculture news articles. For the classification process, we have applied several classification models. We have also added a machine learning-based model to check the duplication between news articles. Although, there will be multiple categories of agriculture news so that people can directly follow the news as they want. People will also be recommended articles

based on content and times. So, Getting information about agriculture will be more straightforward for the farmer, and they can know about new technologies to apply in their work. Finally, in this proposed work, people can get all the essential agriculture news from various sources in one central point, including many exciting features.

https://cse.iitrpr.ac.in/mrig/ica23/

Transforming Slum Dwellings into Better Livable Units: An Approach through Minimum Intervention

SAIFUL HASAN TARIQ et el.

Dhaka, the capital of Bangladesh and the 9th largest city in terms of population, is like an urban melting pot bubbling over with population and a city which is forever changing and never finished for it's over population. When Cities are out of control of population density problems, informal urban development is perceived as a consequence of uneven urban growth. The crisis of Dhaka city disables the conventional planning faculty and requests the formulation of alternatives that will integrate architecture of informality into the whole urban structure. This paper tried to figure out the poor living conditions at Duaripara slum which is in the north-western part of Mirpur Thana at Dhaka North City Corporation. Through research and hands-on inclusive solutions, the paper proposed options for their better living condition. Analyzing the present condition of light, ventilation and temperature inside the houses, this research shows how quality of life might be improved through nurturing the opening condition and insulation system of the existing house, which is very much affordable for the slum dwellers, but unfortunately, they are unaware of it. The innovative solutions and increase in skills of informal builders can uplift the permanent up-gradation to informal settlements. Literature study and field survey have helped to develop module design for the improved living conditions that can be retrofitted in existing built forms with minimum intervention. As we are now living in the cutting edge of technology, this small but inclusive initiative may open up big opportunities to upgrade the living conditions of the settlement of slums in Bangladesh and elsewhere with similar existing context.

https://ajse.aiub.edu/index.php/ajse/article/view/300

Cyber Security Awareness among Generation Z in Bangladesh

NAZIA FARHANA et el.

This study explores the level of awareness regarding cyber security and cyber threats among generation Z in Bangladesh. Cyber awareness plays a vital role in preventing cybercrimes, which are extremely prevalent these days. This study investigates the threat awareness practices and current knowledge levels among Bangladesh's generation Z. To achieve goals and make it sustainable, it is crucial to know the gap between the number of students with access to technology and those with cybersecurity awareness. This paper will eventually assist in formulating a strong cyber security framework for Bangladesh. A mixed-method approach has been adopted for this case study research

to understand the cyber security awareness among business graduates of generation Z in Bangladesh. A thorough literature review helped determine the components of cybersecurity awareness, and a quantitative survey method was used to determine how familiar the graduates were with different cybersecurity practices. Findings indicate that the majority of people are well aware of the cyber threats, yet, most of them are not putting enough effort into avoiding them. In order to manage cybercrime, the study indicates that a model for educating generation Z regarding cyber security is urgently needed. Furthermore, the study portrays an in-depth picture of what generation Z of Bangladesh knows about cybercrime and security measures practices to avoid cyber threats. With the findings of the study, generation Z can get ideas of where they should concentrate more to be more cyber vigilant. As this generation Z is soon to be an integral part of the industry, the policymakers can also develop with frameworks, based on the study findings to educate their employees regarding cyber issues. This research will help outline the gap that needs to be addressed by generation Z and also by others.

https://diujbe.daffodilvarsity.edu.bd/article/cyber-security-awareness-among-generation-z-in-bangladesh

A comprehensive dataset for aspect-based sentiment analysis in evaluating teacher performance

DR. MD. SAEF ULLAH MIAH et el.

Teacher performance evaluation is an essential task in the field of education. In recent years, aspect-based sentiment analysis (ABSA) has emerged as a promising technique for evaluating teaching performance by providing a more nuanced analysis of student evaluations. This article presents a novel approach for creating a large-scale dataset for ABSA of teacher performance evaluation. The dataset was constructed by collecting student feedback from American International University-Bangladesh and then labeled by undergraduate-level students into three sentiment classes: positive, negative, and neutral. The dataset was carefully cleaned and preprocessed to ensure data quality and consistency. The final dataset contains over 2,000,000 student feedback instances related to teacher performance, making it one of the largest datasets for ABSA of teacher performance evaluation. This dataset can be used to develop and evaluate ABSA models for teacher performance evaluation, ultimately leading to better feedback and improvement for educators. The results of this study demonstrate the usefulness and effectiveness of ABSA in evaluating teacher performance and highlight the importance of creating high-quality datasets for this task.

Design Process, Simulation, and Analysis of a Common Source MOS Amplifier Circuit in Cadence at 45 nm CMOS Technology Node

DR. MUHIBUL HAQUE BHUYAN et el.

This work describes a design process, simulation, and analysis of a CMOS-based common source amplifier circuit in the Cadence Virtuoso environment at the 45nm technology node. The suggested CMOS circuit may be useful in the op-amplifier or other circuits. The circuit is designed to work with a 1.8V DC power source. The circuit is constructed from two complementary NMOS and PMOS transistors having a 45 nm gate length. The gate widths are chosen as 1 and 2 μ m, respectively. Transistors are selected from the gpdk045 library of the Cadence. For the simulation purpose, we have used two sources from the AnalogLib library- one is a DC bias source and the other is a pulse source for the input signals. After designing the circuit, the circuit was simulated to test and assess various performance factors, including gain, phase margin, gain bandwidth, power dissipation, etc. Simulation results confirm that the designed circuit works well at this node. This type of design and simulation experience can give confidence to fabrication engineers regarding its functionality and reliability.

https://iosrjournals.org/iosr-jvlsi/pages/current-issue.html

DSC Index: Measuring the Digital Supply Chain Practice among the Higher Education Institutions Community in Least Developed Countries

DR. S. A. M. MANZUR H. KHAN et el.

The 4th Industrial Revolution, more commonly referred to as Industry 4.0, has brought about a wave of multifaceted changes across the industrial spectrum around the world, and it has triggered the digitalisation of supply chains and their management regardless of the type of organisation. With increasing interconnectivity through various sectors, digital supply chain (DSC) practices and intentions have also become integral to higher education institutions. As streamlined, automated administrative processes and virtual classes conducted through online platforms become the norm, digitalisation has been catalysed in the education sector. However, several sociocultural, economic, and psychographic factors influence the adaptation of new technologies, especially in developing countries such as Bangladesh. This study uses the composite index approach to determine the Index derived from the correlation between the factors and their impact on the DSC practices and intentions. The study indicates that Trust (T) is the primary influencer, along with Performance Expectancy (PE), closely followed by Facilitating Value (FV), Facilitating Conditions (FC), and Digital Literacy (DL).

https://ajse.aiub.edu/index.php/ajse/article/view/886

Design and Concept of Renewable Energy Driven Auto-Detectable Railway Level Crossing Systems in Bangladesh

SUSMITA GHOSH et el.

Bangladesh's railway system mostly uses typical manual railway crossing techniques or boom gates through its 2955.53 km rail route all over the country. Accidents frequently happen at railway crossings due to the lack of quickly operating gate systems, and to fewer safety measures at the railway crossing as well. Currently, there are very few automatic railway crossing systems available (without obstacle detectors). Additionally, all of them are dependent on the national power grid, without a backup plan for any emergency cases. Bangladesh is still running a bit behind in generating enough power for its consumption; hence, it is not possible to have a continuous power supply at all times all over the countryside. We aim to design and develop a smart railway crossing system with an obstacle detector to prevent common types of accidents at railway crossing points. We use two infrared (IR) sensors to operate the railway crossing systems, which are controlled by an Arduino Uno. This newly designed level crossing system is run with the help of sustainable renewable energy, which is cost-effective and eco-friendly, and applied under the national green energy policy towards achieving sustainable development in Bangladesh as a part of the global sustainable goal to face climate change challenges. We have summarized the simulated the results of several renewable energy sources, including a hybrid system, and optimized the Levelized Cost of Energy (LCOE) and the payback periods.

https://www.mdpi.com/2673-7590/3/1/5

Design and Analysis of IoT-Based Battery Management and Monitoring System for Electric Vehicle

DR. MD. RIFAT HAZARI et el.

The growing popularity of electric vehicles on a worldwide scale leads to further research to monitor their performance. The use of Internet of Things (IoT) technology will make it easier to integrate the automated real-time monitoring system with the current electric vehicle technology. The great majority of electric vehicles use rechargeable lithium-ion batteries. Use of lithium-ion batteries creates an overcharging situation in the battery, which significantly decreases battery life. It also increases the possibility of disastrous safety risks due to fire. This paper develops an IoT-based battery management system to minimize hazardous situations. The battery monitoring system (BMS) notifies the user about the condition of the battery in real time.

Characterization and Comparison of DSSCs Fabricated with Black Natural Dyes Extracted from Jamun, Black Plum, and Blackberry

DR. MOHAMMAD MAHBUB RABBANI et el.

In this report, natural dyes extracted from three different, black-colored fruits were used as photosensitizers for the construction of dye-sensitized solar cells (DSSCs). The natural dyes were extracted from the dark-colored peels of jamun (also known as Indian black plum), black plum, and blackberry fruit. These natural dyes contain polyphenolic compounds—most prominently anthocyanins—which interact strongly with titanium dioxide (TiO2) semiconductors and accordingly enhance the efficiency of DSSCs. The natural dyes extracted from the various fruits were characterized utilizing UV-Vis and fluorescence spectroscopy. The interaction between the dyes and TiO2 was monitored with FTIR and Raman spectroscopy. The fabricated DSSCs were characterized via current–voltage measurements and electrochemical impedance analysis. DSSCs fabricated with jamun produced the highest efficiency of 1.09% with a short-circuit current of 7.84 mA/cm2, an open-circuit voltage of 0.45 V, and a fill factor of 0.31. The efficiencies of the DSSCs from black plum and blackberry were 0.55% and 0.38%, respectively. The flow of charge occurring at the interfaces between the natural dye and the TiO2 layers were investigated using electrochemical impedance spectroscopy (EIS). To the best of our knowledge, this study is the first to directly compare three distinct types of black DSSCs. Computation analysis was also carried out utilizing SCAPS-1D software (version 3.3.07), which revealed how the type of defects in the devices impacts their performance.

Linear and thermo-optically generated nonlinear optical response of bovine serum albumin and its constituent amino acids in continuous wave z-scan

DR. SARFUDDIN AHMED TAREK et el.

Proteins are large biomolecules in the form of polypeptide chains consisting of amino acid (AA) residues. Ultraviolet–visible absorption spectroscopy and continuous wave (CW) z-scan of bovine serum albumin (BSA) and some of its constituent AAs were examined to deduce the relationship between the optical properties of this protein molecule and its constituents. From the analysis of their optical spectra, the absorption at 278 nm by BSA is found to be the outcome of the cumulative effects of the absorptions by constituent aromatic AA residues, cysteine disulfide bonds, and methionine. Similarly, the closed aperture CW z-scan of BSA and those of the constituent AAs at 74–106 mW incident optical power at 655 nm indicate that thermally generated third-order optical effects arise in BSA and its aromatic AA residues due to multiphoton absorptions. The nonlinear optical (NLO) responses of BSA and those of the AA residues are compared in terms of their molar phase shift per unit power, which indicate a possible relationship between the NLO property of BSA and its AA residues.

Predicting Adoption Intention of Artificial Intelligence A Study on ChatGPT

PROF. DR. FARHEEN HASSAN et el.

The objective of this research is to study the factors that influence the adoption behaviour of ChatGPT among professionals in Bangladesh. This study investigates the adoption intention of ChatGPT by using the modified Unified Theory of Acceptance and Use of Technology (UTAUT) model. This model is used as a theoretical framework to analyse the many aspects that exert effect on the adoption process. The study was administered to a sample of 350 professional knowledge-workers using an online questionnaire. The data analysis was performed using PLS-SEM. The findings of the research provided a significant understanding of the determinants that influence the desire to adopt and the actual use of ChatGPT. The study highlights the significance of strengthening behavioral intentions, emphasizing performance benefits and building trust, and creating facilitating conditions to promote adoption and utilization of ChatGPT among Professionals in Bangladesh. The research contributes to the understanding of factors influencing the adoption and usage behavior of ChatGPT and offers practical implications for organizations and policymakers to maximize the benefits of artificial intelligence applications in the context of Bangladeshi Professionals. The study's limitations include its exclusive focus on Bangladeshi professionals, reliance on selfreported data, and oversight of ethical and privacy concerns. This research is one of the first attempts to elucidate the factors influencing the acceptance of ChatGPT among professionals in Bangladesh, using the modified UTAUT-2 model

https://ajse.aiub.edu/index.php/ajse/article/view/797

Lie Group analysis of magnetohydrodynamic flow with Nonlinear Hydrodynamic, Linear Thermal and Mass Slips

DR. MOHAMMED JASHIM UDDIN et el.

The viscous laminar magnetohydrodynamic convective boundary layer flow with the combined effects of chemical reaction and nonlinear velocity slip and linear thermal and concentration slips have been considered across a flat plate in motion. Using a nondimensional transformation attained by the single parameter continuous group method, the governing equations are transformed into a system of nonlinear ordinary similarity equations, then, the solutions of the coupled system of equations are constructed for velocity, temperature, and concentration functions by using the numerical methods. Among the parameters that have been looked at are the buoyancy parameter N, the nonlinear slip parameter n_1, the order of chemical reaction n, the Prandtl number Pr, and the Schmidt number Sc. An investigation was made on the profiles with respect to mixed convection parameter λ, order of chemical reaction n, arbitrary index parameter n_1, velocity slip parameter a, thermal slip parameter b, mass slip parameter c, suction parameter fw, magnetic parameter M. Verification of the results were possible due to comparison of two numerical methods to obtain the solution to the differential equations. The present study indicates that, for a range of values of the magnetic parameter, the wall shear stress decreases with increasing mixed

convection. Moreover, for a variety of mixed convection parameter instances, the wall heat transfer decreases with increasing perpendicular magnetic effect

https://link.springer.com/article/10.1007/s44198-023-00145-1

Computation and memory optimized spectral domain convolutional neural network for throughput and energy-efficient inference

DR. SHAHRIYAR MASUD RIZVI et el.

Conventional convolutional neural networks (CNNs) present a high computational workload and memory access cost (CMC). Spectral domain CNNs (SpCNNs) offer a computationally efficient approach to compute CNN training and inference. This paper investigates CMC of SpCNNs and its contributing components analytically and then proposes a methodology to optimize CMC, under three strategies, to enhance inference performance. In this methodology, output feature map (OFM) size, OFM depth or both are progressively reduced under an accuracy constraint to compute performance-optimized CNN inference. Before conducting training or testing, it can provide designers guidelines and preliminary insights regarding techniques for optimum performance, least degradation in accuracy and a balanced performance–accuracy trade-off. This methodology was evaluated on MNIST and Fashion MNIST datasets using LeNet-5 and AlexNet architectures. When compared to state-of-the-art SpCNN models, LeNet-5 achieves up to 4.2× (batch inference) and 4.1× (single-image inference) higher throughputs and 10.5× (batch inference) and 4.2× (single-image inference) greater energy efficiency at a maximum loss of 3% in test accuracy. When compared to the baseline model used in this study, AlexNet delivers 11.6× (batch inference) and 5× (single-image inference) increased throughput and 25× (batch inference) and 8.8× (single-image inference) more energy-efficient inference with just 4.4% reduction in accuracy.

https://link.springer.com/article/10.1007/s10489-022-03756-1#citeas

Technology-Driven Supply Chain Management in Readymade Garments: A Literature Review

ZIARAT HOSSAIN KHAN et el.

This paper provides a literature review on the use of technology in supply chain management in the ready-made garment industry. The paper lists many technologies that might change the apparel industry's supply chain, including CAD, CAM, RFID, NFC, IoT, blockchain, and AI. The assessment focuses on the advantages of utilizing technology in the supply chain, including enhanced efficiency, lower costs, and more transparency. The difficulties in implementing new technology and the necessity of adequately integrating people, processes, and technology are also emphasized. The review highlights how crucial supplier collaboration is to the success of technology-driven supply chain management. The study suggests adopting technology-driven supply chain management may significantly boost supply chain performance. It has become a crucial part of the ready-made garments sector.

https://isctj.com/index.php/isctj/article/view/287/283

Consumer Learning and Split-Brain Theory: Potential Usage in an Advertisement

ZIARAT HOSSAIN KHAN et el.

Understanding customers has an enormously beneficial effect on market success. Repeated advertising combining emotional and rational appeals is one technique to establish a foothold in the minds of consumers. Even advertisements on reality programs, movies, and sports are frequent forms of informing clients about the product most commonly used in marketing. Marketers nowadays can employ neuromarketing to tap into consumers' unconscious brain processes, but evaluating neuromarketing approaches is costly. Using split-brain theory, advertisers can better anticipate how consumers respond to their messages. Despite the fact that rational thought would dissuade them from owning an object, people often acquire an emotional attachment to things. This study looked at four countries and their major brands of refrigerators to see how ads' content related to the left and right sides of the brain. This study found that While Germany and India tend to concentrate on the brain's right hemisphere, Bangladesh places equal emphasis on the left and right sides. However, the United States tends to use the left side of the brain more. A consumer's demand can be influenced by economic, demographic, cultural, and political issues, which in turn ultimately causes a consumer's mind to connect with promotional efforts. The findings of this study could be utilized to guide content selections for campaigns both domestically and internationally, which has significant ramifications for advertising agencies.

http://www.ijefm.org/article/173/10.11648.j.ijefm.20231103.21

Purchasing Intentions of Consumers at A City Superstore

ZIARAT HOSSAIN KHAN et el.

Purpose: This study strives to understand what drives suburban superstore customers to buy. With this information, businesses and marketers may better target and interact with these categories of consumers while also gaining insight into the areas that still require significant improvement to maintain their place in the minds of consumers.

Theoretical framework: Over the previous two decades, Bangladesh's superstore commerce has flourished. Multiple reasons have contributed to the rise in the popularity of superstores, which has resulted in intense competition among them. Because of this, researching shoppers' habits concerning supermarkets is crucial. (Alam & Noor, 2020). To broaden the subject of superstore literature in Bangladesh, more research is needed to understand customer behavior patterns, particularly the issue of loyalty.

Design/methodology/approach: This survey focuses on the inhabitants of Bangladesh's northern region. Before the survey, there was a brief discussion that aided in developing a descriptive research design regarding the purchasing behavior of supermarket customers. A research design has been developed using the original UTAUT model, first introduced in 2003 by V. Venkatesh and colleagues

(Venkatesh, Morris , Davis , & Davis, 2003), and the study's hypotheses were evaluated using Cronbach's Alpha Correlation, structural equation regression analysis, Pearson's Correlation analysis, and Scatter plot for Regression analysis.

Findings: The study found a strong correlation between Purchase Intention and consumer awareness, promotional activities, Peer Group influences, and superstore amenities.

Research, Practical & Social Implications: Entrepreneurs find it challenging to develop super shops in urban and suburban areas of Bangladesh, an agricultural country in the lower middle class. Quality goods with a reasonable price strategy, positive word of mouth with celebrity endorsement, extra care, offer and discount, location, and cultural acceptance are all significant elements that require much more attention to attract mega shop customers than typical shops. Marketers and entrepreneurs can establish and successfully promote their super-shop businesses in small cities with the help of this study.

Originality/value: Anybody concerned with the mentality of shoppers in an emerging economy should benefit from this research. Business owners and marketers can nudge consumers in that direction by creating exciting promotional activities that make buyers feel compelled to visit the super shop.

https://russianlawjournal.org/index.php/journal/article/view/2952

Comparative Analysis of Data Mining Techniques for Predicting the Yield of Agricultural Crops

PROF. DR. DIP NANDI et el.

Predicting crop yields is one of the more difficult tasks in the agriculture sector. A fascinating area of

research to estimate agricultural productivity has emerged from recent advancements in information technology for agriculture. Crop yield prediction is a technique for estimating crop production based on a variety of factors, including weather conditions and parameters such as temperature, rainfall, fertilizer, and pesticide use. In the world of agriculture, Data mining techniques are extremely popular. In order to predict the crop production for the following year, data mining techniques are employed and evaluated in the agricultural sector. In this paper, we carried out the comparison between Naive Bayes, K-nearest neighbor, Decision Tree, Random Forest, and K-Means clustering algorithms to predict crop yield in order to determine which method is most effective at doing so. The results show which algorithm is better suitable for this particular purpose by comparing these data mining algorithms for agricultural crop production and determining which algorithm is more successful for this outcome.

https://www.mecs-press.org/ijitcs/ijitcs-v15-n4/IJITCS-V15-N4-3.pdf

Investigation of Student Dropout Problem by Using Data Mining Technique

PROF. DR. DIP NANDI et el.

Throughout the past twenty years, we've seen a huge increase in the number of school universities. Given the intense competition among major universities and schools, this attracts students to apply for admission to these institutions. Early school dropout prediction is a critical problem for learners, and it is hard to tackle. And a wide number of factors can impact student retention. In order to attain the best accuracy, the conclusion of the program, the standard classification approach that was used to solve this problem frequently needs to be applied the majority of organizations and courses launched by universities operate on either an auto model, therefore they always prefer course enrollment over student caliber. As a result, many students stop taking the course after the first year. In order to manage student dropout rates, this research provides a data mining application. The predictive model may provide an effective predictive list of students who typically require the greatest help from the student dropout program given updated data on new students. The results indicate that the object classification algorithm Random Forest data mining technique can create a reliable prediction model using existing student academic data. Future research on student dropout rates will continue to be vital for informing policy decisions, identifying at-risk populations, evaluating interventions, enhancing support services, predicting trends, understanding long-term consequences, and promoting global learning and collaboration in education.

https://www.mecs-press.org/ijeme/ijeme-v13-n5/v13n5-4.html

Effect of Business Ethics and Product Offering on Customer Loyalty in The Disruption Age: An Analysis of The Banking Sector in Bangladesh

DR. M. M. OBAIDUL ISLAM et el.

Abstract: Purpose of the Study: This study aims to analyze the effect of Business ethics and e-satisfaction toward customer loyalty in the context of the banking sector in Bangladesh.

Methodology: The research used an FGD technique to acquire information regarding end-users (bank's client) experiences and feedback.

Findings: The competition is fierce in the current market environment and so every company is under pressure to survive and make more margin which is associated with and requires a huge amount of investment too. Strategic tools are used by all organizations in their style to sustain in the local and/or global market. Among others, ethical practices, product offerings, and technological facilities that are provided (i.e. online transactions) are important strategies that need to be considered in this fiercely competitive market. Hence, the paper identified potential factors are business ethics, Product offering, and technology disruption are the priority to the significant benefits of the business environment.

Implications: This study investigates the effect of business ethics on customer loyalty due to customer satisfaction with online banking (e-satisfaction) and products offered by the bank which would be beneficial for all stakeholders of the sector.

Limitations and Future Direction: Availability of the data was the major challenge to the research as Banks do not want to disclose their information as privacy of their clients as well as business secrecy. Further research may be conducted with empirical data via any of the big data analysis techniques for more accurate direction for customer service delivery improvement or loyalty enhancement in the banking sector of Bangladesh.

Effect of Business Ethics and Product Offering on Customer Loyalty in The Disruption Age: An Analysis of The Banking Sector in Bangladesh

AKM KAMRUL HAQUE et el.

Technology has been playing vital roles in many aspects of human life on a 24-hours basis. Today's business world has become more complex and overwhelmed with a tremendous of tasks. However, technology supports handling too many tasks in a day even at the same time and makes life easy. Researchers have been working for about the past three decades to link business performance, customer loyalty, and sustainability empirically and anecdotally. (Hasiri & Afghanpour, 2016; Leninkumar, 2017; Ofori et. al., 2017). That is why academicians in the field of marketing and customer relations are investigating the nature and drivers of customer loyalty with increasing attention. (Ofori et al., 2017).

Satisfying every customer is the center of attention for any organization companies including banks. It is of great importance to satisfy customers in the case of a bank more than any other organization as a hundred percent service-provider firm. Hence, acquiring new customers requires five times more time, more money, and more effort than satisfying old customers. And it is about fifty to a hundred times more expensive for winning back the lost customers (Ofori et al., 2017). Usually, satisfied customers are willing to pay more prices for products and services. In addition, they may spread the message through word of mouth which is free of cost. Consequently, understanding customers' needs and meeting their needs can build a strong relationship to hold long-term customer loyalty.

Bilan (2013) stated that consumers do not have time to play games, if they feel that something has gone wrong with products and services, they just leave and choose another supplier. Brush et. al. (2012) declared that the capabilities of banks to increase profit are contingent. Based on maximizing the products sold, new customers get attracted/or selling complementary products to its existing customers. Usually, loyal customers proved a higher level of additional purchases than dissatisfied customers. Customers who are more satisfied tend to be more loyal and recommend the bank to other consumers.

Many researchers have conducted many articles on banking sectors like gaps between expectation and perception, satisfaction level, dimensions of SERVQUAL, trust even loyalty but there is not that much

literature on the relation between product offering, Customer Social Responsibilities (CSR), e-satisfaction and loyalty. However, it is very important to know that as customers are being conscious and digitalized, how do they perceive their satisfaction through CSR, offering and eventually becoming loyal. Companies cannot avoid gaining and adopting competitive advantages where markets are highly competitive. Therefore, like others should not limit themselves with internet and mobile banking, ATM & POS but offer something distinguish and continue satisfying customers so they will be loyal.

Empirical analysis of polarization division multiplexing-dense wavelength division multiplexing hybrid multiplexing techniques for channel capacity enhancement

DR. MOHAMMAD NASIR UDDIN et el.

This paper exemplifies dense wavelength division multiplexing combined with polarization division multiplexing with C-band frequency range-based single-mode fiber. In the proposed link, 32 independent channels with 16 individual wavelengths are multiplexed with two different angles of polarization. Each carrying 130 Gbps dual-polarization data with 200 GHz channel spacing claiming a net transmission rate of 4.16 Tbits/s with spectral efficiency of 69% with 20% side-mode-suppression-ratio (SMSR)and optical signal to noise ratio (OSNR)40.7. The performance of the proposed techniques has been analyzed using optimized system parameters securing a minimum bit error rate (BER) 10-9 at a transmission distance up to 50 km.

http://doi.org/10.11591/ijece.v13i1.pp590-600

Thickness-Regulated Harmonious Effect on the Optical and Electrical Characteristics of ZnO Nano-Crystalline Thin Films for High Mobility Transparent Electrode

DR. MOHAMMAD NASIR UDDIN et el.

The effect of thickness modifications of zinc oxide (ZnO) thin films and the impressions over the electrical and optical characteristics were analyzed. ZnO thin films were deposited by the sol–gel spin coating method. For measuring the thickness of the films, a surface profilometer was operated. By maintaining an unvarying density of sol–gel (with 2% fabrication tolerance), the thin films were deposited on glass substrates. To identify the changes in optical variables, an ultraviolet–visible (UV–Vis) spectrophotometer was used. With the increment of deposition thickness, a nonlinear difference in skin depth has been observed. The bandgap showed a redshift and was in the range of 3.27–3.25 eV which is suitable for photonic applications. Electrical parameters were defined by ECOPIA Hall effect measurement system. The maximum measured sheet resistance in the current research is 5.43×10^7 (Ω/square) for 200 nm thin film. For 100 nm thickness, high mobility (221 cm2 V−1 s−1) and small resistivity (306.3) (Ω-cm) has been obtained. The above-mentioned high mobility and small resistivity are highly desirable for the transparent electrode of CIS solar cells and buffer layer.

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Hybrid Scrum-XP: A Proposed Model based on Effectiveness of Agile Model on Varieties of Software Companies in Bangladesh

ABHIJIT BHOWMIK et el.

The Agile Methodology isa term which refers to a method of software development that is incremental and iterative in nature and is used to manage and incorporate constantly changing needs. This entails decomposing the entire development process cycle into a series of tasks. The process is further divided into a number of sub-tasks, each function is independently. The Agile Development technique, which is a popular and growth-oriented strategy, provides not only speedy project delivery, but also software responsiveness, which leads to total corporate growth and agility. The organization's project management capabilities and performance are improved through the adoption of Agile practices. In their business, the companies employ Agile methods. As a result, the goal of this study is to see how effective agile approaches are in Bangladeshi software organizations. A survey of established software companies in Bangladesh is being conducted to accomplish the objective. The Scrum and XP agile technique is the most widely used according to the findings. It is proposed that Scrum and the XP model be combined to achieve maximum effectiveness and overcome their respective limits.

https://ajse.aiub.edu/index.php/ajse/article/view/353/150

Medbot- Design and Development of Medical Robot for Healthcare Digitalization

DR. MD. SANIAT RAHMAN ZISHAN et el.

The main goal of this paper is to make a multifunctional robot along with a database management system named "MEDBOT". That will reduce the problem of spreading any viral or infectious disease by maintaining social distance. A robot is designed and implemented will replace the ordinary system in the medical sector in a digital way with fewer life risks. Being a multifunctional robot, it can perform as a receptionist, entertainer, nurse, cleaner, and deliveryman. As a nurse, it will check a patient's temperature, Heart Rate, Oxygen Saturation, and Heart condition in a contactless way. Furthermore, these vitals are easily stored in its database system. These vitals are broadcast on the device's display and server, where the doctor can quickly monitor them in real-time. A mobile application-based remote-control system is equipped in this robot to control it remotely. Moreover, a disinfecting system and UV-C light are used for sterilizing purposes. The previously invented medical robot can perform one or two tasks, but a revolutionary change will come into the medical sector by making this robot. At last, it can be said that the 'Medbot' can reduce infectious disease, save time moreover digitalize the medical industry by doing these works. Finally, building a digital Bangladesh, it will work along with the medical sector as a warrior.

https://ajse.aiub.edu/index.php/ajse/article/view/257

Enhancement of dielectric properties and conduction mechanism in BaTi0.85Sn0.15O3 for energy storage application

DR. HUMAYRA FERDOUS et el.

To achieve cost effective materials with improved dielectric properties, BaTiO3 and BaTi0.85Sn0.15O3 have been prepared by solid state reaction technique introducing a two step sintering method. The structure of the samples has been investigated by X-Ray diffraction (XRD) and Raman spectra at room temperature (RT ~ 300 K). In addition, crystallographic microstructures and grain morphology have been evaluated by transmission electron microscopy (TEM) and scanning electron microscopy (SEM) respectively. Apart this, the band structure along with density of states (DOS) are evaluated using first principle calculations for BaTiO3 and BaTi0.85Sn0.15O3. The band structure depicts bandgap of 1.80 eV and 1.82 eV for BaTiO3 and BaTi0.85Sn0.15O3 respectively. The DOS calculation displays the increase in hybridization of Ba^{2+} (A site) and Ti^{4+} (B site) cations with oxygen octahedra resulting in off-center displacement of cations in Sn doped BaTiO3 sample. A disordered cubic phase is obtained in BaTi0.85Sn0.15O3 sample sintered at 1350 °C resulting in the highest dielectric constant with a minimum loss. The conduction mechanism has been analyzed from the temperature and frequency dependence of resistivity

. The overall forecasts indicate BaTi0.85Sn0.15O3 annealed at 1350 °C to be a potential candidate for energy storage capacitive devices in the electronic industry.

A Study on the Impact of E-Commerce Adoption for Enhancing Supply Chain Efficiency in Bangladesh SMES

NAZIA FARHANA et el.

This study examines the impact of e-commerce adoption on supply chain efficiency in small and medium-sized enterprises (SMEs) in Bangladesh. The research aims to identify the factors influencing the adoption of e-commerce in SMEs' supply chain operations, understand the challenges and barriers faced by SMEs in adopting e-commerce, and analyze the impact of e-commerce adoption on supply chain efficiency. A qualitative research design is employed, utilizing semi-structured interviews with SME owners and managers who have adopted e-commerce for their supply chain operations. The study highlights the importance of SMEs in Bangladesh's economy and the growing significance of e-commerce in supply chain operations. Despite the rapid growth of Bangladesh's e-commerce industry, the integration of e-commerce into SMEs' supply chain operations is still in its early stages. Factors such as technological readiness, infrastructure availability, organizational culture, and external influences affect the pace of e-commerce adoption. The findings reveal that increased efficiency, cost savings, and improved customer experience are the primary drivers for e-commerce adoption. However, resistance to change, lack of technical skills, and security concerns pose challenges to adoption. Participants recommend training programs to

enhance technical skills and foster a culture of change. Additionally, organizations should conduct thorough market research, seek customer feedback, and engage in discussions with supply chain partners to make informed decisions regarding e-commerce adoption. Investing in cybersecurity measures is crucial to address security risks. The study contributes to the existing literature on e-commerce adoption in supply chain operations, particularly in the context of developing nations like Bangladesh. It provides valuable insights for SMEs, policymakers, and researchers, emphasizing the need to carefully evaluate the benefits, costs, and risks associated with e-commerce adoption. Enhancing supply chain efficiency through e-commerce adoption can lead to improved competitiveness, cost reduction, and increased profitability for SMEs in Bangladesh.

https://bedc.com.my/archives/#bedc-2023-vol1-issue1

SIGNIFICANCE OF WEB 2.0 PLATFORMS IN SHAPING URBAN CONSUMERS TRAVEL CHOICE IN BANGLADESH.

DR. SAHIN AKTER SARKER et el.

Purpose of the study: Urban people in Bangladesh are being influenced through Web 2.0 platforms and this influence is leading them to take travel choice. This paper is thus aimed to find out whether the significance of Web 2.0 platforms in making travel decision is more effective than a traditional travel agency to the urban young consumers of Bangladesh with special reference to Dhaka city.

Methodology: To meet the purpose of the study, several published information has been assessed. To examine the opinions of the respondents a survey was commenced. Both personal and electronic survey methods were applied. Around 250 responses were used to gather reliable data by convenience sampling technique. Basic descriptive tools and factor analysis has been performed to analyze responses using SPSS 20.0.

Findings: The investigation outcomes suggested performance credibility of traditional travel agency is abnormally poor. Possible incorporation of advanced technologies to aid business survival has thus investigated by the analysis.

Implications: Investigation prescribes, various fields under Web 2 platforms are very much time convenient, reliable, and cost-effective compared to the traditional travel agency (as people search, negotiate, look at the reviews, get the ratings, advise other people, share tour experiences, and take decisions to travel the specific place). The analysis surmises with the challenges addressing feasible measures concerning Web 2.0 platforms.

Limitations and Future direction: The first limitation of the study is small sample size. This study covers only those respondents residing in the capital city - Dhaka of Bangladesh. Therefore, the survey must be disclosed to greater number of respondents outside Dhaka city (as due to time limitations the survey results may not represent the motives and opinions of everyone in Bangladesh). Hence, on field random sampling technique may be exploited by forthcoming investigators.

https://ajbe.aiub.edu/index.php/ajbe/article/view/123

Spin Coated Multi-Walled Carbon Nanotube Patch Antenna for Breast Cancer Detection

RAJA RASHIDUL HASAN et el.

Early detection of breast cancer can be a life-saving measure for many patients. The inaccessibility of X-rays, magnetic resonance imaging (MRI), and other medical facilities in many resource-constrained areas hinders the early detection of breast cancer. In this paper, the use of a rectangular patch antenna for breast cancer detection is proposed by using multiwall carbon nanotubes (MWCNTs) as patch material. The proposed antenna is designed by CST software which is (30 × 40 × 1.66) mm in dimension. A breast model is designed including tumor and cancerous tumors by specific tissue properties for observing the antenna performance in different cases. In free space, the return loss of the designed antenna is observed at −33.414 dB. Moreover, the S11 is examined in a normal breast, a breast including a normal tumor, and a breast including a cancerous tumor is −32.641 dB, −34.94 dB, and −35.22 dB respectively. It can be utilized on a human body phantom model due to its adaptability and reduced radiation properties. The proposed antenna is miniature in size, cost-effective, easily portable, and eco-friendly. It can be used as a first screening tool for breast cancer patients, particularly in resource-constrained regions.

4D: A Real-Time Driver Drowsiness Detector Using Deep Learning

DR. MD. SAEF ULLAH MIAH et el.

There are a variety of potential uses for the classification of eye conditions, including tiredness detection, psychological condition evaluation, etc. Because of its significance, many studies utilizing typical neural network algorithms have already been published in the literature, with good results. Convolutional neural networks (CNNs) are employed in real-time applications to achieve two goals: high accuracy and speed. However, identifying drowsiness at an early stage significantly improves the chances of being saved from accidents. Drowsiness detection can be automated by using the potential of artificial intelligence (AI), which allows us to assess more cases in less time and with a lower cost. With the help of modern deep learning (DL) and digital image processing (DIP) techniques, in this paper, we suggest a CNN model for eye state categorization, and we tested it on three CNN models (VGG16, VGG19, and 4D). A novel CNN model named the 4D model was designed to detect drowsiness based on eye state. The MRL Eye dataset was used to train the model. When trained with training samples from the same dataset, the 4D model performed very well (around 97.53% accuracy for predicting the eye state in the test dataset). The 4D model outperformed the performance of two other pretrained models (VGG16, VGG19). This paper explains how to create a complete drowsiness detection system that predicts the state of a driver's eyes to further determine the driver's drowsy state and alerts the driver before any severe threats to road safety.

Distributed Ledger Technology Based Integrated Healthcare Solution for Bangladesh

DR. MD. SAEF ULLAH MIAH et el.

Healthcare data is highly sensitive and must be safeguarded. Personal and sensitive data, such as names and addresses, is stored in Encrypted Electronic Health Records (EHRs). This paper proposes a Blockchain-based distributed application platform for Bangladesh's public and private healthcare service providers. The proposed application framework enables users to create secure digital agreements for commerce or collaboration by leveraging data immutability and smart contracts. As a result, all stakeholders can collaborate securely over the same Blockchain network, taking advantage of their data's openness and read/write nature. The proposed application is made up of various application interfaces for various stakeholders. The proposed solution employs Hyperledger Fabric and Blockchain to ensure data integrity, privacy, permissions, and service availability. In the application portal, each user has a profile. The creation of a unique identity for each user, as well as the establishment of digital information centers across the country, has greatly aided the process. This application collects health data from each user in a systematic manner, which is useful for research institutes and healthcare-related organizations. For this application, a national data warehouse in Bangladesh is feasible, and various healthcare-related analyses can be performed using the collected data, assisting the strategy and planning department in making informed decisions regarding the healthcare sector in Bangladesh. Because Bangladesh has both public and private healthcare providers, a simple digital strategy is essential for all organizations to accomplish their services. This study proposes a solution to achieve this goal.

Yus - A Deep Learning Algorithm for Collision Avoidance through Object and Vehicle Detection

DR. MD. SAEF ULLAH MIAH et el.

One of the safety features that can alert drivers to the presence of other vehicles and reduce the risk of collisions is vehicle detection. In this study, the objective was to create a system for detecting vehicles, motorcycles, and traffic signals on the roads in University Malaysia Pahang using object detection techniques. The video was taken through Go-Pro camera to capture video footage of traffic objects on the roads in the district, which was then analysed using the YOLO-V8 deep learning algorithm. The system was trained on a pre-existing dataset of 1,068 images, with 70% of the dataset used for training and 30% for testing. After conducting a performance validation, the system achieved a mean average precision of 88.2% on training dataset and was able to detect different types of vehicles such as cars, motorcycles, and traffic lights. The results of this study could be beneficial for road safety authorities and researchers interested in developing intelligent transportation systems.

An automated materials and processes identification tool for material informatics using deep learning approach

DR. MD. SAEF ULLAH MIAH et el.

This article reports a tool that enables Materials Informatics, termed as MatRec, via a deep learning approach. The tool captures data, makes appropriate domain suggestions, extracts various entities such as materials and processes, and helps to establish entity-value relationships. This tool uses keyword extraction, a document similarity index to suggest relevant documents, and a deep learning approach employing Bi-LSTM for entity extraction. For example, materials and processes for electrical charge storage under an electric double layer capacitor (EDLC) mechanism are demonstrated herewith. A knowledge graph approach finds and visualizes different latent knowledge sets from the processed information. The MatRec received an F1 score of 96% for entity extraction, 83% for material-value relationship extraction, and 87% for process-value relationship extraction, respectively. The proposed MatRec could be extended to solve material selection issues for various applications and could be an excellent tool for academia and industry.

Aspect-based Sentiment Analysis Model for Evaluating Teachers' Performance from Students' Feedback

DR. MD. SAEF ULLAH MIAH et el.

Evaluating teachers' performance is a fundamental pillar of educational enhancement, guiding the evolution of pedagogical practices and fostering enriched learning environments. This study pioneers an innovative approach by harnessing sentiment analysis within an aspect-based framework to decipher the intricate emotional nuances embedded within students' feedback. By categorizing sentiments as positive, negative, and neutral, we delve into the diverse perceptions of teaching aspects, offering a multifaceted portrait of educators' contributions. Through meticulous data collection, preprocessing, and a deep learning sentiment analysis model, we dissected student comments into distinct teaching aspects. The subsequent sentiment analysis unearthed positive, negative, and neutral sentiments. Positive sentiments highlighted strengths and effective communication, while negative sentiments illuminated areas for growth. Neutral sentiments provided contextual equilibrium, forming a holistic tapestry of teachers' performance. The proposed model achieved 86\% F1 score for classifying sentiments into three classes.

https://ajse.aiub.edu/index.php/ajse/article/view/921

Evaluating the Performance of a Visual Support System for Driving Assistance using a Deep Learning Algorithm

DR. MD. SAEF ULLAH MIAH et el.

The issue of road accidents endangering human life has become a global concern due to the rise in traffic volumes. This article presents the evaluation of an object detection model for University of Malaysia Pahang (UMP) roadside conditions, focusing on the detection of vehicles, motorcycles, and traffic lamps. The dataset consists of the driving distance from Hospital Pekan to the University of Malaysia Pahang. Around one thousand images were selected in Roboflow for the train dataset. The model utilises the YOLO V8 deep learning algorithm in the Google Colab environment and is trained using a custom dataset managed by the Roboflow dataset manager. The dataset comprises a diverse set of training and validation images, capturing the unique characteristics of Malaysian roads. The train model's performance was assessed using the F1 score, precision, and recall, with results of 71%, 88.2%, and 84%, respectively. A comprehensive comparison with validation results has shown the efficacy of the proposed model in accurately detecting vehicles, motorcycles, and traffic lamps in real-world Malaysian road scenarios. This study contributes to the improvement of intelligent transportation systems and road safety in Malaysia.

https://semarakilmu.com.my/journals/index.php/applied_sciences_eng_tech/article/view/3312

Modeling and indoor performance analysis of a transparent multilayer solar cell.

MEHEDI HASAN et el.

The work that has been presented here aims to simulate a multijunction transparent solar cell and analyze its performance in terms of simulated short-circuit current density, open circuit voltage, efficiency, and fill factor. The model structure is created by COMSOL Multiphysics and consists of five layers of InAs/InSb/AlGaAs/GaN/Si, taking into account the source materials' properties. Its electromagnetic wave is used to report on the optical and electrical properties. It is assumed that the cell is working at room temperature (300K). A maximum conversion of 15.2655% would be achieved for this model's simulation exposures at fill factor (FF)=0.6531 from the I-V curve and for such a combination and transparency

https://ajse.aiub.edu/index.php/ajse/article/view/580

Assessing the Performance of a Hybrid Geolocation Algorithm Integrating FP and TOA Techniques Across Diverse Environmental Conditions

DR. MD. HUMAYUN KABIR et el.

This paper presents a validation study of indoor geolocation accuracies using a hybrid approach that combines fingerprinting (FP) and time of arrival (TOA) techniques. The investigation focuses on three dense environments, examining the influence of furniture density and multipath components on geolocation accuracy, particularly in non-line-of-sight (NLOS) scenarios. The results indicate that geolocation performance improves in denser environments with higher furniture density due to increased multipath components. Additionally, optimizing the hybrid method with a polygon size of 50 cm and sampling rate of 80 GHz leads to further accuracy enhancements. These findings underscore the significance of furniture density and demonstrate the effectiveness of the hybrid method in addressing NLOS challenges. The research contributes to the advancement of indoor geolocation techniques and provides valuable insights for designing precise indoor positioning systems across various applications.

https://propulsiontechjournal.com/index.php/journal/article/view/1208

Phishing Attack Detecting System Using DNS and IP Filtering

DR. MOHAMMAD MAHMUDUL HASAN et el.

This study examines the different types of phishing attacks, which are a major threat to digital security. Phishing involves the use of fraudulent messages to deceive recipients, including email spoofing, spear phishing, phone phishing, clone phishing, pharming, HTTP phishing, man-in-the-middle attacks, and fast-flux phishing. Attackers can gather information about their targets from public sources such as social media networks, including work history, interests, and activities. The study developed a filtered website that detects fraudulent links based on the internet protocol (IP), register date, and domain name server (DNS) of each website. While further research is needed to improve the effectiveness of the site, this marks an important step towards enhancing digital security.

https://ojs.trp.org.in/index.php/ajcst/home

Predicting Stock Price from Historical Data using LSTM Technique

DR. MOHAMMAD MAHMUDUL HASAN et el.

The accurate prediction of stock prices in the financial domain has always been a challenging task. While the Efficient Market Hypothesis declared that it is impossible to predict stock prices accurately, research has shown that stock price changes may be predicted with some degree of certainty with predictive models if appropriate and suitable variables are chosen. This work presents a robust and accurate model using statistical and Long Short-Term Memory (LSTM) techniques. Daily stock price data of a particular company was collected from the Yahoo Finance database which served as the primary source for the analysis. The Long Short-Term Memory (LSTM) technique was mainly used to

forecast the stock market closing price on a particular day. The accuracy of this model was evaluated through multiple matrices which included Mean Squared Error (MSE), Root Mean Squared Error (RMSE), Mean Absolute Error (MAE), R-squared, and Directional Accuracy. This provided a clear and comprehensive assessment of the accuracy and performance. This study not only predicted the stock price using the proposed LSMA model but also analysed its accuracy by comparing it with popular conventional methods such as Simple Moving Average (SMA) and Exponential Moving Average (EMA) providing insights into the effectiveness of the LSMA model.

https://dergipark.org.tr/en/pub/jaida/issue/78404/1286071#article_cite

Mapping Gaps Between Academic Resources and Industrial Works in Software Testing

DR. MOHAMMAD MAHMUDUL HASAN et el.

In the industry, software testing is a significant and expensive software engineering process. Numerous studies reveal that many practitioners in the industry continue to cite difficulties with their software testing tasks despite various efforts given by the research community over the past few decades. There has been very little industry-academic cooperation. The goal of this research is to bring the community's attention to the critical problem of software testing's mapping the gap between academic resources and industrial concerns. This work was carried out through an interview process with industrial practitioners to clarify and precisely identify what the industry expects from the academia research in relation to the software testing knowledge, skills, and practices. The study's findings showed that there are divergent academic and industry priority areas in relation to software quality and testing.

http://hbrppublication.com/OJS/index.php/JASET/article/view/3704

FACTORS AFFECTING SUSTAINABLE E-COMMERCE ADOPTION: EMPIRICAL EVIDENCE FROM BANGLADESHI SMES

MD. MEHZABUL HOQUE NAHID et el.

This paper aims to examine the technology-organization-environment (TOE) predictors of Sustainable Ecommerce technology adoption in SMEs of Bangladesh. The study developed a conceptual framework based on the integration of technology-organization-environment (TOE) framework. 156 quantitative survey data were collected from engaging employees from different SMEs from different parts of Bangladesh. SPSS was used in descriptive statistics, Correlation, regression and structural equation modeling approach to test and analyze the data. This study found that Perceived Relative Advantage, Compatibility, Management Support, Resource Commitment, Regulatory Forces, Competitive Forces and Economic Performance in SMEs had a positive influence on the adoption of e-commerce technologies such as responsive website, e-CRM modules, e-payment, mobile app etc. All seven hypothesized relationships were supported be the study. In the context of an emerging economy, the results can be useful for practitioners and decision-makers

because they will help them justify their adoption decisions and effectively contribute to strategies for sustainability.

https://csmj.com.my/csmj-01-2023-32-36/

Predicting Adoption Intention of Artificial Intelligence A Study on ChatGPT

MD. MEHZABUL HOQUE NAHID et el.

This study focuses on predicting the adoption intention of ChatGPT among Professionals in Bangladesh. ChatGPT, powered by natural language processing and artificial intelligence, has the potential to revolutionize communication and enhance productivity in professional settings. The Unified Theory of Acceptance and Use of Technology (UTAUT) is used as a theoretical framework to examine the variables that affect the adoption intention of ChatGPT. The study aims to understand the impact of attitude towards AI, performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, trust, behavioral intention to use, and actual use of ChatGPT among Professionals in Bangladesh. The research questions explore the relationships between these variables. The objectives of the study are to examine the relationship between attitude towards AI and behavioral intention to use ChatGPT, investigate the impact of performance expectancy and effort expectancy on behavioral intention to use, explore the effect of social influence and facilitating conditions on behavioral intention to use, assess the relationship between hedonic motivation and behavioral intention to use, investigate the influence of trust on behavioral intention to use, and analyze the relationship between behavioral intention to use and actual use of ChatGPT. The findings provide valuable insights into the factors influencing the adoption intention and actual use of ChatGPT. The study highlights the significance of strengthening behavioral intentions, emphasizing performance benefits and building trust, and creating facilitating conditions to promote adoption and utilization. The research contributes to the understanding of factors influencing the adoption and usage behavior of ChatGPT and offers practical implications for organizations and policymakers to maximize the benefits of artificial intelligence applications in the context of Bangladeshi Professionals.

https://ajse.aiub.edu/index.php/ajse/article/view/797

Adoption of AI-Powered Web-Based English Writing Assistance Software: An Exploratory Study

MD. MEHZABUL HOQUE NAHID et el.

Purpose of the Study: This research paper examines the usage of web based digital writing assistant software amongst the undergraduate students of private universities in Bangladesh. To examine the effects of different factors in students' adoption and usage of digital writing assistant software, this study applied Unified Theory of Acceptance and Use Technology (UTAUT) model.

Methodology: The study used UTAUT model containing 8 latent variables (self-efficacy, performance expectancy, effort expectancy, social influence, facilitating condition, satisfaction, hedonic motivation, price value, adoption intention, and adoption behavior) and a total of 25 items in those variables. Through online questionnaire distribution, this study has collected and analysed 559 data. The research employed deductive approach and structural equation modelling (SEM) method for data analysis.

Findings: The results shows that the factors that impact on students' behavior intention to use of digital writing assistant are performance expectancy, price value, hedonic motivation, effort expectancy, and facilitating condition, where as social influence and facilitating conditions does not have significant influence on behavioural intention. This study also found the significant impact of facilitating conditions and behavior intention on actual use of the software.

Implication: This study will help to understand students' usage of such software and how academic institutions would be able to incorporate such services for students and academicians. Developers of such software can also identify the necessary features and incorporate them for convenient usages by the students. Authority and faculty members of different institution can identify the factors that enable them to incorporate such technology in the academics that would benefit both the teachers and students.

Limitation and Future Direction: This study has several limitations such as time constrains, financial factors, responses of respondents, etc. Some moderating variable such as gender, field of study, etc can be considered assessing the behavioral intention and actual usages of the software. Future research may also conduct to assess a comparative scenario between public and private universities in Bangladesh.

https://ajbe.aiub.edu/index.php/ajbe/article/view/194

Towards a Novel Identity Check Using Latest W3C standards & Hybrid Blockchain for Paperless Verification

MD. AL-AMIN et el.

With the advent of W3C standards such as DID, VCs, and DPKI beyond 2020, the industry has reached a new level where a technological infrastructure overhaul is possible. By employing blockchain and other Decentralized Ledger Technologies, it is believed that we can eliminate the requirement for paper-based verification. Researchers are aware of the technological components we possess at present and are trying to bring forth their sets of POCs. Additionally, governments ranging from developing to developed countries are taking industrial initiatives that incorporate these technologies. This research also evaluates the latest events and cases to find the need for paperless verification. Previous development conducted in the domains of Information Systems and Public forensics has presented us with various issues at both infrastructural and user levels. It also introduced us to the presence of lots of gaps present that can be improved with a more improvised form of decentralized paperless solution. Researchers have pointed out that the modern day identity

check and forensic solutions will face difficulties with blockchain compatibility, since most of those previous components will require built-in integration with a decentralized environment. As the latest researches suggest the key to this integration is now possible with the proper application of the W3C standards. In this paper, we propose an architecture that interlinks the latest decentralized W3C standards with a permissioned blockchain for implementing paperless verification and identity check.

Green synthesis of silver nanoparticles by using Allium sativum extract and evaluation of their electrical activities in bio-electrochemical cell

BITHI PAUL et el.

An electrical application of green synthesized silver nanoparticles (Ag NPs) by developing a unique bio-electrochemical cell (BEC) has been addressed in the report. Here, garlic extract (GE) has been used as a reducing agent to synthesize Ag NPs, and as a bio-electrolyte solution of BEC. Ag NPs successfully formed into face-centered cubic structures with average crystallite and particle sizes of 8.49 nm and 20.85 nm, respectively, according to characterization techniques such as the UV–vis spectrophotometer, XRD, FTIR, and FESEM. A broad absorption peak at 410 nm in the UV–visible spectra indicated that GE played a vital role as a reducing agent in the transformation of Ag+ ions to Ag NPs. After that four types of BEC were developed by varying the concentration of GE, $CuSO_4$. $5H_2O$, and Ag NPs electrolyte solution. The open circuit voltage and short circuit current of all cells were examined with the time duration. Moreover, different external loads (1 Ω, 2 Ω, 5 Ω, and 6 Ω) were used to investigate the load voltage and load current of BEC. The results demonstrated that the use of Ag NPs on BEC played a significant role in increasing the electrical performance of BEC. The use of GE-mediated Ag NPs integrated the power, capacity, voltage efficiency, and energy efficiency of BEC by decreasing the internal resistance and voltage regulation. These noteworthy results can take a frontier forward to the development of nanotechnology for renewable and low-cost power production applications.

https://iopscience.iop.org/article/10.1088/1361-6528/ad10e4/meta

ConvoWaste: An Automatic Waste Segregation Machine Using Deep Learning

DR. MD. ABDULLAH - AL - JUBAIR et el.

Nowadays, proper urban waste management is one the biggest concerns for maintaining a green and clean environment. An automatic waste segregation system can be a viable solution to improve the sustainability of the country and to boost up the circular economy. This paper proposes a machine to segregate the waste into the different parts with the help of smart object detection algorithm using ConvoWaste in the field of Deep Convolutional Neural Network (DCNN), and image processing technique. In this paper, the deep learning and image processing techniques are applied to classify the waste precisely and the detected waste is placed inside the corresponding bins with the help of

a servo motor-based system. This machine has the provision to notify the responsible authority regarding the waste level of the bins and the time to trash out the bins filled with garbage by using the ultrasonic sensors placed in each bin and the dual-band GSM-based communication technology. The entire system is controlled remotely through an android app in order to dump the separated waste in a desired place by its automation properties. The use of this system can aid the process of recycling resources that were initially destined to become waste, utilizing natural resources and turning these resources back into the usable products. Thus, the system helps to fulfill the criteria of circular economy through the resource optimization and extraction. Finally, the system is made to provide the services at a low cost with higher accuracy level in terms of the technological advancement in the field of Artificial Intelligence (AI). We have got 98% accuracy for our ConvoWaste deep learning model.

Prediction of Cryptocurrency Price using Machine Learning Techniques and Public Sentiment Analysis

DR. MD. ABDULLAH - AL - JUBAIR et el.

Bitcoin and other cryptocurrencies are emerging markets that are growing more and more important in the financial world. Since the definition of money has changed and its price has fluctuated, cryptocurrencies like Bitcoin and others have grown in popularity. In this study, we suggest the use of machine learning technologies and readily accessible social media data for forecasting the price movement of the Bitcoin market. We used sentiment analysis and machine learning techniques to extract tweets from Twitter postings to examine the relationship between bitcoin price changes and tweet sentiment. We used a variety of machine learning methods to create a prediction model and insightful analysis of future market values. We use five distinct machine learning models, including Support Vector Regression (SVR), Prophet, An Autoregressive Integrated Moving Average (ARIMA), Long Short-Term Memory (LSTM), and XGBoost. Every model was tested on the last 30% of the data after training on the first 70%. The models' Root Mean Square Errors (RMSE) are compared. The expansion of the collection of significant characteristics retrieved from textual data using sentiment analysis employing long short-term memory is another way that this work adds to the body of knowledge on directed bitcoin price returns forecast (LSTM). The findings demonstrate that cryptocurrency markets may be predicted using machine learning and sentiment analysis, however other coins may be predicted using only Twitter data. The most impressive outcome from the LSTM model.

An Approach to User-Friendly GUI Model Using HCI Principles on University Websites

DR. MD. ABDULLAH - AL - JUBAIR et el.

I. Introduction

Human-computer interaction (HCI) refers to the interactions that occur between humans and computers through an interface. The main concern of HCI is to make computers more human-friendly through interactions between humans and computers through an interface. The main concern of HCI is to make computers more human-friendly [1], [2]. On the other hand, a graphical user interface (GUI) is a platform for users to interact with electronic devices via visual indicators. Users of computers and other electronic devices can naturally handle graphical user interfaces by directly manipulating graphical icons like buttons, scroll bars, windows, tabs, menus, cursors, and the mouse pointing device. GUIs allow users to engage visually with electrical equipment. Users of computers and electronic devices are capable of manipulating graphical icons such as buttons, scroll bars, windows, tabs, menus, cursors, and the mouse. In current GUIs, voice commands and touchscreens are present. Academic communities today require university websites. It may be indicative of a university's success if its website is well-received. Research indicates that students begin their university search online. Make a favourable impression on prospective students who visit the university website. The website of the university influences its reputation and admissions. This study aims to improve the usability of university websites by designing an easy-to-use, student-friendly approach. We followed HCI principles to improve the user experience. This study will concentrate on user issues on university websites. We began by examining university websites for problems. A new model was created to address problems.

A Comparative Study of Fixing One Barrier-Varying Another Barrier for a ResonantTunneling Diode

TAHSEEN ASMA MEEM et el.

In this research paper, effects of fixing one barrier and varying another barrier have been analyzed and compared for a GaAs/Al0.3Ga0.7As based double barrier resonant tunnelling diode for two different models - Hartree Quantum Charge model and semi-classical Thomas Fermi model. VI characteristic graphs are studied to assess the overall performance of both models. The simulations are carried out in a nanoelectronics modelling tool suite – Nano electronic Modelling 5 (NEMO5) considering Non-Equilibrium Green's Function (NEGF), at room temperature of 300K and biased voltage of 0 to 0.5 V. In this paper, it was demonstrated that a very larger amount of current is supplied by both models when the first barrier is varied and second barrier is fixed in comparison to the first barrier when kept fixed and second barrier is varied. But as quantum charge inside the quantum well is existed in the Hartree model, so overall Hartree model supplied a greater amount of current compared to the Thomas Fermi model. Quantum charge inside its quantum well is not present in the Thomas Fermi model. But a better NDR region is created by the Thomas Fermi model in both varied

first barrier-fixed second barrier and fixed first barrier-varied second barrier cases compared to the Hartree model. This NDR region can be used for numerous digital applications. On the other hand, a vast range of analog applications can be used by the Hartree model that produced larger current per unit voltage.

Detection of Traffic Rule Violations Using Machine Learning: An Analytical Review

TANVIR AHMED et el.

This research paper focuses on current and previous efforts to detect traffic rule violations. So far, some remarkable works have been discovered, and many approaches for detecting traffic rule violations have been introduced from the current situation. Hence, machine learning has been the main target to detect traffic rule violations. A summary of the frameworks and methods that have been used to solve this problem so far is also provided in this study. This study has been divided into two parts. In the first part, the recent works on traffic rule violations have been portrayed. Moreover, the algorithms and frameworks that have been used so far and major works on violation detection using machine learning can be found in this section. In the second part, this study summarizes a brief discussion based on the image quality, camera resolution, device performance, and accuracy level of the works, as well as the algorithms and frameworks that have been used to conduct the detection of traffic rule violation problems using machine learning.

https://mjsat.com.my/index.php/mjsat/article/view/146

Find out the innovative techniques of data sharing using cryptography by systematic literature review

TANVIR AHMED et el.

Secure data sharing is crucial for protecting sensitive information, and the use of cryptographic protocols, such as the Secure Shell (SSH) protocol, provides an efficient way to achieve this. Found a novel proposed authentication system that combines cryptography and machine learning techniques to ensure secure data sharing within a federated cloud services environment. Their approach involves mutual authentication to establish trust between cooperating entities, threat detection using machine learning algorithms, and cryptography-based key agreement for secure data exchange. They evaluated different classifiers and found that LR, KNN, and DT achieved higher accuracy in malware prediction. Founded another approach where a data-sharing scheme for cloud storage that emphasizes security and efficiency. They introduced a secure cloud storage model utilizing a semi-trusted third party (STTP) for user management, key management, and data processing. By combining a hybrid encryption scheme with a re-encryption protocol, they ensured data confidentiality, unforgeability, and user-centricity. These studies highlight the importance of cryptography in secure data sharing and propose innovative techniques to enhance security and efficiency in data sharing.

https://www.turcomat.org/index.php/turkbilmat/article/view/13953

Influence of Sm and Fe Co-doping on Structural and Electrical Features of Yttrium Chromite Nanoparticles

DR. SHOVAN KUMAR KUNDU et el.

Structural and electrical properties of perovskite-type Y1-xSmxCryFe1-yO3 nanoparticles synthesized by the sol–gel technique have been investigated. The X-ray diffraction pattern suggests that a pure phase was obtained for all the samples. The co-doped YCrO3 samples are highly crystalline, with an average crystallite size that varies between 31 and 35 nm. The details of the crystal structure of Sm-Fe co-doped nanoparticles were investigated by Rietveld refinement using Fullprof software. The electrical transport properties of YCrO3 and doped YCrO3 samples were investigated in the temperature range 303 K to 523 K, which shows that due to doping, the dc resistivity of the co-doped YCrO3 samples increases. The effect of doping on dc and ac activation energies was estimated. Temperature dependence of the power factor suggests that ac conductivity below 425 ± 5 K (region I) can be explained by CBH (correlated barrier hopping) model, and above 425 ± 5 K (region II), NSPT (non-overlapping small polaron tunneling) model is suitable. Around 450 K, a broad peak observed in the dielectric constant vs. temperature curve indicates the relaxor ferroelectric behavior in the co-doped YCrO3 nanoparticles. The asymmetric nature of the electric modulus spectra was explained by the modified KWW function.

https://link.springer.com/article/10.1007/s13538-023-01279-9

Measurement of oxygen concentration in atmospheric air using ultrasound time of flight with humidity compensation

DR. MAHJABIN TASKIN et el.

An absolute gas concentration can be measured from the variation in the speed of sound between two gases in principle. Owing to the small difference in the speed of sound between the atmospheric air and oxygen (O2) gas, measuring O2 concentration with high accuracy in the humid atmospheric air using ultrasound needs careful investigation. The authors show successfully a method to measure the absolute concentration of O2 gas in humid atmospheric air using ultrasound. It was possible to measure O2 concentration in the atmospheric air with accuracy by compensating for the influence of temperature and humidity by calculation. The O2 concentration was calculated from the conventional speed of sound equation by utilizing small mass variation for the change in moisture as well as temperature. This method using ultrasound enabled us to measure the O2 concentration in the atmospheric air as 21.0%, which is in agreement with the standard atmospheric dry air. The measurement error values after the humidity compensation are about 0.4% or less. Furthermore, this method takes only about a few ms for measuring O2 concentration and, thus, can be used as a high-speed portable O2 sensor for industrial, environmental, and biomedical instruments.

A Comparative Study of Fixing One Barrier Varying Another Barrier for a Resonant Tunneling Diode

MAHFUJUR RAHMAN et el.

In this research paper, effects of fixing one barrier and varying another barrier have been analyzed and compared for a GaAs/Al0.3Ga0.7As based double barrier resonant tunnelling diode for two different models - Hartree Quantum Charge model and semi-classical Thomas Fermi model. VI characteristic graphs are studied to assess the overall performance of both models. The simulations are carried out in a nanoelectronics modelling tool suite – Nano electronic Modelling 5 (NEMO5) considering Non-Equilibrium Green's Function (NEGF), at room temperature of 300K and biased voltage of 0 to 0.5 V. In this paper, it was demonstrated that a very larger amount of current is supplied by both models when the first barrier is varied and second barrier is fixed in comparison to the first barrier when kept fixed and second barrier is varied. But as quantum charge inside the quantum well is existed in the Hartree model, so overall Hartree model supplied a greater amount of current compared to the Thomas Fermi model. Quantum charge inside its quantum well is not present in the Thomas Fermi model. But a better NDR region is created by the Thomas Fermi model in both varied first barrier-fixed second barrier and fixed first barrier-varied second barrier cases compared to the Hartree model. This NDR region can be used for numerous digital applications. On the other hand, a vast range of analog applications can be used by the Hartree model that produced larger current per unit voltage.

Building a Fortress Against Fake News Harnessing the Power of Subfields in Artificial Intelligence

DR. MD. ASRAF ALI et el.

Given the prevalence of fake news in today's tech-driven era, an urgent need exists for an automated mechanism to effectively curb its dissemination. This research aims to demonstrate the impacts of fake news through a literature review and establish a reliable system for identifying it using machine (ML) learning classifiers. By combining CNN, RNN, and ANN models, a novel model is proposed to detect fake news with 94.5% accuracy. Prior studies have successfully employed ML algorithms to identify false information by analysing textual and visual features in standard datasets. The comprehensive literature review emphasises the consequences of fake news on individuals, economies, societies, politics, and free expression. The proposed hybrid model, trained on extensive data and evaluated using accuracy, precision and recall measures, outperforms existing models. This study underscores the importance of developing automated systems to counter the spread of fake news and calls for further research in this domain.

Employee Promotion Prediction Using Improved AdaBoost Machine Learning Approach

DR. KAMRUDDIN MD. NUR et el.

Employee promotion is an important aspect of the human resource management process. Due to different factors, it refers to the automatic improvement among the employees in an organization. Promoting employees from the lower level to the higher level brings a feeling of satisfaction among the employees. It improves their job satisfaction and motivation by providing more significant income, status, and responsibilities. By building up loyalty, promotion reduces employee attrition. Thus, it is difficult to accurately decide, whether an employee should or should not be promoted based on their current and past performance. So, human resource management does research about promotion, because there are a limited number of research about the finding of employee promotion prediction in the existing studies. First, to find the reasons for employee promotion, we need to analyze the research study for finding the factors which are related to the promotion. The aim of this research study is to implement an employee promotion prediction framework using machine learning. A modified AdaBoost classifier is used for automatic promotion prediction, and six machine learning techniques for instance, Support Vector Machine (SVM), Logistic Regression (LR), Artificial Neural Network (ANN), Random Forest (RF), XGBoost (XGB), and AdaBoost are applied in performance comparison. Through a complex assessment process, the performance of these supervised machine learning algorithms for predicting employee advancement is analyzed using assessment metrics on the employees' evaluation dataset for promotion prediction. The Artificial Neural Network (ANN) and AdaBoost model provide better results on this dataset than all traditional machine learning techniques. Finally, Our proposed modified AdaBoost approach outperformed all other methods evaluated with an accuracy of 95.30%.

https://ajse.aiub.edu/index.php/ajse/article/view/781

Hybrid Scrum-XP: A Proposed Model based on Effectiveness of Agile Model on Varieties of Software Companies in Bangladesh

MD. MAZID-UL-HAQUE et el.

The Agile Methodology is a term which refers to a method of software development that is incremental and iterative in nature and is used to manage and incorporate constantly changing needs. This entails decomposing the entire development process cycle into a series of tasks. The process is further divided into a number of sub-tasks, each function is independently. The Agile Development technique, which is a popular and growth-oriented strategy, provides not only speedy project delivery, but also software responsiveness, which leads to total corporate growth and agility. The organization's project management capabilities and performance are improved through the adoption of Agile practices. In their business, the companies employ Agile methods. As a result, the goal of this study is to see how effective agile approaches arein Bangladeshi software organizations. A survey of established software companies in Bangladesh is being conducted to accomplish the objective. The Scrum and XP agile technique is the most widely used according to the findings. It is proposed that Scrum and the XP model be combined to achieve maximum effectiveness and overcome their respective limits.

https://ajse.aiub.edu/index.php/ajse/article/view/353

A comprehensive dataset for aspect-based sentiment analysis in evaluating teacher performance

MD. MAZID-UL-HAQUE et el.

Teacher performance evaluation is an essential task in the field of education. In recent years, aspect-based sentiment analysis (ABSA) has emerged as a promising technique for evaluating teaching performance by providing a more nuanced analysis of student evaluations. This article presents a novel approach for creating a large-scale dataset for ABSA of teacher performance evaluation. The dataset was constructed by collecting student feedback from American International University-Bangladesh and then labeled by undergraduate-level students into three sentiment classes: positive, negative, and neutral. The dataset was carefully cleaned and preprocessed to ensure data quality and consistency. The final dataset contains over 2,000,000 student feedback instances related to teacher performance, making it one of the largest datasets for ABSA of teacher performance evaluation. This dataset can be used to develop and evaluate ABSA models for teacher performance evaluation, ultimately leading to better feedback and improvement for educators. The results of this study demonstrate the usefulness and effectiveness of ABSA in evaluating teacher performance and highlight the importance of creating high-quality datasets for this task.

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Design Steps, Simulation, and Analysis of a 1-bit ALU in Cadence at 90 nm CMOS Node

DR. MUHIBUL HAQUE BHUYAN et el.

This paper presents the design and analysis of a 1-bit Arithmetic Logic Unit (ALU) with and without a full adder circuit. The objective of the study is to compare the outputs of the two designs considering the performance factors of delay, power, and surface area. The designs were implemented using Cadence Virtuoso and simulated using a 90 nm CMOS process technology. As such, the circuit is built from two paired MOS transistors (i.e., using both N- and P-type MOSs in the pull-down and pull-up circuits, respectively) having a 90 nm gate length. The gate widths are selected as 1 and 2 ⍰m, respectively. Transistors are nominated from the general design CMOS process kit at 90 nm technology node, i.e., gpdk090 library of the Cadence. DC, transient, and noise analyses were performed with a 3.8 V DC power supply to characterize the behavior of the circuits. The results indicate that the ALU without the full adder has lower delay and power consumption but a larger area, while the ALU with the full adder has higher delay and power consumption but a smaller area. The findings of this study can provide insights for designers to choose the appropriate ALU design based on their specific requirements and provide a confidence boost before going into the fabrication steps.

https://www.iosrjournals.org/iosr-jvlsi/papers/vol13-issue6/A1306010114.pdf

Enhancing DDOS Attack Detection Using Machine Learning: A Framework with Feature selection and Comparative Analysis of Algorithms

SYMA KAMAL CHAITY et el.

Distributed Denial of Service (DDoS) attacks are an ever-present threat to network security and can make online services hard for users to access. Conventional detection methods often struggle to effectively counter new and sophisticated DDoS attacks. This research article aims to assess the effectiveness of several machine learning methods in detecting distributed denial-of-service (DDoS) attacks. The evaluation is conducted using the DDOS attack SDN dataset, which is sourced from Google's research dataset.Various algorithms, including Random Forest, Decision Tree, Naive Bayes, and Support Vector Machine (SVM), are used for the purpose of analyzing network traffic data and detecting abnormal patterns that may indicate DDoS attacks.Results indicate that the Random Forest algorithm achieves the highest accuracy rate of 99.4% in detecting DDoS attacks. Additionally, the Decision Tree and SVM algorithms perform admirably, achieving accuracy rates of 98.8% and 98.4%, respectively. This research underscores the potential of machine learning algorithms in detecting and mitigating DDoS attacks. It emphasizes the necessity of employing advanced techniques for robust cyber threat defense and offers valuable insights into the performance of different machine learning algorithms in the context of DDoS attack detection.

CNN Based Covid-19 Detection from Image Processing

DR. MOHAMMAD RABIUL ISLAM et el.

Covid-19 is a respirational condition that looks much like pneumonia. It is highly contagious and has many variants with different symptoms. Covid-19 poses the challenge of discovering new testing and detection methods in biomedical science. X-ray images and CT scans provide high-quality and information-rich images. These images can be processed with a convolutional neural network (CNN) to detect diseases such as Covid-19 in the pulmonary system with high accuracy. Deep learning applied to X-ray images can help to develop methods to identify Covid-19 infection. Based on the research problem, this study defined the outcome as reducing the energy costs and expenses of detecting Covid-19 in X-ray images. Analysis of the results was done by comparing a CNN model with a DenseNet model, where the first achieved more accurate performance than the second.

https://www.researchgate.net/profile/Mohammad-Islam-319/publication/371187941_CNN_Based_Covid-19_Detection_from_Image_Processing/links/648367d8b3dfd73b7770009b/CNN-Based-Covid-19-Detection-from-Image-Processing.pdf?_sg%5B0%5D=started_experiment_milestone&

Real-Time Obstacle Detection with YOLOv8 in a WSN Using UAV Aerial Photography

SHAKILA RAHMAN et el.

Nowadays, wireless sensor networks (WSNs) have a significant and long-lasting impact on numerous fields that affect all facets of our lives, including governmental, civil, and military applications. WSNs contain sensor nodes linked together via wireless communication links that need to relay data instantly or subsequently. In this paper, we focus on unmanned aerial vehicle (UAV)-aided data collection in wireless sensor networks (WSNs), where multiple UAVs collect data from a group of sensors. The UAVs may face some static or moving obstacles (e.g., buildings, trees, static or moving vehicles) in their traveling path while collecting the data. In the proposed system, the UAV starts and ends the data collection tour at the base station, and, while collecting data, it captures images and videos using the UAV aerial camera. After processing the captured aerial images and videos, UAVs are trained using a YOLOv8-based model to detect obstacles in their traveling path. The detection results show that the proposed YOLOv8 model performs better than other baseline algorithms in different scenarios—the F1 score of YOLOv8 is 96% in 200 epochs.

https://www.mdpi.com/2313-433X/9/10/216

Enhancement of dielectric properties and conduction mechanism in BaTi0.85Sn0.15O3 for energy storage application

ANGKITA MISTRY TAMA et el.

To achieve cost effective materials with improved dielectric properties, $BaTiO_3$ and $BaTi_{0.85}Sn_{0.15}O_3$ have been prepared by solid state reaction technique introducing a two step sintering method. The structure of the samples has been investigated by X-Ray diffraction (XRD) and Raman spectra at room temperature (RT ~ 300 K). In addition, crystallographic microstructures and grain morphology have been evaluated by transmission electron microscopy (TEM) and scanning electron microscopy (SEM) respectively. Apart this, the band structure along with density of states (DOS) are evaluated using first principle calculations for $BaTiO_3$ and $BaTi_{0.85}Sn_{0.15}O_3$. The band structure depicts bandgap of 1.80 eV and 1.82 eV for $BaTiO_3$ and $BaTi_{0.85}Sn_{0.15}O_3$ respectively. The DOS calculation displays the increase in hybridization of Ba^{2+} (A site) and Ti^{4+} (B site) cations with oxygen octahedra resulting in off-center displacement of cations in Sn doped $BaTiO_3$ sample. A disordered cubic phase is obtained in $BaTi_{0.85}Sn_{0.15}O_3$ sample sintered at 1350 °C resulting in the highest dielectric constant ε_r' with a minimum loss $\tan\delta$. The conduction mechanism has been analyzed from the temperature and frequency dependence of resistivity ρ. The overall forecasts indicate $BaTi_{0.85}Sn_{0.15}O_3$ annealed at 1350 °C to be a potential candidate for energy storage capacitive devices in the electronic industry.

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Improved magnetic and dielectric quality factors with low losses in rare earth (Eu) substituted Co-Ni-Zn ferrites for high frequency devices

DR. MD. SAROWAR HOSSAIN et el.

Co0.2Ni0.5Zn0.3EuxFe2-xO4 (CNZEFO) composites were synthesized by the conventional double sintering technique, where x = 0.00, 0.02, 0.04, and 0.08. Rietveld refined x-ray diffraction indicates the spinel cubic structure (Fd-3 m space group) of the samples. The refined XRD pattern also mentioned the Fe2O3 secondary peak for x = 0.04 and 0.08 samples. The structural lattice constant was initially increased, but after that it decreased with the Eu concentration. The bulk density of the samples was always lower than the x-ray density, where the densities were increased with the enhancement of Eu concentration. FTIR analysis confirmed the metal–oxygen bonds in ferrite with spinel cubic structure. FESEM micrographs provide the average grain size of the samples, which varies between 105.1 nm and 169.9 nm. EDX analysis was used to carry out the compositional verification and confirm that the elements were present in the required ratios. Magnetic hysteresis loop measurements were studied at room temperature, where the magnetization demonstrates the decline with the substitution of Eu ions. The addition of Eu concentration also changed other fundamental properties of the ferrites, such as coercivity (Hc), retentivity (Mr), anisotropy constant (K), and magnetic moment (nB). The permeability measurements show that the real permeability of the samples was decreasing at lower frequency region further they became high at higher frequency region. The magnetic loss tangent (tanδM) and dielectric loss tangent (tanδD) were reduced with the addition of Eu concentration, where the Eu doped samples show higher dielectric and magnetic quality factor than the pure sample. The enhancement of resistivity and impedance were also noticed for the addition of Eu content in Co0.3Ni0.2Zn0.5Fe2O4 sample. These europium doped cobalt–nickel-zinc ferrites may be strong candidates for potential high frequency applications.

Structure based photocatalytic efficiency and optical properties of ZnO nanoparticles modified by annealing including Williamson-Hall microstructural investigation

DR. MD. SAROWAR HOSSAIN et el.

Structural deficiency in annealed ZnO nanoparticles would be a critical concern for the optical properties and photocatalysis efficiency of ZnO. Therefore, the structure and microstructure of synthesized ZnO nanoparticles annealed at 500 °C, 700 °C, and 900 °C for 4 h have been analyzed by X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM), and UV–visible Diffuse Reflectance Spectroscopic (UV–Vis DRS) techniques. Williamson-Hall and modified Williamson-Hall models have explored microstructural properties. The bandgap in ZnO decreases from 3.18 eV to 3.11 eV for annealing, which coincides with the assessed optical band edge approximately and the accumulation of particles observed from SEM images. Moreover, the redox potential has been

calculated for annealed samples to perform the photocatalytic experiment. Additionally, the photocatalytic performance has been estimated from the degradation of UV irradiation through the studied samples. Finally, the sample ZnO annealed at 500 °C confirms maximum RhB degradation rate of 60.9% due to its lower particle size with a higher surface area. The ZnO-500 may be a potential photocatalyst material, including semiconducting properties.

Enhancement of dielectric properties and conduction mechanism in BaTi0.85Sn0.15O3 for energy storage application

DR. MD. SAROWAR HOSSAIN et el.

To achieve cost effective materials with improved dielectric properties, BaTiO3 and BaTi0.85Sn0.15O3 have been prepared by solid state reaction technique introducing a two step sintering method. The structure of the samples has been investigated by X-Ray diffraction (XRD) and Raman spectra at room temperature (RT ~ 300 K). In addition, crystallographic microstructures and grain morphology have been evaluated by transmission electron microscopy (TEM) and scanning electron microscopy (SEM) respectively. Apart this, the band structure along with density of states (DOS) are evaluated using first principle calculations for BaTiO3 and BaTi0.85Sn0.15O3. The band structure depicts bandgap of 1.80 eV and 1.82 eV for BaTiO3 and BaTi0.85Sn0.15O3 respectively. The DOS calculation displays the increase in hybridization of Ba^{2+} (A site) and Ti^{4+} (B site) cations with oxygen octahedra resulting in off-center displacement of cations in Sn doped BaTiO3 sample. A disordered cubic phase is obtained in BaTi0.85Sn0.15O3 sample sintered at 1350 °C resulting in the highest dielectric constant $\varepsilon r'$ with a minimum loss $\tan\delta$. The conduction mechanism has been analyzed from the temperature and frequency dependence of resistivity ρ. The overall forecasts indicate BaTi0.85Sn0.15O3 annealed at 1350 °C to be a potential candidate for energy storage capacitive devices in the electronic industry.

https://www.sciencedirect.com/science/article/abs/pii/S2352152X23027330?via%3Dihub

Structure, microstructure and magneto-elastic property study on Co40Ni29Al31 ferromagnetic shapememory alloy ribbon

DR. MD. SAROWAR HOSSAIN et el.

Ferromagnetic shapememory Alloys having huge magnetic field and stress-induced strain are suitable materials for sensors and actuators. Ni2MnGa being the prototype of these materials and because of its brittleness alternative systems CoNiAl/Ga were recently developed. CoNiAl being a ductile material because of its two-phase microstructure and the large range of transformation temperatures. In this line, a ribbon with nominal composition Co40Ni29Al31 was prepared using melt-spun technique. The structure and microstructure of the sample was determined using XRD and SEM. The transformation temperatures were determined using four probe method using a cryocooler within the temperature range of 4 K to 350 K. The elastic and magneto-elastic properties

were studied using a Vibrating reed method within the temperature 80 K to 300 K. A constant magnetic field of 300 Oe is applied with a coil wound on the cryostat of the vibrating reed setup. As was expected the sample has two phases of microstructure, from the XRD data, a high amount of phase with a few amount of phase was found and it was also replicated in SEM photographs. The phase fractions were found by fitting the XRD data with Reitveld refinement. The transformation temperatures of the sample were obtained from the four probe resistivity measurements, and they are TMs = 133 K, TMf = 83 K, TAs = 130 K and TAf = 179 K. From the sound velocity and internal friction study without and with the magnetic field interesting results were found. The martensitic and inter martensitic transformations were suppressed with the application of magnetic field. It was clearly seen in the sound velocity change plots as a function of temperature and the same was replicated in the internal friction plots. Such studies through light on the magneto-elastic coupling-related issues and are quite useful for the application of these materials for the Micro Electro Mechanical Systems at different operating conditions.

https://www.sciencedirect.com/science/article/abs/pii/S2214785323028699?via%3Dihub

Natural convective non-Newtonian nanofluid flow in a wavy-shaped enclosure with a heated elliptic obstacle

DR. SALAIKA PARVIN et el.

A numerical investigation has been carried out in a wavy-shaped enclosure with an elliptical inner cylinder to find out the effect of an inclined magnetic field and a non-Newtonian nanofluid on fluid flow and heat transfer. Here, the dynamic viscosity and thermal conductivity of the nanofluid are also taken into account. These properties change with the temperature and nanoparticle volume fraction. The vertical walls of the enclosure are modeled through complex wavy geometries and are kept at a constant cold temperature. The inner elliptical cylinder is deemed to be heated and the horizontal walls are considered adiabatic. Temperature difference between the wavy walls and the hot cylinder leads to natural convective circulation flow inside the enclosure. The dimensionless set of the governing equations and associated boundary conditions are numerically simulated using the COMSOL Multiphysics software, which is based on finite element methods. Numerical analysis has been scrutinized for varying Rayleigh number (Ra), Hartmann number (Ha), magnetic field inclination angle (γ), rotation angle of the inner cylinder (ω), power-law index (n), and nanoparticle volume fraction (ϕ). The findings demonstrate that the solid volumetric concentration of nanoparticles diminishes the fluid movement at greater values of ϕ. The heat transfer rate decreases for larger nanoparticle volume fractions. The flow strength increases with an increasing Rayleigh number resulting in a best possible heat transfer. A higher Hartmann number diminishes the fluid flow but converse behavior is exhibited for magnetic field inclination angle (γ). The average Nusselt number (Nuavg) values are maximum for $\gamma = 90°$. The power-law index plays a significant role on the heat transfer rate, and results show that the shear-thinning liquid augments the average Nusselt number.

https://www.sciencedirect.com/science/article/pii/S2405844023037866?via%3Dihub

MultiResEdge: A deep learning-based edge detection approach

FAHMIDA KHANOM et el.

Edge detection is a fundamental technique in image processing and computer vision that plays a crucial role in various applications including object recognition, shape analysis, segmentation, feature extraction, image enhancement, image understanding, compression, and preprocessing. It involves identifying the boundaries or edges between different objects or regions which enables us to extract valuable visual information, analyze image structure, and facilitate subsequent computer vision tasks. In this study, we highlighted two primary issues that are faced in edge detection: edge connectivity and edge thickness. Choosing the right threshold for reliable edge detection has long been one of the most difficult problems in traditional edge detection techniques. To deal with these issues, the present research is motivated to execute a new deep learning-based edge detection model named MultiResEdge which is a tweaked variant of the original UNet framework. Instead of directly integrating encoder and decoder features, the suggested model makes use of a MutiRes block to modify spatial information from different scales, and a residual path with a set of convolutions to convey the features from the encoder to the decoder. To reduce the gap between the encoder and decoder features, we advocate using a combination of convolutional and skip connections. We also incorporated semantic edge information with semantic curves to improve the border. In addition, we have integrated a multi-step preprocessing technique that mitigates the false positives and false negatives and hence improves the accuracy, precision, recall, and F1 score. The extensive experiment is performed using images from two benchmark datasets to justify the predicted edge comparing it with the corresponding ground truth in terms of various objective metrics (such as entropy, MSE, PSNR, SSIM, and FSIM). Overall, our proposed edge detection model has obtained an accuracy of 99% along with an F1 score of 98% which is better than the related state-of-the-art methodologies.

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Miniaturized Micro Strip Patch Antenna to Achieve Wireless Power Transfer for ISM Applications

MD. ALOMGIR KABIR et el.

This article proposes a miniaturized defective ground structure (DGS)-based microstrip patch that is suitable for usage in a variety of applications, including those in the medical, scientific, and industrial fields. The dimension of a conventional patch antenna at 2.7 GHz on an FR4 substrate consists of 11.01×5.19×0.1575 cm3, where the proposed antenna geometry is set as 5.89×3.06×0.1575 cm3, reducing the overall circuit size by 68.9%. This miniaturized antenna will be easily implementable in wearable devices for healthcare applications. The dimension and shape of the DGS are optimized in such a way as to improve the return loss from -19 dB to -24 dB at the desired frequency. Finally, the transmission coefficient for a conventional and suggested DGS-based antenna has been examined while these antennas are placed in a near-field region.

http://hmjournals.com/journal/index.php/IJASM/article/view/2527

Assessing the Performance of a Hybrid Geolocation Algorithm Integrating FP and TOA Techniques across Diverse Environmental Conditions

MD. ALOMGIR KABIR et el.

This paper presents a validation study of indoor geolocation accuracies using a hybrid approach that combines fingerprinting (FP) and time of arrival (TOA) techniques. The investigation focuses on three dense environments, examining the influence of furniture density and multipath components on geolocation accuracy, particularly in non-line-of-sight (NLOS) scenarios. The results indicate that geolocation performance improves in denser environments with higher furniture density due to increased multipath components. Additionally, optimizing the hybrid method with a polygon size of 50 cm and sampling rate of 80 GHz leads to further accuracy enhancements. These findings underscore the significance of furniture density and demonstrate the effectiveness of the hybrid method in addressing NLOS challenges. The research contributes to the advancement of indoor geolocation techniques and provides valuable insights for designing precise indoor positioning systems across various applications.

http://dspace.aiub.edu:8080/jspui/handle/123456789/2073

Q-learning-based routing inspired by adaptive flocking control for collaborative unmanned aerial vehicle swarms

DR. MUHAMMAD MORSHED ALAM et el.

A collaborative unmanned aerial vehicle (UAV) swarm can support various applications, including aerial surveillance and emergency communication. Owing to the high mobility, limited energy of UAVs, and frequent link breakages, data routing from remote UAVs to a base station may produce retransmissions, loops, energy holes, and long delay. In a UAV swarm network, therefore, relative mobility, path stability, and delay should be jointly taken into consideration to improve routing performance because they are highly coupled with each other. However, they are not properly exploited in the existing literature. To address these issues, in this paper, a Q-learning (QL)-based routing protocol inspired by adaptive flocking control (QRIFC) is proposed. The proposed adaptive flocking control algorithm generates optimal mobility with fairness in travel distance for each UAV to control the optimal node density. It also addresses the trade-off between aerial coverage and quality of service in connectivity by imposing constraints on the minimum separation distance and maximum allowable inter-UAV spacing using two-hop neighbor information. Additionally, it provides a stable link duration (LD) between neighboring UAVs and optimizes the control overhead. Furthermore, QL performs multi-objective optimization by utilizing a new state exploration and exploitation strategy to select an optimal routing path in terms of delay, stable path selection defined by predictive LD, and energy consumption. According to an extensive performance study, the proposed QRIFC outperforms existing routing protocols by 21-40 percent of average end-to-end delay and 9-23 percent of average packet delivery ratio, with less retransmissions.

https://www.sciencedirect.com/science/article/abs/pii/S2214209623000025

Vision-Based Navigation Techniques for Unmanned Aerial Vehicles: Review and Challenges

DR. MUHAMMAD MORSHED ALAM et el.

In recent years, unmanned aerial vehicles (UAVs), commonly known as drones, have gained increasing interest in both academia and industries. The evolution of UAV technologies, such as artificial intelligence, component miniaturization, and computer vision, has decreased their cost and increased availability for diverse applications and services. Remarkably, the integration of computer vision with UAVs provides cutting-edge technology for visual navigation, localization, and obstacle avoidance, making them capable of autonomous operations. However, their limited capacity for autonomous navigation makes them unsuitable for global positioning system (GPS)-blind environments. Recently, vision-based approaches that use cheaper and more flexible visual sensors have shown considerable advantages in UAV navigation owing to the rapid development of computer vision. Visual localization and mapping, obstacle avoidance, and path planning are essential components of visual navigation. The goal of this study was to provide a comprehensive review of vision-based UAV navigation techniques. Existing techniques have been categorized and extensively reviewed with regard to their capabilities and characteristics. Then, they are qualitatively compared in terms of various aspects. We have also discussed open issues and research challenges in the design and implementation of vision-based navigation techniques for UAVs.

https://doi.org/10.3390/drones7020089

Drone Routing for Drone-Based Delivery Systems: A Review of Trajectory Planning, Charging, and Security

DR. MUHAMMAD MORSHED ALAM et el.

Recently, owing to the high mobility and low cost of drones, drone-based delivery systems have shown considerable potential for ensuring flexible and reliable parcel delivery. Several crucial design issues must be considered to design such systems, including route planning, payload weight consideration, distance measurement, and customer location. In this paper, we present a survey of emerging drone routing algorithms for drone-based delivery systems, emphasizing three major drone routing aspects: trajectory planning, charging, and security. We focus on practical design considerations to ensure efficient, flexible, and reliable parcel delivery. We first discuss the potential issues arising when designing such systems. Next, we present a novel taxonomy based on the above-mentioned three aspects. We extensively review each algorithm for drone routing in terms of key features and operational characteristics. Furthermore, we compare the algorithms in terms of their main idea, advantages, limitations, and performance aspects. Finally, we present open research challenges to motivate further research in this field. In particular, we focus on the major aspects that researchers and engineers need to consider in order to design effective and reliable drone routing algorithms for drone-based delivery systems.

https://doi.org/10.3390/s23031463

Impact of foreign ownership on firm performance: evidence from listed banks and NBFIs of Bangladesh

QUAZI NUR ALAM et el.

This study investigates the impact of foreign ownership structure and firm-specific factors on firm performance using data from 53 banks and NBFIs listed in DSE, Bangladesh. With the help of linear regression analysis, the relationship that has developed between firm performance (measured by Tobin's Q) and independent variables, firm-specific factors and foreign ownership are examined. From the analysis, it is found that foreign ownership has a positive impact on listed banks and NBFIs of Bangladesh. However, minor or major foreign ownership only significantly affects the firm performance. Total assets are positive, and the number of employees (a proxy for firm size) is negatively related to firm performance. The relationship of leverage level with firm performance is negative. A higher level of leverage in capital structure increases the firm's financial risks. Liquidity has a negative relationship with the firm performance of listed banks and NBFIs of Bangladesh.

Industrial Internet of Things enabled technologies, challenges, and future directions

AIMAN LAMEESA et el.

The Industrial Internet of Things (IIoT) is recognized as the fourth industrial revolution as it enhances productivity, dependability, and competitive performance by concentrating on profitability. IIoT-enabled technologies have been reviewed and implemented in several research, but more research into the opportunities and challenges they present is necessary. This paper explores IIoT-enabled technologies and infrastructure, their role in global industrial growth, applications, challenges, and future directions. IIoT applications use the intelligence of things to solve industrial problems like supply chain mismanagement, data privacy risks, a weak cloud strategy, cost containment, and others. For instance, fog computing reduces parking, platform, fuel, and CO_2 emissions. A blockchain-based security framework for the cement sector can resolve 51% of security issues and Sybil attacks caused by consensus algorithms like Proof of Work (PoW). Major companies' performance depends on well-designed IIoT infrastructure, despite significant challenges. Industrial technologies will improve as research and experimentation advance IIoT infrastructure.

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Solving maximum clique problem using chemical reaction optimization

MAHMUDUL HASAN et el.

The maximum clique problem (MCP) deals with a given arbitrary graph that finds the maximum clique in the graph. The target is to maximize the size of the clique which means maximizing the size of a complete subgraph. The MCP finds the largest complete subgraph or clique of a given graph. Several metaheuristic approaches were proposed to solve the problem as it is an NP-hard problem. To solve

the maximum clique problem we propose a metaheuristic algorithm named chemical reaction optimization (CRO). It is an algorithm that is usually used to solve optimization problems. Solving optimization problems the algorithm gives better results than any other related metaheuristics. It can search the solution space locally as well as globally over a large population with the help of its four reaction operators. We are proposing a method to solve MCP by tuning all the initial parameters and redesigning four reaction operators of CRO. An additional repair operator is also designed to find optimal solutions in less computational time. Three benchmark datasets are used to observe the efficiency of the proposed algorithm. We obtained better results with less average errors in comparison to the state of art methods for the three datasets. For most of the graphs, the algorithm gives the best-known results mentioned in the datasets. The results are shown with the repair operator for all the datasets to understand the improvement in results clearly.

https://link.springer.com/article/10.1007/s12597-023-00654-z

Two Proposed Models for Securing Data Management for Enterprise Resource Planning Systems Using Blockchain Technology

ANIK KUMAR SAHA et el.

An Enterprise Resource Planning (ERP) system is a software application that serves as a centralized platform to streamline and automate organizational functions and share real-time data, facilitating efficient communication and collaboration. It provides an all-inclusive approach to managing and optimizing business processes, boosting efficiency, fostering cooperation, and giving an overall picture of how the organization is operating. However, the traditional centralized databases in ERP systems pose security concerns. Blockchain Technology can be an appealing alternative as it comes with immutable and decentralized data as well as enhanced security. This study focuses on two methods of securing data management in ERP systems: Organizing the distributed information using The Ralph Kimball data model and optimizing an individual block using Database Sharding. This study does an extensive examination to determine the effectiveness of both suggested strategies, comprising a detailed evaluation that highlights the benefits and limitations of both techniques. This paper intends to patch the security holes in ERP systems to safeguard sensitive data and mitigate risks.

https://www.mecs-press.org/ijieeb/ijieeb-v15-n6/v15n6-2.html

The Impact of User Participation on the Success of Enterprise Resource Planning (ERP) Adoption in Bangladesh

MD. MEHZABUL HOQUE NAHID et el.

he successful adoption of Enterprise Resource Planning (ERP) systems is crucial for organizations to enhance operational efficiency and gain a competitive edge. User participation has been recognized as a key factor in determining the success of ERP implementation. This study aims to investigate the impact of user participation on ERP adoption success in the context of Bangladesh.

The specific objectives include assessing the relationship between user participation and work performance, understanding/proficiency, user-friendliness, and training/support. Additionally, the influence of organizational factors, such as organizational value, guidelines/procedures,and resource/support availability, on user participation is examined. The study also explores the impact of user participation on compatibility with existing organizational processes and alignment with strategic goals. The findings reveal that user participation significantly influences work performance, understanding/proficiency, user-friendliness, and training/support. Organizational factors and strategic alignment play important roles in facilitating user participation. The results emphasize the need tofoster user participation, provide adequate training and support, promote organizational values, and align strategic goals for successful ERP adoption in Bangladesh. These insights contribute to a better understanding of the factors that drive ERP implementation success and provide guidance for organizations in Bangladesh and similar contexts.

https://ojs.unikom.ac.id/index.php/injuratech/article/view/10292/3847

Design and Analysis of IoT-Based Battery Management and Monitoring System for Electric Vehicle

ABIR AHMED et el.

The growing popularity of electric vehicles on a worldwide scale leads to further research to monitor their performance. The use of Internet of Things (IoT) technology will make it easier to integrate the automated real-time monitoring system with the current electric vehicle technology. The great majority of electric vehicles use rechargeable lithium-ion batteries. Use of lithium-ion batteries creates an overcharging situation in the battery, which significantly decreases battery life. It also increases the possibility of disastrous safety risks due to fire. This paper develops an IoT-based battery management system to minimize hazardous situations. The battery monitoring system (BMS) notifies the user about the condition of the battery in real time.

https://ajse.aiub.edu/index.php/ajse/article/view/731

Detection of Traffic Rule Violations Using Machine Learning: An Analytical Review

RIFATH MAHMUD et el.

This research paper focuses on current and previous efforts to detect traffic rule violations. So far, some remarkable works have been discovered, and many approaches for detecting traffic rule violations have been introduced from the current situation. Hence, machine learning has been the main target to detect traffic rule violations. A summary of the frameworks and methods that have been used to solve this problem so far is also provided in this study. This study has been divided into two parts. In the first part, the recent works on traffic rule violations have been portrayed. Moreover, the algorithms and frameworks that have been used so far and major works on violation detection using machine learning can be found in this section. In the second part, this study

summarizes a brief discussion based on the image quality, camera resolution, device performance, and accuracy level of the works, as well as the algorithms and frameworks that have been used to conduct the detection of traffic rule violation problems using machine learning.

IoT Based Single Identification Database Model For Under Development Countries

SYMA KAMAL CHAITY et el.

The Internet of Things is becoming one of the most primary topics of conversation in the World of information Technology. There is a huge revolution that comes with the internet of things. With its multi-disciplinary application growth, the Internet of Things has changed our lifestyle. In regular life, people need to provide their user information multiple times for creating any national or international document. In this paper, a simple central server-based database model is proposed to reduce people's struggle of providing the same information multiple times and also reduces the chance of redundancy of data. According to this proposed model, users need to provide their information only once, and can use the same information in multiple sectors. Users need to provide their identification number which is provided by the central server and fingerprint only to access previously stored personal data. Users can easily create or update any national or international document using those data. The goal of this proposed model is to make a central database model for people to reduce the hassle of creating or updating national or international documents.

GLD-Det: Guava Leaf Disease Detection in Real-Time Using Lightweight Deep Learning Approach Based on MobileNet

MD. MUSTAK UN NOBI et el.

The guava plant is widely cultivated in various regions of the Sub-Continent and Asian countries, including Bangladesh, due to its adaptability to different soil conditions and climate environments. The fruit plays a crucial role in providing food security and nutrition for the human body. However, guava plants are susceptible to various infectious leaf diseases, leading to significant crop losses. To address this issue, several heavyweight deep learning models have been developed in precision agriculture. This research proposes a transfer learning-based model named GLD-Det, which is designed to be both lightweight and robust, enabling real-time detection of guava leaf disease using two benchmark datasets. GLD-Det is a modified version of MobileNet, featuring additional components with two pooling layers such as max and global average, three batch normalisation layers, three dropout layers, ReLU as an activation function with four dense layers, and SoftMax as a classification layer with the last lighter dense layer. The proposed GLD-Det model outperforms all existing models with impressive accuracy, precision, recall, and AUC score with values of 0.98, 0.98, 0.97, and 0.99 on one dataset, and with values of 0.97, 0.97, 0.96, and 0.99 for the other dataset,

respectively. Furthermore, to enhance trust and transparency, the proposed model has been explained using the Grad-CAM technique, a class-discriminative localisation approach.

불필요한 핸드오버 최소화를 위한 핸드오버 방법 및 장치 (Handover method and device for minimizing unnecessary handover)

DR. MD MEHEDI HASAN et el.

A handover control method for frequent handover mitigation (FHM) involves one or more terminals. Receiving handover history information and/or handover event measurement report determines which terminal among the one or more terminals causes unnecessary handover step and a step of moving the terminal causing the unnecessary handover to a macro cell.

Electrical Activities of Ginger Extract-Mediated Silver Nanoparticles in Bio-electrochemical Cell

BITHI PAUL et el.

Green synthesis of silver nanoparticles and their electrical activities in bio-electrochemical cell.

A Study on Structural and Magnetic Properties of Magnesium Cobalt Zinc Ferrite Nanoparticles

BITHI PAUL et el.

Magnetic properties of ferrite nanoparticles.

AI-Driven Corporate Transformation: Strategies for Adopting Artificial Intelligence at Scale

DR. KHONDAKER SAZZADUL KARIM et el.

AI-Driven Corporate Transformation: Strategies for Adopting Artificial Intelligence at Scale

Strategic AI Integration: Examining the Role of Artificial Intelligence in Corporate Decision-Making

DR. KHONDAKER SAZZADUL KARIM et el.

Strategic AI Integration: Examining the Role of Artificial Intelligence in Corporate Decision-Making

HER2 Breast Cancer Segmentation Using Transfer learning

DR. MD. ABDULLAH - AL - JUBAIR et el.

Structure based photocatalytic efficiency and optical properties of ZnO nanoparticles modified by annealing including Williamson-Hall microstructural investigation

TUSAR SAHA et el.

Structural deficiency in annealed ZnO nanoparticles would be a critical concern for the optical properties and photocatalysis efficiency of ZnO.

Effect of chromium doping on the band gap tuning of titanium dioxide thin films for solar cell applications

TUSAR SAHA et el.

A simple and inexpensive spray pyrolysis deposition (SPD) approach was used to produce TiO_2 and Cr (2–8) at.%-doped TiO_2 thin films. To explore the morphological features of the films, FESEM micrographs were used and found that 6 and 8 at.% TiO_2:Cr films had fibrous patterns with diameters of 0.45 and 0.78 μm, respectively, while the remainder of the films were agglomerated particles.

Hyperthermia temperature reduction in biomagnetic flow: Thermal transfer in Fe3O4–blood particle suspension with uniform and non-uniform effects

MD. HASSAN FARUK et el.

The article tries to show that with the help of magnetism we can reduce the temperature in local hyperthermia.

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