American International University-Bangladesh (AIUB)

SDG Activity Report 2023

SDG 13: Climate Action

Take urgent action to combat climate change and its impacts

American International University-Bangladesh (AIUB) is committed to promoting climate action in line with Sustainable Development Goal 13. The university has significant efforts to monitor and reduce carbon emissions through initiatives like solar energy generation on campus. AIUB encourages the use of renewable energy sources, such as solar PV systems, and continuously tracks the energy consumed from low-carbon sources.

AIUB is also engaged in environmental education and raising awareness about climate change. Events like the “Rethinking Climate Action” talk and the “Women Empowerment for Mitigating Climate Change” seminar highlight the importance of addressing climate risks and the need for climate resilience. The university integrates climate change education into its curricula and fosters collaborations with organizations like Grameen Shakti, focusing on sustainable energy solutions.

In terms of climate action planning, AIUB has a Climate Action Plan to ensure a cooperative approach to disaster management and climate resilience. AIUB participates in different local and international Conferences discussing climate impacts and developing strategies for better governance of ecological resources. These efforts reflect AIUB’s commitment to SDG-13, driving impactful change both on campus and within the broader community.

#AIUB #SDG13 #ClimateAction #RenewableEnergy #Sustainability

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University Activities towards SDG 13

Scholarly talk on "Rethinking Climate Action"

The Department of English of American International University-Bangladesh orchestrated a scholarly talk titled "Rethinking Climate Action: Climate Justice for Whom," on 14 December 2023 drawing together the esteemed faculty members of the Faculty of Arts and Social Sciences. The talk aimed to delve into the intricate layers of climate justice, a pressing concern of the time.

Distinguished by the presence of the renowned speaker, Dr. Sajal Roy, a climate action specialist, the discussion became lively with the engagement of the participants. The talk triggered the environmental consciousness and sparked dynamic exchanges among academicians, exploring the multifaceted dimensions of climate justice.

The welcome speech, delivered by Hamidul Huq, Head, Department of English, set the tone for the event, emphasizing the gravity of the topic and the imperative need for collective action. Throughout the event, impassioned deliberations underscored the intersectionality of climate action, dissecting its implications across societal strata. The event ended with the closing remarks from the Professor & Dean of Faculty of Arts and Social Sciences, Dr. Tazul Islam.

The event served as a poignant reminder of academia's pivotal role in championing climate justice and underscored the imperative for collective, equitable solutions in addressing the global climate crisis.

https://www.aiub.edu/scholarly-talk-on-rethinking-climate-action

BiMUN 2023 held at AIUB

The United Nations Youth and Students Association (UNYSAB) organized the Bangladesh International Model United Nations (BiMUN) 2023 at the American International University-Bangladesh (AIUB) from October 11th to October 14th, 2023. AIUB was the venue partner for BiMUN 2023.

The theme of BiMUN 2023 was "Unity for a Sustainable Future: Addressing Climate Vulnerability." On October 11th, during the inaugural ceremony, the Pro Vice-Chancellor of the American International University-Bangladesh, Prof. Dr. Md. Abdur Rahman; Mr. Benjamin Morgan, Development Coordinator Officer of the UN Resident Coordinator in Bangladesh; Md. Mahbur Rahman, Director, United Nations Wing, Ministry of Foreign Affairs; President of UNYSAB and Secretary General of BiMUN-2023, Md. Jahidul Islam, were present. A total of 350 students from different educational institutions, both national and international, participated in BiMUN-2023 as delegates and organizers.

On October 14th, during the closing ceremony, the French Ambassador to Bangladesh, H.E. Marie Masdupuy; Group Captain (Retd) Dr. Mohammad Zahidul Islam Khan, Registrar of AIUB; Dr. Sayed Saikh Imtiaz, Professor in the Department of Women and Gender Studies at the University of Dhaka.

https://www.aiub.edu/bimun-2023-held-at-aiub

“Celebration of IEEE Day 2023”

On Tuesday, 10th October 2023, the IEEE AIUB Student Branch organized an all-day long event celebrating “IEEE Day 2023”. The event aimed to unite members and supporters of the IEEE AIUB Student Branch, showcasing the collaborative efforts of local IEEE members in shaping technology for a brighter future. It emphasized the collective impact of community-driven ideas and contributions in creating a positive change.

At the first phase of the IEEE DAY 2023 celebration, Dr. Shameem Ahmad, Counselor, IEEE AIUB Student Branch; Assistant Professor, Department of EEE, Faculty of Engineering, AIUB, conducted the workshop titled “Modeling and Analysis of PV Inverter using MATLAB/Simulink”. He discussed PV panel output voltage, IPS, and power conversion, as well as designing single-phase inverters using MATLAB and hardware-in-loop setups. Additionally, discussed the role of DSP, microcontrollers, Arduino, and MATLAB in the design process. The transient period, H-bridge inverters, power electronic switches, pulse generation, initial stages, component selection, gate pulse generation, relationship of frequency and time in DC to AC conversion, and the significance of Total Harmonics Distortion in inverter output, including filter design and LC filter construction was explained. The workshop on PV inverters aligns with SDG 7 by promoting clean and affordable energy and supports SDG 13 by contributing to climate action using solar energy technology.

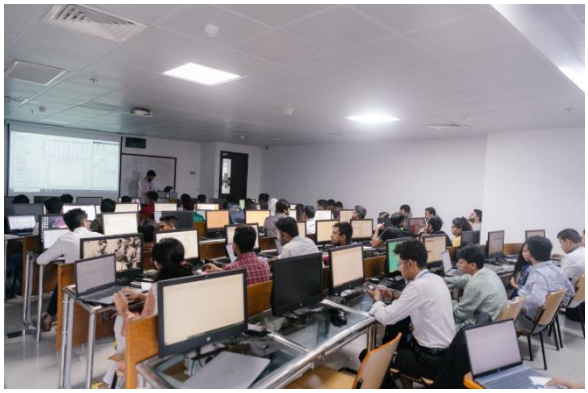
The second phase of the event began with a moment of silence to honor and remember Late Mr. A.N.M Nasimunnabi, Chair of IEEE Young Professionals Bangladesh, who passed away tragically on October 4, 2023, due to complications from dengue fever. Then Prof. Dr. A.B.M Siddique Hossain, Dean, Faculty of Engineering, AIUB; Advisor, IEEE AIUB Student Branch, inaugurated the seminar session which was followed by a cake cutting ceremony to celebrate IEEE Day 2023. Afterwards, the honorable speaker Dr. Shahriar Khan, Professor, Department of EEE, Independent University Bangladesh (IUB) took the stage to conduct a seminar on “Smart Power Systems: Automating Sustainability in the Age of Climate Change”. He thanked the faculties and IEEE AIUB SB for inviting him to the session. He discussed a wide range of topics, such as automation, sustainability, and climate change, focusing on renewable energy which relates to SDG 13: "Climate Action". He discussed solar energy and electric vehicles (EVs) and shared experiences from visits to power-generating facilities and discussed biofuels, global warming, and the future of oil production. Nuclear energy and climate change were also discussed. The speaker also discussed smart grid evolution, AI origins, and smart load tripping. The discussion concluded with IEEE's opportunities and contributions to major global companies, followed by a Q&A session. The seminar also explored the complexities of the modern world and the various forms of energy, aligning with various SDGs like SDG 7 (Affordable and Clean Energy) and SDG 12 (Responsible Consumption and Production). Prof. Dr. Mohammad Abdul Mannan, Associate Dean, Faculty of Engineering, AIUB; Advisor, IEEE AIUB Student Branch, presented the token of appreciation to the honorable speaker and gave his kind remarks for the session.

There was a poster presentation competition involving a total of thirteen groups from which the top three groups were awarded. The winners were judged by Distinguished faculty members Dr. Tanbir

Ibne Anowar, Associate Professor, Department of EEE, Faculty of Engineering, AIUB and Dr. Rifat Hazari, Senior Assistant Professor, Department of EEE, Faculty of Engineering, AIUB; Deputy Director, Dr. Anwarul Abedin Institute of Innovation; The segment aimed to promote the integration of Sustainable Development Goals (SDGs) into projects and ideas. Attendees were encouraged to incorporate SDG 7 (affordable & clean energy), SDG 9 (Industry, innovation, and infrastructure), SDG 11 (sustainable cities and communities) and SDG 13 (Climate action). The poster presentation competition was followed by a lively cultural event. At the end of the event Dr. Md. Saniat Rahman Zishan, Director, Faculty of Engineering, AIUB; Advisor, IEEE AIUB Student Branch & Mr. Chowdhury Akram Hossain, Department Head, CoE, Faculty of Engineering; Special Assistant, Office of Student Affairs (OSA), AIUB; Advisor, IEEE AIUB Student Branch, declared the winners of the poster presentation competition. After the closing remarks, a photo session was arranged which concluded the session.

The event was attended by around 100+ attendees, including IEEE members and non-members. Honorable faculty members Mr. Md. Shahariar Parvez, Lecturer, Department of Computer Engineering, Faculty of Engineering, AIUB; Mr. Tamim Hossain, Lecturer, Department of EEE, Faculty of Engineering, AIUB, also attended the daylong event.

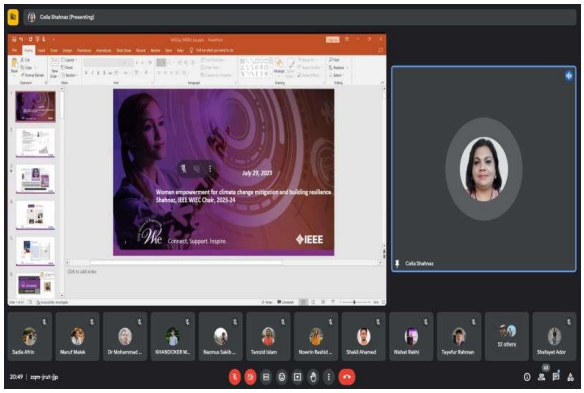
https://www.aiub.edu/celebration-of-ieee-day-2023

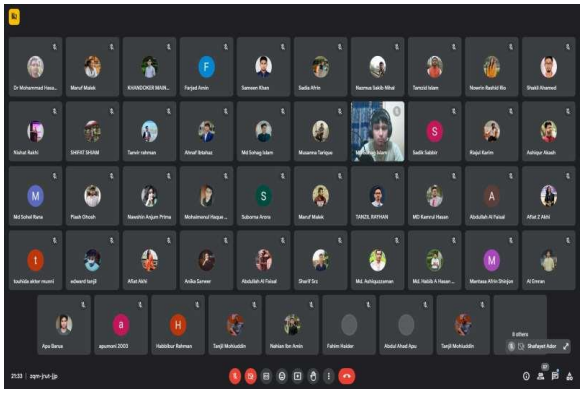


Women Empowerment for mitigating climate change and building Climate resilience

On Saturday, 29th July 2023, the IEEE AIUB Student Branch WIE Affinity Group successfully organized a webinar titled “Women Empowerment for mitigating climate change and building Climate resilience” as an extended celebration of IEEE WIE Day 2023. The webinar was held with the aim of enlightening participants about the current state of the climate. It highlighted the significant contributions made by the changes in climate towards human health. Dr. Mohammad Hasan Imam, Counselor, IEEE AIUB Student Branch; Advisor IEEE EMBS AIUB SB; Associate Professor, Faculty of Engineering, AIUB, inaugurated the webinar by speaking briefly about climates and its impacts on human well-being. He then introduced the speaker prior to the keynote session.Dr. Celia Shahnaz, 2023 IEEE WIE Chair, professor BUET, Member IEEE New initiative and history Committee, IEEE EAB FRC, then initiated the session. She began by highlighting the crucial role of Women in Engineering (WIE) and the promising opportunities it offers for female students. Sharing her own inspiring biography and remarkable achievements, she highlighted her deep passion for engineering and its profound impact on society. Moving on, she delved into the diverse IEEE societies and stressed the immense value of diversity and collaboration within the organization, including IEEE HKN. Next, she turned her attention to the pressing issue of climate change and discussed initiatives aimed at promoting eco-friendly products and environmental preservation, particularly concerning high-risk populations. The session's focus on climate health and its significance was evident throughout. The talk culminated with a powerful and motivational speech, wherein the speaker highlighted the importance of capstone projects aligning with Sustainable Development Goals (SDGs) and actively contributing to combating climate change. She encouraged participants to embrace novelty and innovation as they address the challenges posed by climate change, urging them to think outside the box for solutions. The session then transitioned into a dedicated question and answer segment, fostering interaction between the participants and the speaker. This provided an excellent opportunity for attendees to seek clarification on various important topics discussed during the talk. The discussed topics and concerns which align with various SDG agendas such as Climate Action, Gender Equality, Good Health, and Well-being. It demonstrated the interconnectedness of women empowerment as well.Following the keynote session, Dr. Mohammad Hasan Imam took the stage to deliver the closing remarks. With gratitude and admiration, he presented a virtual token of appreciation to the esteemed speaker, acknowledging her insightful contribution to the webinar. He also extended his heartfelt thanks to the IEEE AIUB Student Branch WIE Affinity Group for organizing the event. The event started at 8:10 PM and ended at 9:30 PM. A total of 80+ participants attended the event.

https://www.aiub.edu/women-empowerment-for-mitigating-climate-change-and-building-climate-resilience

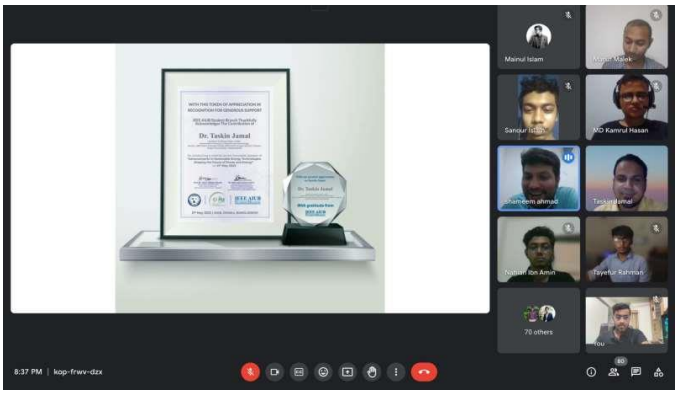




IEEE AIUB Student Branch Celebrated PES Day 2023 with Engaging Webinar

On Sunday, May 21st, 2023, the IEEE AIUB Student Branch successfully organized a webinar session titled “Advancements in Renewable Energy Technologies: Shaping the Future of Power and Energy” in celebration of the 6th IEEE PES Day. The webinar started at 7:10 PM and ended at 8:40 PM. A total of 100+ participants attended the webinar. The webinar aimed to inform students about the latest developments in the power and renewable energy sectors, including advancements in wind, solar, and hydro technologies. It highlighted the potential of renewable energy to meet growing energy demands while addressing the climate crisis, inspiring students in their career choices.Advisor of IEEE AIUB Student Branch Dr. Md. Saniat Rahman Zishan, Director, Faculty of Engineering, American International University - Bangladesh inaugurated the event by emphasizing the significance of PES Day and its relevance to the participants. He shed light on the power and energy sector, setting the stage for an insightful session. Advisor of IEEE Power and Energy Society AUST Student Branch Chapter Dr. Taskin Jamal, Assistant Professor, Department of EEE, AUST took the floor as the speaker of the session. His session revolved around sustainability and its crucial role in combating the global energy crisis. He delved into topics such as the impact of climate change, the revolution in renewable energy, and the importance of achieving a carbon emission-free environment. The webinar's objective aligned with United Nations Sustainable Development Goals (SDGs) 7 and 13. SDG 7 aims to ensure access to affordable, reliable, sustainable, and modern energy for all, while SDG 13 calls for urgent actions to combat climate change and its impacts. The webinar aimed to inspire participants to contribute to a more sustainable future by addressing these goals. The discussion further explored the volatile energy market, shifting energy forecasts, and the expanding capacity of renewable resources.Dr. Taskin emphasized China's dominance in renewable energy manufacturing and the potential for wind and solar energy to double within the next five years. He also touched upon alternative fuels, fuel cells, and the increasing adoption of renewable energy in various sectors. Following the completion of the speaker's session, an engaging Q&A session took place, allowing participants to further delve into the topics discussed. Motivator of IEEE AIUB Student Branch Dr. Shameem Ahmad, Assistant Professor, Department of EEE, Faculty of Engineering, AIUB concluded the session by expressing gratitude to the esteemed speaker and presenting a token of appreciation on behalf of the IEEE AIUB Student Branch. Overall, the webinar served as an educational platform, fostering awareness and understanding of sustainable energy solutions while emphasizing the importance of taking action to combat climate change in line with United Nations SDGs 7 and 13.

https://www.aiub.edu/ieee-aiub-student-branch-celebrated-pes-day-2023-with-engaging-webinar



Workshop conducted by “Grameen Shakti”

On Tuesday, 26th September 2023, IEEE AIUB Student Branch WIE Affinity Group participated in a workshop organized by the non-profit company Grameen Shakti. The event emphasized the significance of greenhouse gases, as well as the impacts of global warming and climate change.

The workshop was hosted and inaugurated by Mr. Abdul Arif, Manager, Project Development, Grameen Shakti, Engr. Md. Arafath Mostafa, Deputy Manager, Grameen Shakti, and Ms. Rubaya Nasrin, Assistant Manager, Project Development, Grameen Shakti. They addressed the topics of global warming and climate change, delving into the concept of greenhouse gases. Additionally, they explored various forms of renewable energy, particularly focusing on solar energy and the diverse types of solar panels. The discussion revolved around the significance of solar energy, highlighting its associated benefits.

Moreover, they specifically talked about the solar panel installations at AIUB, following which they visited the solar panels installed at AIUB campus. The workshop concluded as Prof. Dr. Mohammad Abdul Mannan, Associate Dean, Faculty of Engineering, American International University – Bangladesh; Advisor, IEEE AIUB Student Branch and Dr. Md. Saniat Rahman Zishan, Director, Faculty of Engineering, AIUB; Advisor, IEEE AIUB Student Branch provided the closing remarks and handed over the tokens of appreciation to the hosts.

The workshop effectively accomplished its objective by raising awareness about the consequences of global warming and climate change among participants. It also highlighted the merits of renewable energy sources and the advantages associated with various solar panel technologies. As this workshop emphasized the significance of providing affordable and sustainable energy access for everyone in the fight against climate change and its effects, it ultimately aligned with SDG-7 (Affordable and Clean Energy) and SDG-13 (Climate Action).

https://www.aiub.edu/workshop-conducted-by-grameen-shakti

Digital Technologies: The Opportunities & Challenges in Combatting Climate Change

On June 6, 2023, a panel discussion on the opportunities and challenges of digital technologies to combat climate change has been organized at American International University-Bangladesh (AIUB). The event was jointly organized by Science, Technology, Innovation & Public Policy Forum (STIPPF) and American International University-Bangladesh (AIUB). The Panel Discussion featured members from different sectors including policy makers, industry experts, diplomats, and academia. Mr. Saber Hossain Chowdhuryv(MP & Chairman of Parliamentary Standing Committee on the Ministry of Environment, Forest, and Climate Change), Mr. Charles Whiteley, His Excellency, Ambassador & Head of Delegation of the European Union in Bangladesh; Mr. Ishtiaque Abedin (Founder Member and Chairman, Board of Trustees, AIUB), Prof. Dr. A.F.M. Saiful Amin (Professor, Dept. of Civil Engineering, BUET & Acting Chair of BAETE, IEB) and Mr. Md. Sazzadul Hassan (Chairman and MD, BASF Bangladesh Limited) were present at panel discussion. Mr. Riaz Hamidullah, His Excellency, Ambassador of Bangladesh in Netherlands, was also present in online. Panelists discussed on the role of digital technologies in combating climate change both from Bangladesh and the broader global context. All the honorable panelists agreed that digital technologies can potentially unlock innovative solutions to complex development challenges brought by climate change. The session was moderated by Prof. Dr. Muhammad Tarik Arafat (Head, Department of Biomedical Engineering, BUET and Member, STIPPF). STIPPF is a non-profit think tank, wants to promote such discussions, to harness the nexus between science, technology, innovation, and public policy.

Prior to the panel discussion, a European Mock Parliament Debate session was organized on the Corporate Sustainability: Due Diligence Directive. The debate session was moderated by Mr. M Nakibur Rahman (Country Head of Sandoz). 27 participants from more than 10 debating clubs of different universities participated in the debate session. The vote of thanks for the event was given by Prof. Dr. Md. Abdur Rahman (Pro-Vice Chancellor, AIUB). The event has been supported by the Faculty of Engineering along with AIUB Oratory Club (AOC) and AIUB Community of Engineering Students (ACES).

https://www.aiub.edu/digital-technologies-the-opportunities--challenges-in--combatting-climate-change

AIUB inks MoUs with Amity University Tashkent (AUT) and Kimyo International University (KIUT)

In the face of increasingly interconnected and complex global challenges, international collaboration between universities has become more crucial than ever. By fostering partnerships across borders, institutions can pool their expertise, resources, and insights to address pressing issues that demand collective action. International collaboration is not just about sharing knowledge and resources, but rather about building bridges of understanding, fostering mutual respect, and creating a sense of shared responsibility for the future of our planet.Institutions of higher education around the world are embracing the power of international collaboration to tackle a wide range of challenges, from climate change and pandemic preparedness to sustainable development and global health equity. And the American International University – Bangladesh (AIUB) has always proactively pursued constructive cooperation across borders in order to better equip its students to compete on a global landscape. These partnerships are not only advancing knowledge and innovation but also promoting cross-cultural collaboration. To further that notion, 2 Memorandums of Understanding (MoUs) were signed with Amity University Tashkent (AUT) and Kimyo International University (KIUT) on the 23rd of November 2023, by Dr. Carmen Z. Lamagna, Vice Chancellor In-Charge and Member, Board of Trustees, AIUB, Mr. Babur Abdullaev, Chief Executive Officer, AUT, and Prof. Janpolat Kudaybergenov, Rector, KIUT.This strategic alliance marks a significant step forward in advancing higher education and research in Bangladesh and beyond. The MoU outlines a comprehensive framework for collaboration between the two institutions, encompassing key objectives of promoting curriculum development, supporting doctoral studies, and enhancing institutional capacity building. The agreement facilitates the mutual participation of the partners' students and staff, providing them with the opportunity to enhance their academic qualifications and research expertise. This exchange of knowledge and expertise will undoubtedly contribute to the advancement of the academic programs and research endeavors for all the partners. The MoUs also underscore the commitment of both AIUB, AUT, and KIUT to support the enhancement of the skills and knowledge of the students and staff of the 3 institutions in the ever-evolving IT industry.Formalizing the collaborative partnerships mark a significant milestone for AIUB, AUT, and KIUT, in their commitment to leverage their expertise and resources to advance higher education and research, fostering innovation, and preparing future leaders for the challenges and opportunities of the digital era. As the world becomes increasingly interconnected, the need for international collaboration will only grow. As institutions of higher education, there is a critical role to play in addressing global challenges and fostering a more sustainable and equitable future for all, and together, AIUB, AUT, and KIUT intends to work towards creating a better and brighter one for the generations to come.

https://www.aiub.edu/aiub-inks-mous-with--amity-university-tashkent-aut-and-kimyo-international-university-kiut

IEEE Student Professional Awareness Venture (SPAVe) 6.0

On Thursday, March 16th, 2023, The IEEE AIUB Student Branch successfully organized the IEEE Student Professional Awareness Venture 6.0 at American International University-Bangladesh. The venture was technically supported by IEEE, IEEE Bangladesh Section, and IEEE Young Professionals Bangladesh and was sponsored and partnered by Catec, Kishwan Group, Talukdar Foods, and Doinik Amader Shomoi.The major focus of the event was a series of professional and career-focused sessions centered on professional development. The daylong venture was inaugurated with an opening remark by Prof. Dr. Md. Abdur Rahman, Pro Vice Chancellor, AIUB who emphasized the advantages of these professional development activities. The first session of the venture titled "Impact of Renewable Energy on Climate Change" was led by Dr. Shameem Ahmad, Motivator, IEEE AIUB SB and Assistant Professor, Faculty of Engineering, AIUB. He talked about how to develop a sustainable future, the goals to raise awareness to contribute to the C02 emission zero targets, and how everyone is involved in research work. Another session titled "The Future of Work: Embracing Technological Disruptions & Developing In-Demand Skills" was conducted by Dr. M. Tanseer Ali, SAC, IEEE BDS ExCom 2 and Associate Professor & Special Assistant, Capstone Project, Faculty of Engineering, AIUB. The third session was conducted by Dr. Celia Shahnaz, 2023 Global IEEE WIE Chair, professor BUET, Member IEEE New initiative and History Committee, IEEE EAB FRC. She conversed about WIE and engineering scope for female students. She discussed research work, innovation, collaboration, and sharing.After the lunch break, the fourth session of the venture, entitled ' Engineers Career Potentials and Readiness', was conducted by Muhammad Abdul Bari, Head of IT (Associate Director), Brac Enterprises. He demonstrated how to look for the right career path and highlighted how to be prepared and the readiness for the job market. The last session was entitled "Ins and Outs of Entrepreneurship", conducted by Ghulam Sumdany Don, Chief Inspirational Officer at Don Sumdany Facilitation; Managing Director at DS Education, Ikigai HR Services, & LoveGen Bangladesh. The session focused on the important aspects of a person's mental health, growth, persistence & patience, adaptability, willingness to act and fixed mindset in a professional's life. After that, Prof. Dr. A.B.M Siddique Hossain, Advisor, IEEE AIUB SB; Dean, Faculty of Engineering, AIUB, gave his remarks where he thanked the participants for their patience, the ambassadors and the speakers for their tremendous effort to make the event successful. Dr. Md. Raju Ahmed, Dean, Faculty of Engineering; Director of IQAC, DUET; Vice-Chair (Activity), IEEE Bangladesh Section; Life Fellow IEB, Member IEEE, gave the closing remarks for the session. The Venture ended with a cultural program performed by AIUB Performing Arts Club, a thanksgiving ceremony, and a group photo session of the speakers, guests, faculty members, organizing team, and participants. 120+ participants from several universities around the nation participated in this mega flagship event.

https://www.aiub.edu/ieee-student-professional-awareness-venture-spave-60

Faculty Research and Publication on SDG 13

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.

A Location-Independent Flood Prediction Model for Bangladesh's Rivers

MD. SAJID HOSSAIN et el.

The involvement of a multitude of parameters adds to the complexity of modeling a flood. However, floods are among the most destructive of natural disasters and therefore, flood forecasting is one of the key priorities of hydrology. Flood forecasting goes a long way to minimize the loss of lives as well as economic losses. Furthermore, proper modeling of floods can contribute immensely towards future risk reduction and the introduction of necessary policies. At present, the application of machine learning in river and flood analysis has dramatically increased among hydrologists. In this research, we propose a location (District) independent flood prediction model (Random Forest-RF) of commercially significant rivers in Bangladesh. The data Imbalance problem is solved by synthetic minority oversampling of numerical and categorical (SMOTENC) data augmentation techniques. Our results show that the proposed framework outperforms the previously reported results by up to 9%. To the best of our knowledge, our proposed flood prediction framework achieved the best performance in terms of all evaluation matrices on the specific dataset.

https://ieeexplore.ieee.org/document/10356538

CO_2 discharges, consumption of energy and growth of GDP in KSA: A pragmatic analysis

MD. MORTUZA AHMMED et el.

In this study, we inspect the consequences of energy utilization and CO_2 discharges on GDP growth in KSA (Kingdom of Saudi Arabia) 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 bidirectional 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 CO_2 emissions.

Statistical Modeling of Air Quality Determinants in Urban Dhaka

MD. MORTUZA AHMMED et el.

Abstract

Urbanization and industrialization have markedly affected air quality, notably in Dhaka City, which has become a focal point for heightened air pollution. This study utilizes advanced statistical modeling techniques to uncover the multifaceted determinants impacting air quality in Dhaka's urban landscape. The primary objective is to systematically analyze and comprehensively understand the various factors influencing air quality in the urban context of Dhaka. Data encompassing air quality, meteorological parameters, traffic emissions, industrial emissions, and residential emissions were collected for urban Dhaka. A regression model was constructed to predict air quality levels based on this data, revealing significant impacts of temperature, humidity, wind speed, traffic volume, vehicle type, fuel consumption, and emissions from industrial facilities and households (p-value < 0.01). The statistical model demonstrated a robust predictive capability with an R-squared of 0.86. In conclusion, our study identifies major pollution contributors, outlines seasonal patterns, and locates pollution hotspots. The validated statistical models underscore the reliability of our findings, providing critical insights for policymakers and recommending targeted interventions to mitigate air pollution and improve overall urban air quality in Dhaka.

https://ieomsociety.org/bangladesh2023/

Statistical and Mathematical Approaches to Understanding Climate Change Impacts and Challenges in Bangladesh

MD. MORTUZA AHMMED et el.

Objective:

This research aims to employ statistical and mathematical methods to comprehensively analyze the impacts of climate change and associated challenges in Bangladesh. By quantifying these impacts, our objective is to provide a more precise understanding of the specific issues facing this vulnerable nation due to climate change.

Methodology:

We collected historical climate data and relevant socio-economic information from World Bank database to build a comprehensive dataset for Bangladesh. Utilizing time series analysis, regression models, and correlation studies, we examined climate variables and their influence on various sectors such as agriculture, infrastructure, and health. We also developed mathematical models to project future climate scenarios and their potential impacts on Bangladesh. These models integrated climate change predictions and regional factors.

Research outcomes:

Quantified Climate Trends: Our statistical analysis has revealed significant climate trends in Bangladesh, including rising temperatures, changing precipitation patterns, and increased frequency of extreme weather events.

Sector-Specific Impacts: By analyzing the data, we have identified sector-specific vulnerabilities. For instance, the agricultural sector is particularly sensitive to changing rainfall patterns, while the coastal regions are at higher risk due to sea-level rise and cyclone frequency.

Future Projections: Our mathematical models will provide projections of climate change impacts in Bangladesh over the coming decades. These projections will help in planning adaptation and mitigation strategies.

Policy Implications: We will provide data-driven recommendations for policymakers, emphasizing the urgency of climate action in Bangladesh, considering its unique challenges.

Conclusion:

Our research, employing statistical and mathematical methods, will offer a detailed and quantifiable insight into the challenges and impacts the nation faces. These findings will facilitate more targeted policy decisions, better preparation, and resilience-building strategies to protect the people and ecosystems of Bangladesh in the face of climate change. It is our hope that this research will contribute to the broader global conversation on climate change mitigation and adaptation and serve as a blueprint for similar studies in vulnerable regions worldwide.

https://met.du.ac.bd/conference/

Patterns and Variability of Extreme Weather in Bangladesh: A Statistical Exploration

MD. MORTUZA AHMMED et el.

Due to its geographical location and topographical features, Bangladesh is highly vulnerable to a spectrum of extreme weather events such as cyclones, floods, and heatwaves. The escalating frequency and intensity of these occurrences have profound implications for the nation's agriculture, infrastructure, and overall resilience. Recognizing the historical patterns and variability of extreme weather is imperative for the implementation of effective risk mitigation and adaptation strategies. The principal aim of this research is to conduct a meticulous statistical exploration into the patterns and variability of extreme weather events in Bangladesh. Specifically, the study seeks to uncover trends, quantify variability, and identify discernible patterns in the occurrence of cyclones, floods, and heatwaves over an extensive timeframe. Employing robust statistical methodology, the research utilizes historical weather data spanning several decades. Techniques such as time series analysis, regression modeling, and other advanced statistical tools are deployed to quantify trends, evaluate variability, and detect patterns in the incidence of extreme weather events. Additionally, spatial analysis is integrated to comprehend regional variations within Bangladesh. Preliminary findings indicate a noteworthy escalation in the frequency of extreme weather events throughout the study period. The analysis unveils specific temporal and spatial patterns in the occurrence of cyclones, floods, and heatwaves. These revelations contribute to a holistic comprehension of the evolving climate landscape in Bangladesh, facilitating the identification of high-risk zones and periods. This study assumes paramount significance in guiding policy formulation and strategic planning for disaster resilience in Bangladesh. The statistical insights derived from the research furnish a data-driven foundation for implementing climate change adaptation measures, directing infrastructure development, and formulating early warning systems. Furthermore, the findings contribute to the global discourse on climate change impact assessment and adaptation strategies. In conclusion, this study underscores the critical importance of continuous monitoring and data-driven decision-making in the face of a changing climate. It emphasizes the necessity for proactive measures to build resilience and ensure sustainable development in Bangladesh.

https://met.du.ac.bd/conference/

The Meaning of Community-led Climate Change Resilience: A Case Study with Indigenous and Minority Communities in Bangladesh

DR. ARIFATUL KIBRIA et el.

Climate change poses a growing threat to all over world, particularly it directly threatens Indigenous and minority peoples in Bangladesh, who are uniquely vulnerable as climate-related events affect their practices, lifeways, self-determination, and physical and cultural health. Following Indigenous

and relational theoretical frameworks, we (Indigenous and non-Indigenous scholars, Elders, and leaders) explore the meanings of community-led climate change resilience from and within Indigenous and minority perspectives. For achieving our research goals, we used traditional story sharing, land-based conversation, deep listening, and reflective reflections as our research methods. In addition to our reflective learning, we collected 20 in-depth stories from Indigenous and minority Elders, Knowledge-keepers, and leaders in Bangladesh. Our collective research findings show how to need to rethink, reshape, and reclaim the meanings of climate change resiliency within and from the Indigenous and minority ways of knowing. Indigenous and minority communities see that their ways of knowing and doing are innovative and effective for their climate change adaptations. From this research, we also learned that Indigenous and minority perspectives on climate change resiliency can provide innovative and timely solutions, self-determination for the community, and effective community-led actions for developing climate change resilience. We hope, our collective learning research from and within Indigenous and minority communities may helpful to transform the meanings climate change resilience, governance, policy and practices in community, nationally, and internationally.

https://www.earthsystemgovernance.org/2022toronto/

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

MD. SHAORAN SAYEM 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.

https://ieeexplore.ieee.org/xpl/conhome/10101485/proceeding

Isolation Forest-Based Anomaly Detection and Fault Localization for Solar PV System

ABU SHUFIAN et el.

The decrease in fossil fuel reserves has prompted a global move toward distributed energy resources. For this reason, solar PV power generation has recently gained much attention as a feasible

renewable energy source. However, large-scale generation is challenging if there are anomalies in individual solar PV panels. This will reduce the efficiency of the PV system and create a potential fire hazard. In this perspective, the anomaly detection technique discloses system anomalies accurately and effectively. Identified anomalies will localize the event for an improved generation. This paper addresses the performance analysis of using the isolation forest technique to identify anomalies in the PV system and the rule-based fault localization technique to identify defective panel events. In the developed model, the isolation forest technique found around 453 anomalies in 45,740 observations, and approximately six panels indicated a fault in the system. The accuracy score is found to be approximately 0.9886. The proposed fault detection method will help detect the faults in solar power systems.

https://icrest.aiub.edu/

Optimized Energy Management of Grid Connected Solar/Battery-dependent Smart Microgrid

ABU SHUFIAN et el.

To satisfy the escalating energy demand with minimal environmental damage, the world is taking an expeditious shift toward the augmentation of renewable energy sources with the prevailing power sources by using a microgrid, where solar/battery-based grid-connected microgrid systems are gaining immense popularity. However, the intermittent nature of the sun is the most significant impediment to producing a steady flow of energy with solar power, so to resolve this issue, an optimized microgrid energy management system (EMS) has been proposed in this paper, which provides the requisite functionality to ensure that the consumption, production, and distribution systems supply energy level at minimum operational costs. With the aid of demand-side management, a linear programming optimization technique has been developed for cost-effective microgrid operation, monitoring, and administration. The obtained result from this proposed model clearly bespeaks the usefulness of the optimized EMS of the microgrid model, which can effectively generate electricity and deliver it to customers at low prices.

https://conf.manit.ac.in/resem2023/index.php

Investigating Clean Energy Generation from Unoccupied Roof-top Space in University Premises

ABU SHUFIAN et el.

Distributed energy sources are becoming popular for producing clean energy, depleting fossil fuels, and meeting growing electricity demand. Solar PV is one of the most commonly used renewable energy sources due to its availability and cost-effective operation. Recently, the roof-top PV system

installation on academic premises has been significantly emerging. The unoccupied roof space can be effectively used to generate electricity to substantially meet the university's load demand. This paper investigates the feasibility of a roof-top PV system placed on the EME (Electrical and Mechanical Engineering) academic Building in Chittagong University of Engineering and Technology (CUET). A small test system was developed considering the effective roof-top area and actual load demand. The simulation results demonstrate that the proposed system successfully meets the required load demand of the building. An excess energy supply during peak sun hours can also be shared with the nearby premises.

https://conf.manit.ac.in/resem2023/index.php

Prospects and Economic Feasibility Analysis of Solar PV/Hydrogen Fuel-based Power System for Green City

ABU SHUFIAN et el.

Meeting the energy demands of self-sustaining off-grid systems, especially in regions with extreme solar intermittency and energy consumption patterns like northern climates, requires effective short-term and seasonal energy storage solutions. This research investigates the feasibility and economic viability of a solar PV/hydrogen fuel-based power system for a green city. Employing the Hybrid Optimization of Multiple Energy Resources (HOMER) software, an extensive analysis is conducted to optimize and simulate the proposed system. And a comprehensive assessment is performed to evaluate the technical and economic feasibility of implementing this system in a green city context. Key factors such as potential energy generation capacity, system efficiency, and economic viability are thoroughly analyzed. The findings reveal that the proposed system offers a reliable and sustainable energy source for a green city. By significantly reducing greenhouse gas emissions and providing a cost-effective solution to meet the city's energy requirements, this system showcases its potential in addressing environmental concerns.

https://confncim.com/

Grid-tied Smart Microgrid with Heuristic Optimized Energy Management System (EMS)

ABU SHUFIAN et el.

There is a global shift towards integrating renewable energy sources into existing power systems to address the increasing energy demand while minimizing environmental impact. One popular approach is the utilization of solar/battery-based grid-connected microgrid systems, which have gained significant popularity. However, the intermittent nature of solar power poses a challenge in ensuring a steady energy supply. To overcome this challenge, this research proposes an optimized microgrid EMS that efficiently manages energy consumption, generation, and distribution, aiming to

minimize operational costs. A cost-effective solution for microgrid operation, monitoring, and administration has been developed by incorporating demand side management (DSM) techniques and employing a heuristic optimization approach. The results demonstrate a remarkable 33.6% reduction in operational costs compared to systems without an EMS. These findings highlight the effectiveness of the proposed optimized EMS in generating and delivering electricity to consumers at affordable prices. This research contributes to the advancement of microgrid systems and provides valuable insights for policymakers, industry stakeholders, and researchers, supporting the adoption of renewable energy and enhancing microgrid performance.

https://confncim.com/

Enhanced Optimum Design and Performance Evaluation for Grid-Connected Solar PV Rooftop Systems: A Case Study for Bangladesh

ABU SHUFIAN et el.

Load-shedding has been rising because of a vast gas shortage that has led to Bangladesh's significant fall in power generation. Renewable energy sources could help Bangladesh's electricity production overcome these problems. The roof-mounted solar PV system is a desirable alternative energy source. Location, design, appropriate installation, and solar module type all affect the performance and efficiency of a PV system. The PV simulation tool computes how much electricity will be produced by the PV array setup. The energy efficiency of rooftop PV systems is significantly impacted by the design and orientation of roofs. By increasing the energy production of rooftop PV systems through improved roof design, this study seeks to close a knowledge gap. In this study, we used SketchUp and PVsyst to design and simulate a grid-tied rooftop solar photovoltaic system for Bangladeshi educational-type consumer loads. This project also attempts to lower grid outages close to the building, energy costs (COE), grid dependence, and CO2 emissions. The suggested system has been accurately modeled, considering factors such as choosing the most suitable PV panel rating, inverter, tilt angle, sun azimuth, shading calculation, loss calculation, performance, and technical assessment. The electric grid receives extra energy. The suggested system will generate electricity efficiently, minimizing reliance on the grid, as shown by the real-time simulation.

https://csa.ru.ac.bd/icrpset/2022/

GSM-based Automatic Voltage Protection System for Residential Small Appliances

ABU SHUFIAN et el.

A voltage protection system is one of the essential things in most of residential and home appliances. It is a low-cost, easy-to-use system that safeguards electrical and electronic devices and low-power home appliances. The main goal of this research is to create a system that can detect undervoltage and overvoltage conditions and regulate the associated output of different loads. The proposed protection system is developed and analyzed in the Proteus flatform. A voltage divider circuit and a voltage regulator are attached to the Arduino Pro Mini in the protection model, which determines

whether the voltage level is accurate. When the GSM module is turned on, the user receives a message that says “System Initializing”. When the voltage reaches a threshold level, it notifies the user that “System is ON”. Otherwise, it notifies the user that “System is OFF”. Several case studies reveal that the system protects small residential and home appliances from undervoltage and overvoltage.

https://www.bracu.ac.bd/academics/departments/electrical-and-electronic-engineering/icepe-2022

PREDICTING PHOTOVOLTAIC POWER GENERATION BY MACHINE LEARNING USING TIME SERIES ANALYSIS

DR. AFROZA NAHAR et el.

National Conference

FERDOUSI BEGUM et el.

In April 2019, Milieudefensie (Friends of the Earth Netherlands), as well as many NGOs and private individuals started a lawsuit against Royal Dutch Shell (RDS) seeking the reduction of carbon emissions to cause no harm to the present and future generations putting the defendant liable for the violation of the standard of care, Dutch civil law, and human rights. The Court held the corporation liable under many grounds and concluded that it had to take all necessary steps to prevent the realization of the risks and minimize any consequences of carbon gas emissions. This is a historic judgment rendered by the District Court of the Hague on 26 May 2021 in Milieudefensie et al. v. Royal Dutch Shell plc (2021) representing a new understanding of corporate liability regarding the risk of harm caused by their contribution to climate change. The objective of this research is to determine the corporate responsibility for adjudication of future climate change suits towards those corporations. This research is qualitative in nature and the researcher objectively assessed legal information gathered from legal materials. Both primary and secondary sources have been used in this research while primary sources comprise the judgment of the Shell case itself and secondary sources used in this research include journal articles, books, newspaper articles, articles published in various legal blogs etc. This judgment is unprecedented and showcases the development in legal thinking as the court has asserted the responsibility of both public and private for the reduction of carbon gas emissions. The judgment of this case can be used as a milestone to measure the standard to hold the corporation liable in the adjudication of future climate change lawsuits against those corporations.

https://culawnc.com/#:~:text=The%20aim%20of%20the%20National,their%20new%20ideas%20and%20research.

Predicting Photovoltaic Power Generation by Machine Learning Using Time Series Analysis

MD. FARUK ABDULLAH AL SOHAN et el.

https://applied-energy.org/icae2023/

Three Phase Fault Analysis using Thermal-Magnetic Circuit Breaker and Overcurrent Relay

ABU SHUFIAN et el.

Three Phase Fault Analysis using Thermal-Magnetic Circuit Breaker and Overcurrent Relay

http://icict4sd.bup.edu.bd/

Solar PV Panel Automatic Shading Analysis Using Boost Regulator and Inverter System

ABU SHUFIAN et el.

Solar PV Panel Automatic Shading Analysis Using Boost Regulator and Inverter System

http://icict4sd.bup.edu.bd/

Smart Power Systems for Smart Cities: Architectural Development and Economic Performance Assessment

ABU SHUFIAN et el.

Smart Power Systems for Smart Cities: Architectural Development and Economic Performance Assessment

https://r10htc2023.org/

An IoT-Enabled Microbial Fuel Cell for Wastewater Treatment and Enhancing Hydroponic Systems: An Eco-Friendly Renewable Energy Development

ABU SHUFIAN et el.

An IoT-Enabled Microbial Fuel Cell for Wastewater Treatment and Enhancing Hydroponic Systems: An Eco-Friendly Renewable Energy Development

https://r10htc2023.org/

Smart Monitoring and Control of Water Purification System Using UF Membrane Filtration

ABU SHUFIAN et el.

Smart Monitoring and Control of Water Purification System Using UF Membrane Filtration

https://r10htc2023.org/

Design and Simulation of Standalone Solar Agri-PV System in Bangladesh: A case study

ABU SHUFIAN et el.

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https://r10htc2023.org/