



3RD INTERNATIONAL POSTER COMPETITION FOR
YOUNG RESEARCHERS 2025

BOOK OF ABSTRACTS



**3rd International Poster Competition
for
Young Researchers 2025**

Book of Abstracts

July to October, 2025

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UniV**

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UniV

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PREFACE

On behalf of the organizing committee, we're proud to present the **Book of Abstracts** for the **3rd International Poster Competition for Young Researchers 2025**. This isn't just another event, it's the continuation of a journey that started with the very first competition on *Achieving Sustainable Development Goals (SDGs) in Developing Countries* back in 2020, and grew stronger through the 2022 edition that brought together hundreds of young researchers from across the world. Each year, the circle has widened more voices, more ideas, more collaboration.

The 2025 competition carries forward UniV's simple but powerful belief: "Competence beyond the box." That's more than a tagline it's the mindset that drives everything we do. UniV was built to give young researchers the guidance and opportunity they need to reach their full potential. Through initiatives like this competition, we're helping students and early-career scholars step onto the global stage to test their ideas, challenge assumptions, and learn from each other. You can explore more about this year's event and UniV's mission at competition3.univbd.com. What makes this year special is how it connects people.

The hybrid format combining online access with an in-person final round in **Dhaka** has allowed ideas to move freely across borders and time zones. The abstracts you'll find in this book span **13 major disciplines**, from Natural and Physical Sciences to Law and Governance. Every one of them went through a **rigorous multi-stage review** by our **Scientific Committee**, made up of over **25+ international experts**. Their thoughtful feedback helped shape this final collection into something we're genuinely proud of a snapshot of the next generation of thinkers at work.

We owe huge thanks to our **Competition Chairs** *Prof. Dr. Nasar U. Ahmed, Prof. Dr. Atiar Rahman, and Prof. Dr. Jamal Uddin*; whose guidance and leadership have been steady anchors throughout. The same gratitude goes to our **Scientific and Technical Committees**, the **Secretariat**, and our **Support Team** for keeping everything running behind the scenes. And to our **Strategic, Media, and Club Partners** your support helped amplify our reach and made this event visible to so many around the world. Thank you for being part of it.

Most importantly, to all the **young researchers** who took part, congratulations. Your ideas, your persistence, and your courage to put your work out there are what make this competition matter. We hope this book feels like more than a record, that it becomes a spark for new projects, new collaborations, and new confidence in what you can achieve.

Md Awwal Islam Khan

Coordinator,

Book of Abstract Committee

Director,

Research and Development (Science School) Unit,

Competition Secretariate,

3rd International Poster Competition for Young Researchers 2025

UniV

Acknowledgement

We extend our profound gratitude to all those whose invaluable contributions and support made the *3rd International Poster Competition for Young Researchers 2025* and this *Book of Abstracts* possible.

First and foremost, we are indebted to the **Competition Chairs** for their visionary leadership and strategic guidance: **Prof. Dr. Nasar U. Ahmed**, Founding Chair, Florida International University, USA, **Prof. Dr. Atiar Rahman**, Vice Chancellor, Rangamati Science & Technology University, Bangladesh, **Prof. Dr. Jamal Uddin**, Shahjalal University of Science & Technology, Bangladesh

We also express our heartfelt appreciation to the **Scientific and Technical Committees**, comprising distinguished professors, associate professors, researchers, and professionals from Bangladesh, the USA, UK, Türkiye, Canada, Sweden, South Korea, Germany, Australia, and beyond. Their rigorous peer review, critical evaluation, and dedication ensured the academic quality, innovation, and integrity of this competition and its proceedings.

Our sincere thanks are due to the **Competition Secretariats** and **Support Team** for their tireless efforts in managing communications, coordinating logistics, and facilitating smooth operations across continents. A special note of gratitude is due to **Md Syful Islam**, Manager of Operation at UniV, for his exceptional work in overseeing all aspects of the competition. We also extend our thanks to **Eti Khan Mitu**, Deputy Director of Research and Development (Science School) at UniV, for her pivotal role in coordinating support team.

We are especially grateful for the visionary leadership and unwavering support of **Dr. Ashiqur Rahman**, The CEO of UniV. His inspiring guidance and steadfast dedication have been the cornerstone of this initiative, providing the strategic direction that made this global platform possible.

Their collective commitment and professionalism transformed this large-scale, hybrid event into a successful and inclusive global platform. We gratefully acknowledge UniV, the organizing body, for its unwavering commitment to empowering young researchers worldwide through mentorship, creativity, and global exposure under the motto “Competence beyond the box. We also extend our appreciation to our **Strategic Partners, Media Partners, and Club Partners** whose generous collaboration and promotion amplified the reach and impact of this competition, encouraging broader participation and visibility.

Finally, and most importantly, we celebrate and congratulate all the **young researchers and participants** from across the globe. Your innovative work, enthusiasm, and scholarly engagement are the very foundation of this event and the essence of this *Book of Abstracts*. Your contributions not only enrich this competition but also represent the future of global research and collaboration.

With deepest respect and gratitude,

The Organizing Committee

3rd International Poster Competition for Young Researchers 2025

Dhaka, Bangladesh | July – October 2025

NOTE FROM THE PUBLICATION COMMITTEE

This Book of Abstracts presents the compiled extended abstracts of the posters and presentations featured at the 3rd International Poster Competition for Young Researchers 2025, organized by UniV.

The publication process began with the 324 extended abstracts submitted by young researchers from around the world. Each submission underwent a rigorous, double-blind peer review process conducted by our distinguished International Scientific and Technical Committee. Based on the criteria of originality, clarity, significance, and relevance to the conference themes, 203 abstracts were initially accepted.

The competition began with 179 registered abstracts. After the video submission stage, which yielded 171 presentations, we requested final abstract versions for publication. This volume features the 163 abstracts that were provided, organized according to the 13 key thematic areas.

The role of the Publication Committee has been limited to a thorough proofreading process. We have corrected obvious typographical, grammatical, and formatting errors to ensure a consistent presentation and to comply with page layout constraints. No substantive changes were made to the content, methodology, or results presented by the authors.

It is therefore imperative to state that the views, opinions, findings, and conclusions expressed in each abstract are solely those of the author(s). They do not necessarily represent the views of the Publication Committee, the Scientific Committee, UniV, or the organizing partners. The Committee disclaims any responsibility for the accuracy of the data or the soundness of the arguments presented herein.

Our primary goal is to provide a platform for emerging scholars to share their work. We congratulate all the authors on their contributions and hope this publication serves as a valuable record of the promising research presented at this international forum.

The Publication Committee

1. Nusrat Zahan Bhuiyan
2. Md Awwal Islam Khan
3. Eti Khan Mitu
4. Mahbub Hasan
5. Md Sayeed Parvez

The 3rd International Poster Competition for Young Researchers 2025

UniV: Inspiring Youths

Our Story

In early 2020 the world fell quiet. Classrooms closed, labs locked, and students stayed home as their plans stalled. In June 2020 we, a small group of Bangladeshi origin scholars studying and working abroad, chose to act. We built a volunteer platform so Bangladeshi students could keep learning, practice research, and receive clear guidance on higher study. We named it **UniV**, short for **Virtual University**. Our idea was simple and bold. We would start as a community, teach what truly matters, grow the network, and one day become a world-renowned virtual university that opens doors for anyone willing to do the work.

From the very beginning we carried a clear promise. We would make the path visible, pair ambition with mentorship, and share practical methods with honest feedback. That spirit lives in our motto, “*Competence beyond the box*,” and in our mission to prepare young people for demanding times while broadening perspectives and strengthening a supportive global community.

What we built

We began with research training. Through the ‘Workshop on Research and Publication,’ we ran more than one hundred eighty sessions over three hundred hours, giving hands-on access to tools such as Grammarly, a paraphrasing assistant, and Turnitin so learners could practice the right way. Across eleven batches we welcomed six hundred thirty participants.

We then focused on language readiness. With ‘IELTS Intensive Care,’ we designed thirty core sessions, assigned mentors for each module, and hosted a weekly speaking club. Over twenty batches, we delivered five hundred forty sessions for about six hundred students and crossed one thousand hours of instruction. We also recorded and shared sessions privately so participants could continue learning beyond the classroom.

Next, we built pathways for higher study. Our program, ‘A Complete Guideline for Higher Study Abroad and Scholarship,’ covered every step of the journey: writing academic CVs, crafting statements of purpose, preparing research proposals, attending interviews, contacting professors, and navigating scholarship routes by country. Across sixteen batches, we delivered more than two hundred thirty sessions and five hundred hours of guidance to six hundred seventy-five participants, supported by more than hundred resource persons.

Around these core pillars we added skills and community spaces. We ran courses on R, Power BI, Python, SPSS, MS Office and STATA. We hosted movie and speaking clubs and organized a summer IT school. Altogether, we completed sixty-five events and brought in participants from a wide range of institutions.

Competitions and our growing footprint

As our mentorship network grew, we began hosting international competitions that placed students on a larger stage. Our poster competition follows a clear timeline from registration

and primary selection through video submission, final presentations, and awards. We make dates and steps explicit so students can plan and stay fully engaged.

Pathways to grow and lead

We created opportunities for students to learn by doing. Through our internship program, we gave young people real work experience and leadership practice. What began with a few dozen interns has now grown to more than four hundred graduates.

We also launched the ‘Campus Ambassador Program,’ which helps students represent their institutions and build networks. More than hundred ambassadors have completed the program, and fifty are active in 2025, strengthening UniV’s presence across campuses.

Behind these initiatives stands a global circle of mentors and alumni. Our team includes senior academics and administrators with experience in Bangladesh, the United States, Sweden, Denmark, Germany, Malta, Turkey, Australia, and Canada. Today, more than one hundred PhD-holder scholars and global mentors are connected with UniV, giving our community the depth and guidance of a living academy.

Results that matter

We focused on outcomes, not just activities. Since launch, more than seventy students have earned scholarships abroad after training with us, and more than one hundred students have hit their target IELTS scores through UniV IELTS Intensive Care. We publish a newsletter every month to share opportunities and track progress. Our internship pipeline has graduated more than four hundred students. Our campus ambassador network keeps expanding and now links UniV with institutions across the country. More than one hundred PhD holder scholars and global mentors support this work and guide our students.

We also trained our stakeholders and ran standing training sessions every month. We conducted more than sixty free sessions and webinars, collaborated on programs with several universities in Bangladesh, and have arranged more than fifty programs and events to date. Across all offerings, we have delivered hundreds of sessions and well over eighteen hundred hours of practical instruction, with recordings available so learning continues after class.

What this means

We began UniV as a response to a crisis, and it has grown into a lasting culture of service. We keep the door open. We teach what is useful. We pair coaching with practice. We record sessions so learning continues. We invite students to lead so each new cohort inherits a stronger platform. That is how a difficult year gave birth to a community that continues to move students forward.

Md Syful Islam

Manager of Operations,
UniV

Message from Competition Chair



Dear Young Researchers:

With great pride and enthusiasm, I would like to welcome you to the 3rd International Poster Competition for Young Researchers 2025, organized by UniV. We are thrilled to share that we have received over 250 abstracts from across the globe. Each one of your abstracts is a clear reflection of the passion, creativity, and intellectual rigor that defines the next generation of scholars.

This competition is more than a platform to present your research; as a matter of fact, it is a celebration of bold ideas, new generational perspectives, and enthusiastic pursuit of knowledge and wisdom. Your work represents the future of breakthroughs in science and scholarship, and it is inspiring to witness the depth and diversity of your contributions.

As your abstracts move through the review process and into the next round, I encourage you to embrace this exciting moment. Let this competition be a launchpad, not just for your research, but for your growth as thinkers and changemakers. Engage with your peers, challenge with daring questions, and share your bold vision with confidence. Previous International Poster Competitors are now scholars doing groundbreaking research as students, and some of them became faculty members at renowned universities and institutions in the world.

UniV is compiling your work into an *Abstract Book* that will serve as a lasting record of your achievements and a source of inspiration for others. I am honored to be part of the UniV's efforts to make a significant difference in the lives of the young generation and prepare future leaders.

So, step forward. Present with passion. Learn with curiosity. Inspire for purpose. Dream Big! The world needs your ideas and surely your voice.

With great admiration and encouragement,

Nasar U. Ahmed

Nasar U. Ahmed, PhD

Chair, Poster Competition

Founding Chairman

Departments of Epidemiology & Biostatistics

Florida International University

United States of America

Message from Competition Chair



Dear Young Researchers,

It is with immense pride and sincere pleasure that I welcome you to the 3rd International Poster Competition for Young Researchers 2025, organized by UniV. This year's competition has drawn an extraordinary response, with hundreds of abstracts submitted from across the globe – a testament to your passion, dedication, and pursuit of excellence.

This competition goes beyond simply showcasing research. It is a gathering of curious minds, a space where ideas meet, challenge each other, and grow. Every poster is a window into a researcher's journey – the questions asked, the experiments tried, the insights gained. Seeing such a wide spectrum of disciplines and fresh perspectives is both humbling and energizing.

As a researcher myself, with a lifelong focus on plant-based therapeutics, biogenic nanoparticles, and alternative medicine, I am continually reminded of the power of curiosity-driven research to improve lives and shape a better future. I encourage you to embrace this opportunity fully – engage with your peers, seek constructive feedback, and explore new perspectives. Competitions like this can ignite lifelong collaborations and open doors to meaningful academic and professional growth.

I extend my deepest gratitude to the organizing committee, reviewers, mentors, and sponsors for their tireless efforts in making this event a success. Most importantly, I commend each participant for your commitment to research and for contributing to a vibrant exchange of ideas.

May this competition be a milestone in your journey as scholars and a stepping stone toward greater achievements. I wish you every success in your presentations and hope that this event will inspire you to reach even greater heights.

With admiration and encouragement,



Prof. Dr. Atiar Rahman

Vice Chancellor

Rangamati Science & Technology University

Bangladesh

Message from Competition Chair



Dear Young Researchers,

It is my distinct honor to welcome you to the 3rd International Poster Competition for Young Researchers 2025. Competitions such as this remind us of the critical role research plays in understanding the world around us and improving it.

As the statistician John Tukey once said, “The greatest value of a picture is when it forces us to notice what we never expected to see.” Your posters do exactly that, they turn data into stories, highlight patterns, and reveal insights that move us closer to understanding and solving real world problems.

What excites me most about this event is its diversity. Here, work on molecular biology sits next to public health studies; social science insights are presented alongside engineering innovations. This mix is not accidental – progress often happens at the intersections, when one field borrows from another and new solutions emerge. Multidisciplinary research not only broadens perspectives but also fosters creativity, enabling us to tackle complex problems that no single discipline could solve alone.

I encourage you to use this competition as an opportunity to think critically, to discuss your findings with peers, and to be open to new perspectives. Some of the most valuable outcomes of events like this are not the prizes but the collaborations, ideas, and friendships that last long after the posters come down.

I have also learned that the organizing committee publishes a Book of Abstracts for this event. This thoughtful effort not only celebrates the hard work behind each project but also ensures your contributions become part of the shared knowledge base for future researchers. My hope is that seeing your work in print encourages you to keep pushing boundaries and exploring new ideas.

I extend my gratitude to the organizing committee, reviewers, and sponsors for their tireless dedication, and I applaud each of you for taking the time to share your work. Your participation is an investment not only in your own career but in the collective future of research and innovation.

May your experience here be intellectually stimulating and personally rewarding.

Prof. Dr. Md. Jamal Uddin

Professor

Department of Statistics

Team Leader, Biostatistics, Epidemiology and Public Health Research Team

Shahjalal University of Science & Technology, Bangladesh

Message from Convenor



Dear Participants,

It is a great honor and heartfelt pleasure to welcome you all to the 3rd International Poster Competition for Young Researchers 2025, organized by UniV. This competition stands as a global platform for emerging researchers to share their ideas, present their discoveries, and connect with like-minded peers across diverse disciplines.

This year's overwhelming response 324 abstracts submitted from around the world – reflects the remarkable enthusiasm and dedication of young researchers who are shaping the future of science, innovation, and creativity. After a rigorous double-blind review process, we are proud to present 163 extended abstracts in this Book of Abstracts, representing 13 thematic areas of cutting-edge research.

As convenor, I have witnessed the incredible commitment and collaboration that went into every stage of this event from abstract submission to review, evaluation, and publication. Each poster tells a unique story of curiosity, perseverance, and discovery. I encourage all participants to take pride in your work, engage actively with your peers and mentors, and make the most of this opportunity for academic and professional growth.

I would like to extend my sincere appreciation to the Conference Chairs, International Scientific and Technical Committee, Publication Committee, Reviewers, Mentors, Organizing Committee and Support Team Members, whose expertise and dedication made this event possible. My deepest thanks also go to our partner institutions for their continued support in fostering research excellence among young scholars.

To all the participants your journey as a researcher is just beginning. Let this competition be a celebration of your efforts and a stepping stone toward greater achievements. Continue exploring, questioning, and innovating the world needs your ideas more than ever.

With warm regards and best wishes for your success,

A handwritten signature in black ink, appearing to read 'Md Ashiqur Rahman'.

Dr. Md Ashiqur Rahman

Convenor

The 3rd International Poster Competition for Young Researchers 2025
CEO, UniV.

Message from Organizing Secretary



The 3rd International Poster Competition for Young Researchers 2025 is organized by UniV, a platform committed to helping young scholars share ideas, build connections, and grow through constructive exchange. This gathering brings together emerging researchers from many disciplines and regions, with a shared interest in questions that matter and work that moves knowledge forward.

The Organizing Committee set out to make this experience both rigorous and welcoming. Each step from abstract submission to final presentation has been designed to be transparent, supportive, and respectful of your time and effort. We value clear communication, timely updates, and open channels for questions so that you can focus on presenting your best work.

Quality and fairness guide the review process. Independent evaluation, clear criteria, and conflict management are in place to ensure that every submission is judged on merit. Mentors and session leads are prepared to facilitate thoughtful dialogue so that feedback is specific, actionable, and encouraging.

This program is also about community. We invite you to attend sessions outside your own field, ask good questions, and listen carefully. Many of the most useful insights appear at the boundaries between disciplines. Take notes, trade ideas, and introduce yourself. Collaborative work often begins with a single conversation.

To honor your contributions, UniV is compiling an Abstract Book so that your efforts are recorded and discoverable for future readers. This record reflects the spirit of the event and the diversity of perspectives it brings together.

We extend sincere thanks to the Competition Chairs, reviewers, mentors, sponsors, and volunteers for their steady work. Above all, we recognize the participants whose preparation, perseverance, and curiosity give this program its purpose.

May the presentations, discussions, and connections formed here continue to grow into new ideas, new partnerships, and new paths for impact in the years ahead.



Md Syful Islam

Organizing Secretary

The 3rd International Poster Competition for Young Researchers 2025

Manager of Operations, UniV

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Natural and Physical Sciences

Poster ID: P250306

Assessment Of Legacy-Nitrogen in The Gumai Beel Agricultural Landuse Area, Rangunia, Chattogram

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Abstract

Legacy nitrogen known as residual nitrogen that are accumulated in the soil due to long term fertilizer application. This study investigates nitrogen (N) in agricultural field across top layer (0-10 cm), middle layer (10-20 cm) and bottom layer (20-30 cm) during two seasons (Growing season, post-growing season). A total of 66 soil samples were collected from GIS generated random sampling point and each sample is consists of 5 sub samples. Through laboratory analysis and statistical analysis (ANOVA-one way, Tukey's HSD test), variations in soil properties were assessed across different soil depths. Findings reveal significant seasonal variation in nitrogen concentration for all soil layers, the bottom layer ($F=19.4$, $p<0.001$) showing the most evident changes due to leaching. A questionnaire survey was conducted with approximately 30 farmers to understand the types and amounts of fertilizers used. These results emphasize the importance on soil profile-based assessment in for sustainable nutrient management practices.

Keywords: Legacy nitrogen, Nutrient leaching, Seasonal variation, Fertilizer management, Sustainable agriculture.

Poster ID: P250320

Statistical Inference and Applications of Quartic Transmuted Inverse Weibull Distribution

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Abstract

A novel generalization of the standard Inverse Weibull distribution, namely the Quartic Transmuted Inverse Weibull (QTIW) distribution, is introduced in this paper using a quartic transmutation technique. The predominant motivation of this extension is to give users more opportunities when it comes to capturing numerous data patterns seen in real-life phenomena. Several basic characteristics of the suggested distribution are fully derived in order to do this. Furthermore, the behavior of order statistics is given particular attention. Comprehensive simulation studies are used to further test the performance of the proposed model parameters. Using real-life datasets from the fields of engineering and medicine, the QTIW distribution's practical value is illustrated. It is shown to perform better than what are thought of as traditional models by providing a closer fit and more interpretability. Therefore, this new distribution will be a useful addition to the tools of applied statisticians engaged in lifetime modeling.

Keywords: Quartic Transmutation, Cubic Transmutation, Probability Distribution, Order Statistics, Maximum Likelihood Estimation, Simulation Study.

Poster ID: P250334

Hydrogen Horizons: Integrating Renewables for a Carbon-Free Economy

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Abstract

The hydrogen economy is emerging as a transformative force to decarbonize hard-to-abate sectors such as heavy industry, long-distance transport, building heating and seasonal energy storage. While hydrogen may not dominate the global energy market, it is projected to supply around 2.3 gigatons annually, cutting emissions in nearly 18% of energy-intensive sectors. Central to this transition is green hydrogen, produced sustainably from renewable sources. Among promising technologies, supercritical water gasification (SCWG) of biomass stands out for its cost-effectiveness, efficiently utilizing moist biomass without costly drying. Solar and wind-powered electrolysis also hold great potential but face challenges due to high costs and low efficiency. Achieving competitive green hydrogen prices hinges on significantly lowering renewable electricity costs. As global deployment accelerates, green hydrogen is not only driving emission reductions but also fostering a circular bioeconomy. Its strategic integration with renewables offers a compelling pathway to decouple economic growth from carbon emissions, advancing a cleaner, resilient energy future.

Keywords: Green hydrogen, Supercritical water gasification (SCWG), Renewable energy, Circular bioeconomy, Decarbonization.

Poster ID: P250381

Visualizing Ionizing Radiation: Design And Real-Time Validation of A Hybrid Portable Cloud Chamber Using Image Processing Algorithm

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Abstract

Most contemporary designs are not economically feasible or practical for widespread use in education; cloud chambers serve as essential apparatuses for the visualization of ionizing radiation. The cloud chamber developed as part of this work enables real time, infrastructure-free, accessible, thermally optimized tracking of particles. The chamber's construction employs Peltier heaters and dry ice cooling, which together maintain the top and bottom of the chamber at different temperatures, creating a stable supersaturated isopropyl alcohol vapor, thus permitting the visualization of clear particle tracks. The cloud chamber visualizes alpha, beta, and cosmic ray radiation as well as environmental radiation, interacting with radioactive materials like Cesium- 137 and Strontium-90, as well as cosmic background radiation. The stability of such data was validated with simulations of thermal gradients with vapor flow in Ansys, while the classification of tracks was enhanced using image processing techniques. This prototype demonstrates the ability to achieve high-quality radiation visualization with minimal resources through the integration of thermal management and automated evaluation. Its effectiveness and simplicity make the system highly suitable for practical nuclear physics classes in university laboratories and paves the way for the future development of AI-based particle identification systems.

Keywords: Radiation Visualization, Cloud Chamber, Portable Radiation, Detector, OpenCV, Ionizing Radiation

Poster ID: P250441

An Approach to Differentiate Venomous from Non-venomous Species Analyzing Microscopic Ultrastructure in Microdermatoglyphics of Shed-off Snake Skin

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Abstract

Snakes are taxonomically diverse group and linked to public health, yet accurate identification remains difficult in resource-limited settings. We evaluated shed-off skins as a non-invasive method for species identification using microscopic ultrastructure. Shed skins from twelve adults, two venomous cobras (*Naja naja*, *Naja kaouthia*) and two non-venomous colubrids (*Ptyas mucosa*, *Fowlea piscator*) were collected across Bangladesh. Fifteen scale types from head, body, and tail regions were examined at 40X, 100X, and 400X magnification, and six ultrastructural traits (edge perimeter, edge area, edge WPD, follicle perimeter, follicle area, follicle 20,000 μm^2) were quantified. Paired t-tests and Wilcoxon signed-rank tests ($\alpha = 0.001$) evaluated variation, with PCA used for pattern separation. Four traits differentiated two venomous snakes, while all six separated two non-venomous snakes. Five traits distinguish venomous from non-venomous species. Principal component analysis (77.6% variance) revealed distinct clustering. This approach enables reliable differentiation and offers applications in snakebite management, forensic herpetology, and biodiversity monitoring.

Keywords: Cobra, Colubridae, Dermatoglyphic, Identification, Non-invasive, Shaded scale.

Poster ID: P250515

Implementation of a Compact Verilog-A MOSFET Model in Cadence Virtuoso for 90 nm CMOS Technology

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Abstract

This poster presents the development and integration of a compact Enz–Krummenacher–Vittoz (EKV) MOSFET model in Verilog-A, implemented within the Cadence Virtuoso design environment for 90 nm CMOS technology. The model employs a charge-based formulation to accurately represent device physics and short-channel effects, enabling precise prediction of I–V characteristics over a wide range of operating conditions. DC validation is complemented by RF analysis through S-parameter simulations, from which key parameters, including power gain, group delay, and intrinsic gate–source capacitance (C_{gs}) are extracted. Furthermore, parametric sweeps and process corner simulations are conducted to assess robustness and portability. The results indicate that the implemented compact Verilog-A MOSFET model delivers high accuracy and versatility, making it suitable for analog and RF design workflows in both academic and industrial contexts.

Keywords: EKV MOSFET, Verilog-A, Cadence Virtuoso, 90 nm CMOS, Analog Modeling, S-parameters.

Poster ID: P250564

Nuclear Weapons: A Multidisciplinary Analysis of Physics, History and Geopolitical Implications

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Abstract: Since their first use in 1945, nuclear weapons have remained among the most powerful and controversial creations of modern science. Their designs range from fission-based atomic bombs to fusion-powered hydrogen bombs, both capable of striking targets anywhere in the world. For many years, the world stockpile has evolved through intense arms races, international treaties, and ongoing geopolitical tensions. The Nuclear Non-Proliferation Treaty (NPT) and the Comprehensive Nuclear Test Ban Treaty (CTBT) are two examples of international control initiatives that aim to restrict proliferation and advance disarmament, however, challenges to enforcement and compliance still exist. This research aims to review the current state of nuclear weapons, encompassing power, geopolitics, and International relations. Investigating Nuclear weapons' destructive impact, like blast, heat, nuclear fallout, and radiation. Nuclear weapons continue to have an impact on international security plans and on analyzing the modern situation of Nuclear weapon threats. A thorough literature review was done to gather information, and surveys were conducted on Nuclear weapons. Software like Excel spreadsheets was used for further analysis of raw data. The research shows the horror of nuclear weapons and the consequences of detonating one and calls for the urgent need to balance nuclear deterrence with efforts to eliminate these weapons. This study presents a comprehensive discussion on the multiple aspects of nuclear weapons, like their history, physics, and current world situation. It is a must to build a safer, nuclear-weapon-free future that requires global cooperation and action to reduce the humanitarian and environmental dangers of these weapons.

Keywords: Nuclear weapons, Treaty, Deterrence, Disarmament, Non-proliferation.

Poster ID: P250580

Design And Synthesis of Catalysts for The Lignin Valorization for The Application as Chemical Feedstocks in The Paints and Textile Industries.

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Abstract: Lignin is the second most abundant naturally occurring material, which was extracted from rice straw by alkaline pre-treatment and characterized by the UV-Vis extinction spectra and FTIR spectra analysis. This research work is dedicated to design and synthesis of metal and metal-oxide nanostructures with different morphologies (nano rod & core-shell) and compositions that would carry out depolymerization process of lignocellulosic polymer. Structural modification of metal to metal-oxide was investigated with extinction spectra analysis, and morphologies were analyzed by scanning electron microscopy (SEM) and transmission electron microscopy (TEM) images, and energy dispersive spectroscopy (EDS) technique was used for elemental investigation. Depolymerization process was monitored by UV-Vis extinction spectra, and primarily characterized by FTIR analysis. The GC-MS test would be carried out for further investigation. Further work will be directed towards effective filtration, and optimization of shell thickness to enhance catalytic activity for the valorization, which can be used as chemical feedstocks.

Keywords: Lignocellulosic polymer, Core-shell, Heterostructure, Nano-catalysts, Valorization, Feedstocks.

Poster ID: P250588

Controlled Depositon of Bioactive Nanomaterial in Nanocellulose Matrix for Engineering Hygienic Textiles

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Abstract: In this research work, we aimed to prepare silver nanoparticles deposited nano-cellulose composite for potential application in hygienic textiles. The deposition of silver nanoparticle on nano cellulose was performed in a controlled manner. Prior to deposition, cellulose was extracted from rice straw, a biocompatible raw material, by pre-treating it with alkaline and acid solutions successively. The formation of silver nanoparticles was primarily confirmed by monitoring extinction spectra of deposited silver on cellulose matrix. Morphology of the extracted cellulose was studied by Scanning Electron Microscope (SEM) image analysis. The morphology and distribution of silver nanoparticles on nano cellulose will be carried out by recording Scanning Electron Microscope (SEM) and Transmission Electron Microscopy (TEM) image respectively. Further work will be directed towards investigating the antibacterial activity of the Cellulose-Ag-nanocomposite in varying load percentage, utilizing better cellulose-silver nanocomposites for hygienic textiles in medical applications, such as wound dressings, and surgical masks.

Keywords: Rice-Straw, Nano-cellulose, Silver nanoparticles, Cellulose-Ag-nanocomposite, Hygienic textiles.

Poster ID: P250623

From Sea to Skin: Unlocking the Affordable Wonders of Seaweeds in Food and Beauty

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Abstract: Bangladesh is the largest delta in the world and a 710-kilometer-long coastline, has a vast Exclusive Economic Zone rich in marine life. The only coral island in Bangladesh is Saint Martin. grow unique species of seaweed, locally known as **Hegela**, or “**stone flowers**.” seaweeds called a nutritional powerhouse. It's high in: Vitamins and minerals, Antioxidants plant-based protein Globally, iodine for thyroid function, omega-3 fatty acid, it's already used in soups salads, snacks, and even as a salt substitute. For countries battling malnutrition or looking for affordable alternatives, seaweed can help bridge the gap, especially in climate vulnerable zones from premium moisturizers to anti-aging masks, seaweed is a star ingredient in global skincare. It hydrates, soothes, and protects the skin naturally, which are 100% Natural or organic ingredients soap. No side effects but better for skin lovers. If local businesses in countries like Bangladesh invest in seaweed-based cosmetics, we can create affordable beauty solutions, reduce imports, and support small entrepreneurs especially women. Seaweed farming is low-cost, eco-friendly, and highly scalable. It: Absorbs carbon dioxide, improves marine ecosystems, creates jobs for coastal communities, supports climate resilience exporting seaweed and its products can boost foreign exchange earnings and open up new global markets. If we take the right steps including public awareness, policy support, and small-scale entrepreneurship seaweeds can become a game-changer in both health and beauty industries in Bangladesh. From sea to skin, seaweeds offer affordable, sustainable, and powerful benefits. Let's work together to unlock this green gold-for better nutrition, beauty, and a stronger economy. **Keyword:** Marine biotechnology, Natural skincare, Industrial gums, Bioactive substances, Eco-friendly cosmetics.

Engineering

Poster ID: P250318

HYBRID-CUBE Sat: A Multi-Sensor AI-Powered CubeSat for Real-Time Earth Monitoring and Adaptive Intelligence.

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Abstract

HYBRID-CUBE Sat will introduce an innovative CubeSat concept featuring optical, thermal, and hyperspectral payloads, driven by an AI system residing in the satellite. CNNs provide the ability to detect anomalies and classify objects and reinforcement learning dynamically allocates priorities to sensing tasks. HYBRID-CUBE Minimal Downlink Requires: By computing the data on-orbit, HYBRID-CUBE reduces the dependence on downlink and enhances the agility to perform science. Results From simulation and hardware-in-the-loop testing, our CubeSat has a 40% reduction in data latency, compared to a baseline CubeSat, suggesting its usefulness in disaster response and precision agriculture as well as sustainable Earth monitoring.

Keywords: CubeSat, Artificial Intelligence, Multi-sensor Fusion, Earth Observation, Data Latency, Disaster Response.

Poster ID: P250379

Universal Nuclear Engines: A Sustainable Alternative to Fossil Fuels

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Abstract

The rapid depletion of fossil fuels from the Earth's natural resources, combined with increasing greenhouse gas emissions, global warming, climate change, and the limitations of conventional propulsion technologies, necessitate innovative solutions for sustainable transportation. This study presents a conceptual design of a universal nuclear propulsion system applicable to road, rail, marine, air, and space vehicles. In contrast to conventional engines, which have low efficiency (~30%), high emissions, high operating costs, and short lifespans, the proposed design integrates nuclear thermal, electric, and hybrid propulsion modes. It has zero carbon emissions, reduces fuel mass by 97.6%, reduces fuel cost by 93%, and increases engine efficiency by 1.28 times while simultaneously extending its effective lifespan to 50 years. Nuclear reactor design with advanced materials, multi-layered radiation protection, and a safe radioactive waste management system. Once fueled, the vehicle can provide power for 8 months to 2 years, enabling long-range missions and reducing dependence on energy infrastructure.

Keywords: Nuclear, Propulsion, Engine, Multi-modal, Transportation, Technology

Poster ID: P250462

Impact of SCRAM on Accident Progression in a VVER-1200 Under Combined LBLOCA and Station Blackout Conditions

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Abstract

This study examines the behavior of a VVER-1200 reactor under one of the most challenging accident combinations - a Large Break Loss of Coolant Accident (LBLOCA) occurring alongside a Station Blackout (SBO). Using the PCTRAN code simulator, a 95 cm² hot leg break was initiated 10 seconds after reactor startup, and two scenarios were compared one being the successful reactor trip (SCRAM) and another was failure to trip (ATWS). In the SCRAM case, fission power rapidly decreased to decay levels, enabling passive safety systems to restore coolant flow, lower core temperatures, and prevent fuel damage. In contrast, ATWS maintained high power output due to positive void reactivity feedback, sustained system pressure, and complete coolant voiding, which led to severe fuel and cladding overheating, considerable amount of hydrogen generation which can lead to core meltdown. The findings underscore that SCRAM is a decisive factor separating controllable incidents from catastrophic reactor failure.

Keywords: VVER-1200, PCTRAN, Large Break Loss of Coolant Accident (LBLOCA), Station Blackout (SBO), SCRAM, ATWS.

Poster ID: P250466

Designing Prototype of a Force-Sensitive Smart Classic-Toothbrush for Improved Dental Health

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Abstract

Smart force-sensitive toothbrush is designed to maintain optimal brushing force which is essential for oral health. Yet most manual toothbrushes provide no feedback. This study presents a mechatronics-upgraded version of the conventional toothbrush with force-detection technology. Excessive brushing force can cause gum recession and enamel wear. This project presents the prototyping of a Force-Sensitive Smart Toothbrush which preserves the familiar structure of a manual toothbrush while integrating a mechatronics-based sensing system to monitor brushing pressure. A Force Sensitive Resistor (FSR) is embedded beneath the bristle layer of a standard toothbrush. A simple circuit measured the brushing force and instantly lit up green for safe pressure and lit up red when too much force is applied. The prototype accurately detected brushing forces between 50 to 300g with 95% accuracy. This design offers a low-cost, manufacturable solution for safe brushing. Future innovations may include waterproofing, wireless tracking, and artificial-intelligence-based personalized oral health advice.

Keywords: smart toothbrush, force-sensitive toothbrush, toothbrush, oral health monitoring, mechatronic design

Poster ID: P250469

BIONIC EYE: Engineering Retinal Prosthetics for Vision Restoration

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Abstract

Retinal degenerative disorders such as retinitis pigmentosa and age-related macular degeneration cause progressive vision loss due to photoreceptor deterioration. The Bionic Eye project addresses this challenge through the development of an advanced retinal prosthetic system designed to restore visual function by electrically stimulating surviving retinal neurons. The system integrates an external camera mounted on eyeglasses, a digital image processor, and a biocompatible microelectrode array implanted on the retina. Captured visual data is processed, enhanced using AI-based real-time algorithms, and wirelessly transmitted to stimulate retinal ganglion cells, enabling partial vision recovery. Key innovations include ultra-flexible electrode materials, adaptive image resolution, energy-efficient wireless power transfer, nanocoatings for improved biocompatibility, and closed-loop feedback for personalized neural stimulation. Preclinical studies validated neural responses in vitro and in vivo, demonstrating improved resolution, reduced latency, and basic shape and motion recognition. This work represents a major advancement in biomedical engineering, with future efforts focused on clinical trials, long-term integration, and scalable patient accessibility.

Keywords: Retinal prosthetics, Neural interfacing, Biocompatible implants, Vision restoration, Wireless communication, Artificial vision

Poster ID: P250473

Single-Modality Gsr-Based Emotion Detection Using Feature Engineering And Random Forest

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Abstract

Emotion recognition based on physiological signals is a significant area of interest in affective computing and has a wide range of applications. This research utilizes galvanic skin response (GSR) data of YAAD dataset from Mendeley Data and additional data obtained through GSR module. This study possesses the possibility of classifying emotion by only using the physiological signal GSR. We use the preprocessed GSR signals to extract 16 features from each signal series to recognize 3 emotions, i.e., Anger, Happiness, and Sadness. A Random Forest model was employed to classify the GSR data into emotion categories. To evaluate the performance of the proposed approach, accuracy, F1 score, precision, and recall were used as validation metrics. The model achieved an accuracy of approximately 62.5% without 5-fold cross-validation and 58.33% with 5-fold cross-validation, indicating that the emotion detection system performs reliably and effectively in distinguishing between happiness, sadness, and anger using GSR signals.

Keywords: Emotion Detection, Galvanic Skin Response (GSR), YAAD dataset, Machine Learning, Random Forest

Poster ID: P250490

Artificial Kinetic Intelligence (AKI), A No-Code Automatic Machine Learning (ML) Web-Tool

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Abstract: Machine Learning education has become imperative across all sectors. Educators, SMEs, and public agencies without in-house expertise struggle to find reliable, and affordable platform. This study presents Artificial Kinetic Intelligence (AKI), a no-code Auto-ML workbench that converts spreadsheets into deployable predictive models within minutes. It also provides a sequential approach for easy learning of data-science and ML pipelines using various algorithms with performance analysis through minimum mouse-clicks. Built with Streamlit frontend and a containerized Python backend, AKI guides users through five visual steps, Upload, Data cleaning, Explore ML models, Train, and Deploy. Behind the scenes, AKI orchestrates data-cleaning heuristics, feature-engineering templates, and scikit-learn/XGBoost model sweeps. AKI reduces model-development time from 4 weeks to under 1 hour and cut deployment costs by 65%. Features include side-by-side metric dashboards, single-click rollback, and multi-tenant isolation for SaaS scalability. AKI lowers barriers, enabling Bangladeshi innovators to harness data insights and advance SDG-driven AI adoption.

Keywords: Automated Machine Learning (AutoML), No-Code Platforms, Data Preprocessing, Model Training and Deployment, Artificial Intelligence Applications.

Poster ID: P250491

Development of Walking Gait Strategies for an 8-DoF Quadrupedal Robot.

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Abstract: Quadruped robots are one of the important platforms in the field of mobile robotics, as they offer enhanced mobility and impressive stability over the complex terrain. Traditional mobile robots struggle in most of the cases. These capabilities make the quadruped robots highly suitable for military operations, industrial applications, and assistance in disaster scenarios. In Bangladesh, research in this field is not impressive. So, the focus of this research is to design and development of an 8-degree-of-freedom (8-DoF) quadruped robot with the objectives of enhancing the mechanical architecture, optimizing the distribution of joint torques, and improved gait design. The operational framework emphasizes combining 3D modelling to ensure optimal weight distribution, torque analyses, uniform actuator control, and comprehensive gait analyses. The developed prototype is capable of adapting locomotion modes showing is stability in balancing and acceptable performance by fulfilling desired requirements. The resulting modular robotic platform also demonstrates stable and versatile movements across a wide range of indoor terrains. Experimental results indicate that the combination of mechanical optimization and intelligent path-planning produced a reliable system, significantly increasing its applicability in critical environments. Applications such as search-and-rescue, would potentially benefit from this flexibility and stabilized modes of motion.

Keywords: 8-degree-of-freedom (8-DoF), Gait design, Mobility & Stability, Mechanical architecture, Joint torques, and Actuator control.

Poster ID: P250494

BIM and CFD-Driven Design Evaluation of Roof Forms for Cyclone-Resilient Housing in Coastal Bangladesh

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Abstract

The southwestern coastal region of Bangladesh experiences considerable damage to buildings and livelihoods because of the severe impacts of cyclones. This research aimed to develop a climate-resilient housing model by combining BIM with CFD to assess resilience against strong winds. The roof models were constructed in Revit 2024 and evaluated for a wind speed of 240 km/h. The results from the simulation showed that the hip roof experienced unstable flow separation at the eaves and ridgelines, accompanied by significant suction forces. On the other hand, the octagonal roof showed 31% less suction, a more uniform pressure distribution compared to the hip roof. From the laboratory tests calculated drag forces, revealing that the leeward suction force for the hip roof exceeded that of the octagonal roof by 39%. The combination of BIM, CFD, and wind tunnel testing showed that the octagonal roof is better at resisting cyclones in coastal Bangladesh.

Keywords: Coastal, Aerodynamic, CFD, BIM, Wind Tunnel

Poster ID: P250516

Nuclear Power System and Materials: Connecting Advanced Materials for Safety, Efficiency, and Sustainability.

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Abstract

Nuclear power is an essential source of low-carbon electricity, providing high output and sustaining climate balance. Materials play important roles in securing safety and efficiency of the nuclear power system. This poster outlines how nuclear energy and its components are interrelated with materials to make it safer and more efficient in producing energy, as well as more lasting. The latest nuclear plants depend on special materials to survive the strict conditions. Zirconium-fuel cladding offers the best neutron economy, steels maintain structural integrity even when corrosion-resistant, and containment is constructed of reinforced concrete to help provide a radiation shield. Newer technologies have developed silicon carbide composites and high-performing alloys, introducing 40% improvements in failed components and extending plant lifelines of over 60 years. This work on the development of materials, together with SMR technologies, strives to enable safer and more efficient nuclear energy systems. Materials studies also continue to provide answers for radiation damage and high-temperature degradation in sustainable nuclear power.

Keywords: Nuclear, Materials, Technology, Structure, Sustainable

Poster ID: P250577

Performance Evaluation of Concrete Incorporating Fish Bone Ash and Coconut Fiber: Towards a Sustainable Construction

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Abstract: The construction industry is under increasing pressure to develop sustainable alternatives to conventional concrete due to the high carbon footprint of cement production and the challenges of waste disposal. This study explores the combined use of fish bone ash (FBA), derived from calcined fish waste, and natural coconut fiber (CF) as a hybrid eco-friendly material for concrete. Fish bone ash was used to partially replace cement at 5%, 10%, and 15% levels by weight, while coconut fibers were added at 0.25%, 0.5%, and 1% by volume. Experimental investigations were conducted on fresh properties (workability), mechanical properties (compressive, split tensile, and flexural strength), and durability (water absorption, sulfate and chloride resistance). Results indicate that the inclusion of FBA improves the microstructure through pozzolanic activity, while CF enhances crack resistance and ductility. The optimum mix was observed at 10% FBA with 0.5% CF, offering comparable compressive strength to control concrete and superior tensile and flexural strength. This study demonstrates the potential of combining industrial and agricultural wastes in concrete to address both environmental and structural performance demands.

Keywords: Sustainable concrete, Fish bone ash, Coconut fiber, Mechanical properties

Poster ID: P250578

3d Cad Design and Implementation of A Vacuum Cleaner Robot Using Arduino and Sensor-Based Navigation for Clean Environments

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Abstract: Clean environments are essential for both productivity and health, and this is particularly true in places like hospitals, universities, and dorms where a lot of people congregate. Manual vacuum cleaners and traditional cleaning techniques are time-consuming, dangerous in dangerous environments, and useless during disease outbreaks when little human contact is necessary. The goal of this project is to use Arduino to design and build a smart vacuum cleaner robot that can clean university buildings and other similar spaces on its own. A 1200mAh 3S lithium-ion battery with a buck converter to provide 5V to the electronics powers the system's 12V DC gear motors, motor driver, Arduino Uno, and ultrasonic obstacle detection sensor. An effective cleaning rate of 2.26 m² per minute at 120 rpm and 100% obstacle detection accuracy (0–200 cm range) were demonstrated in experimental tests conducted in a 120×20-inch field. The inexpensive, easy-to-use design provides a secure, efficient automated cleaning solution.

Keywords: Vacuum Cleaner Robot, Autonomous system, SolidWorks, Obstacle, Ultrasonic sensor, Arduino uno.

Poster ID: P250591

Renewable Energy Supported Operational Robot Control, Monitoring, Cybernetics System with (IoV)

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Abstract: Internet of Things connects and allows items or entities to share information with one another device. The subset of IoT technologies that have been applied to vehicles is called Internet of Vehicles IoV the Internet of Vehicle IoV is the development of conventional Vehicular Adhoc Networks introducing emerging innovations to the sophisticated interconnected robots. A real time data interchange between cars and roads, vehicles and other vehicles, vehicles and sensors, and vehicles and everything else on the road is made possible by IoV network communication. In this research work, we have designed a Renewable Energy Supported Operational Robot. It combines both autonomous and non-autonomous robot control system. As a result, this robot is designed to simplify human work while being more adaptable, dependable and accurate in monitoring. Through an AI based image processing system, this robot can monitor the surroundings of a confined area where unauthorized humans cannot enter and send an alarm message through notification as the interconnected system is based on IoT. This type of robots can be used in multiple command, control, communication and computing system where the risk of sending human is much high.

Keywords: Internet of Things, Internet of Vehicles, Artificial Intelligence, Machine Learning, Renewable Energy.

Poster ID: P250596

Eco-Innovative Silencer Design by Using Solidworks to Reduce Noise Pollution and Carbon Emissions

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Abstract: Environmentally sound and efficient mechanical solutions are needed considering growing resource scarcity and environmental degradation. Old silencers are less durable, have excessive noise, and contribute to CO₂ emissions since they do not take the environment into consideration. In this research project, we concentrate on a new global model of the 3D silencer that is designed on sustainability concepts. Silencer noise cancels noise pollution, reduces carbon footprint, is constructed to endure with stainless steel (304/316), and is money-saving. It was designed in SolidWorks, and its strengths and airflow were investigated via an FEA and CFD simulation, as well as its acoustics. Through the life-cycle assessment, less energy consumption and reduced emission are demonstrated as compared to traditional models. Overall, the research demonstrates that through the integration of 3D CAD models, superior simulations, and green design, products with high performances, low costs, and environmental sensitivity can be created.

Keywords: Sustainable design, Noise reduction, Lower carbon emission, Stainless steel, SolidWorks, FEA & CFD simulation.

Poster ID: P250598

Design And Cfd Analysis Of A Hybrid Catalytic Converter For Reducing Carbon Emissions In Brick Kilns, Automobiles And Industrial Sectors

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Abstract

Large volumes of CO, VOCs, PM, and CO₂, which are significant contributors of air pollution and global warming, are emitted by automobiles, brick kilns, and industrial exhausts. Current catalytic converters are largely sector-specific, which do not offer effective emission control in various combustion systems. The proposed research will develop and test a hybrid honeycomb catalytic converter that can be used in various industries to lessen the detrimental pollutants. A 3D CAD model was created in SolidWorks and was simulated on Computational Fluid Dynamics (CFD) in ANSYS Fluent to investigate the flow of gases, pressure drop, temperature distribution, and conversion of pollutants. It was found that at pressure drop less than 1.2 kPa, 60-80% CO reduction, 40-60% VOC removal and 30-60 percentage PM reduction was achieved through simulations. The converter provides an effective, flexible and long-term multi-sector emission control solution.

Keywords: Hybrid Catalytic Converter, Carbon Emission Reduction, CFD Analysis, Air Pollution Control, Automotive Emissions, Industrial Exhaust.

Poster ID: P250601

Hybrid Hydrogen–Lithium Storage for Renewable Grid Integration

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Abstract

The global transition to renewable energy, driven by the need to reduce carbon emissions and mitigate climate change, has heightened the demand for reliable and efficient energy storage solutions that can address the intermittent nature of renewable resources like solar and wind. While these resources are abundant, they often do not align with grid demand, necessitating advanced energy storage technologies. This study provides a comprehensive comparative analysis of Hydrogen-based Energy Storage (HES) and Lithium-Ion Batteries (LIBs), two promising technologies, by assessing their technical performance, economic viability, and environmental impact. Using simulation models, the study evaluates the energy storage behavior of both systems over a 24-hour period, focusing on key factors such as energy density, charge/discharge efficiency, and cycle life. The results show that LIBs outperform HES in terms of energy density, storing 95.02 kWh compared to 73.90 kWh in HES, making LIBs ideal for short-term storage applications like grid balancing and frequency regulation. The research provides key insights for policy recommendations, supporting grid stabilization and aligning with national dual-carbon goals.

Keywords: Hydrogen-based Energy Storage, Lithium-Ion Batteries, Distribution Network, Hybrid system optimizes, Renewable energy integration.

Business Studies

Poster ID: P250391

Microfinance or Commercial Banking? A Comparative Study of Their Impact on Women Entrepreneurship in MSMEs-A Case Study in Bangladesh (2020-25)

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Abstract

In Bangladesh, women entrepreneurs in Micro, Small, and Medium Enterprises (MSMEs) are playing a catalyst role in economic development and social progresses relying mainly on microfinance institutions (MFIs) and commercial banks for startup financing. This paper explores how microfinance institutions (MFIs) and commercial banks differ in accessibility, loan terms, requirement conditions, and their respective impacts on revenue growth, profitability, employment generation, survival rate and long-term sustainability of women-owned MSMEs. Using a mixed methods approach, this research is conducted by primary survey data from women-owned MSMEs across selected urban, peri-urban, and rural areas, in-depth interviews and group discussion, secondary data from Bangladesh Bank in (2020-25), Literature, the Microcredit Regulatory Authority and SME Foundation report. Findings show MFIs provide easier, collateral-free access to rural women with smaller loans, higher interest, and shorter repayment periods, while commercial banks offer larger, cheaper loans but with stricter requirements. Both of them have pivotal role in fostering growth, sustainability, empowerment of women-led MSMEs in Bangladesh.

Keywords: Microfinance, Commercial Bank, Entrepreneurship, MSME, Women Entrepreneurship

Poster ID: P250435

Authoritarian Economy, Corruption and National Development in the context of Bangladesh

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Abstract: From 2008 to 2024, Bangladesh's governance consolidated into a rigid authoritarian structure creating a horrible environment where corruption became deeply embedded in the national development process. Study suggests the annual illicit outflows of USD 3.1-15.8 billion drained public resources. The PK Halder launderings network, Janata and Islami Bank loan frauds, the 2011 stock market crash and the USD 81M Bangladesh Bank cyber heist exposed entrenched state business collusion. Mega project costs raised 30-200%, FDI fell 13.8% in 2023, while recruitment corruption, exam leaks and market syndicates deepened inequality. This study investigates how concentrated political and economic power enabled systemic corruption, facilitated large scale capital flight, and distorted development priorities. Using Transparency International's CPI data, Global Financial Integrity's illicit flow estimates, Bangladesh Bank economic indicators and case analyses of major scandals and mega project audits, the research apply a mixed quantitative-qualitative approach to trace the patterns of the governance and the alleged corruption. The study is expected to recommend establishing independent oversight bodies, enforce transparent procurement, depoliticize governance and safeguard media freedom to break the corruption authoritarianism cycle.

Keywords: Authoritarianism, Corruption, Capital Flight, Inequality, Reform.

Poster ID: P250495

Perception towards risk management of financial products: Islamic vs. Conventional Banks in Bangladesh

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Abstract: The purpose of the study is to investigate people's perceptions of the risk management approach between conventional and Islamic banking and to identify the possible barriers Islamic banks face. Previous research was carried out on customer satisfaction toward these two banks, but there is an absence regarding the underlying understanding of the approaches. Qualitative data were collected through structured interview questionnaires among the customers. Banker and professional in Dhaka city. The finding reveals that both conventional and Islamic banking customers are not aware of the approach banks use for their risk management. Furthermore, Islamic banks have limited products due to the prohibition of *riba*, compared to conventional ones. For this, in the risk management approach, they need to go through a complex process to maintain the Shariah law. Moreover, the main possible barrier faced by Islamic banks to avail the customer's perception is the lack of awareness regarding Islamic banks and the limited product diversification. The limitation of the study is that the data is collected only from the Dhaka region, this might not represent all the conventional and Islamic banks as well as the customer segments. Therefore, further study needs to include the other regions as well as the university students who have access to bank accounts.

Keywords: Islamic Bank, Conventional Bank, Risk Management

Poster ID: P250501

The Impact of Digital Marketing on Brand Awareness: A Study of Multinational FMCG Brands in Bangladesh

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Abstract

Bangladesh's FMCG sector has become increasingly competitive, with multinational brands adopting digital marketing to strengthen consumer engagement. Despite rapid adoption, little research explores how specific strategies influence brand recall and recognition. This study investigates the relationship between digital marketing initiatives and brand awareness by conducting a systematic literature review of 124 publications (2015–2024), of which 38 met inclusion criteria. Data were coded in NVivo 14 to identify thematic patterns and analyzed in SPSS 28 for statistical insights, complemented by a cross-brand comparison of three multinational FMCG companies. Results indicate that influencer partnerships increased recognition among 18–30-year-olds by 32%, social media-led campaigns improved recall by 27%, and localized cultural content achieved 15% more engagement than global templates. However, only 18% of studies examined long-term awareness. The study concludes that digital marketing significantly boosts brand awareness, with localized strategies outperforming standardized approaches, while highlighting the need for longitudinal research.

Keywords: Digital marketing, brand awareness, FMCG Bangladesh, multinational brands, consumer engagement.

Social Sciences and Humanities

Poster ID: P250348

Assessing Agricultural Loss and Damage from Climate-Induced Disasters in Bangladesh's Southwestern Coastal Region

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Abstract

Bangladesh's coastal agriculture is highly vulnerable to climate-induced disasters such as cyclones, storm surges, saline intrusion, and erratic rainfall, with Atulia Union in Shyamnagar Upazila experiencing severe impacts on productivity and livelihoods. This study assesses both economic and non-economic agricultural losses caused by extreme weather events. Using a mixed-methods design, household surveys (n=385) and focus group discussions were conducted, and data were analyzed with SPSS and STATA, guided by loss and damage assessment frameworks. Results show that farmers lose an average of 4–6 maunds of paddy per bigha (≈7,800 BDT) after extreme events, with 88% reporting pest outbreaks linked to climatic stress. Economic losses include crop failure, land degradation, and yield reduction, while non-economic losses involve migration, mental health strain, erosion of traditional knowledge, and biodiversity decline. The findings emphasize the urgency of adaptation measures such as rainwater harvesting, sustainable groundwater use, and credit schemes to enhance agricultural resilience.

Keywords: Agriculture, Climate-induced disasters, Loss and damage, Coastal Bangladesh, Adaptation strategies

Poster ID: P250351

Impact of Social Capital on Post-Disaster Recovery: A Study on Dacope Upazila

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Abstract

The southwest coastal region of Bangladesh has endured repeated extreme events, including Cyclones Sidr and Aila, which caused widespread destruction of assets and livelihoods. This study investigates the role of social capital in disaster coping and post-disaster recovery in cyclone-affected villages of Dacope Upazila. Using a qualitative research design, data were collected through focus group discussions, key informant interviews, and case studies with participants from diverse occupational backgrounds in Jaliakhali village, Kamarkhola Union. The analysis highlights the significant role of bonding and bridging social capital in both immediate response and long-term recovery, while the benefits of linking social capital were largely captured by a small elite group. Patron-client relations and inequitable structures allowed local elites to dominate relief and rehabilitation processes, excluding many severely affected households. The findings suggest that strengthening inclusive social networks and ensuring fair aid allocation are essential for equitable and sustainable recovery.

Keywords: Cyclone, Disaster recovery, Social capital, Coastal Bangladesh, Equity, Community resilience

Poster ID: P250352

Development Aid and Post-Disaster Reconstruction: A Study of Surkhali Union, Khulna, Bangladesh

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Abstract: Bangladesh's coastal regions face recurring natural disasters that severely affect infrastructure, livelihoods, and public services, with Surkhali Union in Khulna District among the most vulnerable. This study explores the role of development aid in post-disaster reconstruction, emphasizing the "Build Back Better" model and its alignment with sustainable development goals. Qualitative methods, including interviews with stakeholders, field observations, and secondary data review, were employed to assess aid allocation, delivery, and institutional mechanisms. The findings reveal a persistent gap between aid allocation and actual delivery due to weak institutional frameworks, insufficient monitoring, technological limitations, and uncoordinated planning. Moreover, limited social cohesion constrained community-based reconstruction efforts. Despite steady aid inflows, these barriers hindered long-term recovery and resilience. The study concludes that stronger stakeholder coordination, transparent aid distribution, robust government oversight, and enhanced community participation are essential to transforming recovery initiatives into sustainable development pathways.

Keywords: Disaster, Vulnerability, Post-disaster reconstruction, Sustainable development.

Poster ID: P250387

Assessing The Socioeconomic Impact of The Ashrayan Project on Resettled Households in Gopalganj District

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Abstract: Government-led housing initiatives are essential in disrupting cycles of poverty, as access to adequate shelter serves as a foundation for wider social and economic progress. This paper includes 280 landless families from the Asharayan of Gopalganj district. The primary data for this study were collected with a predetermined questionnaire from June to August 2024. A stratified sampling technique was used to ensure a representative sample of landless households across the five upazilas of Gopalganj District. The sample is almost evenly split between males (47.9%) and females (52.1%), showing a slightly higher proportion of women. The largest age group is 25–40 years (44.6%), followed by 40–55 years (34.6%). Most respondents belong to nuclear families (80.4%), while only 19.6% live in joint families. The majority of households consist of 4–6 members (59.6%). Most households have at least one earning member (76.1%). A large proportion of respondents are illiterate (48.9%), while about one-third (33.2%) have completed primary education. Most earn between BDT 10,000–15,000 (28.2%). A majority (74.6%) reported an improvement in their condition, while 25.4% stated no improvement from staying in the Ashrayan project. Bivariate analyses showed a significant association between the improvement of overall conditions-such as housing, health, child education facilities, economic situation, satisfaction level, employment status, average monthly income, access to loans, and electricity-and the living conditions of the Ashrayan project's residents. By conducting the binary logistic regression model, study detect that electricity facilities, housing condition and employment have significant impact on socio-economic condition of the landless people of that Ashrayan Project. **Keywords:** Poverty, Housing intervention, Socioeconomic, Landless households.

Poster ID: P250419

Assessment of SDG 8: A case of RMG sector in Bangladesh

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Abstract

This study explores the experiences of Ready-Made Garment (RMG) workers in Bangladesh, focusing on unequal improvements in workplace conditions and proposing affordable innovations for decent work. Despite safety reforms after the Rana Plaza disaster, worker experience remains mixed. A field survey was conducted in two factories - Bengal Hurricane Group and Sawda Fashion through random sampling of 20 workers and one management official from each site. Findings reveal dissatisfaction with wages, clean water, childcare and ventilation, though some workers reported benefits such as medical compensation, maternity leave and air conditioning. Persistent issues include harassment, delayed bonuses and inadequate incident response. Management acknowledged safety upgrades like fire training, ventilation and emergency exists, while recognizing ongoing challenges. The study provides a balanced perspective, identifies priority areas for improvement and offers insights for policymakers to promote sustainable development through decent working conditions in Bangladesh RMG sector.

Keywords: Ready-Made Garment (RMG), Labour, Harassment, Sustainable Development, Distribution, Dissatisfaction.

Poster ID: P250428

Non-State Actors in State Conflict: The Role of Inuvialuit and Inupiat Communities in the Resource Schism between US and Canada in the Beaufort Sea.

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Abstract

The Beaufort Sea, residing in the Arctic Ocean, lies to the north of Alaska (the United States) and Canada's Yukon and Northwest territories. As global temperatures are rising and ice sheets are evaporating, large terrains of the Beaufort Sea are becoming easier to attain. This granting opens up new anticipation for resource extraction. The contest for energy resources and their overlapping claim has been accelerated between the United States and Canada. There is a prominent role of non-state actors in this conflict, which includes indigenous communities, and environmental groups. This study explores the role of non-state actors in this resource conflict. This paper examines how Inuvialuit and Inupiat communities claim resist and influence state-level decisions. By employing qualitative research methodologies, the research utilizes secondary data derived from various sources, including literature, articles, official documents, websites, newspapers, journals, and so on. Consummately, the paper provides applicable recommendations for resolving the schism.

Keywords: The Beaufort Sea, Sub-state Actors, Inupiat and Inuvialuit, Resources Schism.

Poster ID: P250434

Livelihood Pattern of Climate Migrants in Khulna City: A Study on Urban Slums

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Abstract

Khulna City is experiencing a growing influx of climate-induced migrants from vulnerable coastal regions, contributing to the expansion of slums characterized by limited services and poor infrastructure. This study explores livelihood transformations before and after migration and examines the challenges migrants encounter in adapting to urban life. Based on data collected from 385 randomly selected migrant households in Wards 21 and 22 of Khulna City Corporation, using a mixed-methods explanatory design, the research highlights shift in income, expenditure, housing, health, education, and asset loss. Findings reveal that household income generally increased post-migration, but proportional rises in expenditure limited savings. Housing conditions improved, with most households now residing in semi-permanent or permanent structures, although the average reported asset loss was BDT 570,000 per household. Despite partial improvements, inadequate access to essential services perpetuates urban poverty. These findings underscore the importance of targeted urban planning, skill development, and integration programs to strengthen migrant resilience and sustainability.

Keywords: Climate Migrants, Urban Slum, Livelihood Pattern, Khulna City, Migration Challenges, Urban Planning.

Poster ID: P25449

Negotiating Identity in the age of Transnational Cultural Flows: Gender Dynamics and Local Counter-Cultural Politics in Bangladesh

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Abstract

This study examines the local gender dynamics as they are manifested in the local counter-cultural politics in Bangladesh and how identities are negotiated between right and left of the spectrum. The paper examines the negotiation of gendered identities under the impact of global cultural flows and local traditions and investigates in what ways counter-cultural movements resist or internalize transnational cultural flows. By employing a qualitative methodology including qualitative interviews and digital content analysis. The findings shed light on the emergence of new gendered subjectivities via digital platforms as well as the interplay of global cultural forces and local gender norms. Alternative gender identities are more strongly represented in social media in Bangladesh, as social media creates a space for marginalized voices. Still, with global norms and local traditions in constant tension, gender as a source of negotiation must be grounded in a better-informed space.

Keywords: Counter-cultural politics, Negotiating identity, Transnational cultural flows, Digital platforms, Local resistance movements

Poster ID: P250451

Driving Forces of Farmer's Awareness on Climate Change: A Study in the South-West Coastal Region of Bangladesh

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Abstract

Farmer's awareness of climate change is crucial for adaptation and mitigation in agriculture, particularly in vulnerable regions such as Haridhali Union of Paikgacha Upazila in Bangladesh's south-west coast. This study investigates the socio-demographic, economic, and institutional factors shaping farmers' awareness of climate variability and hazards. Data were collected from 325 farming households using a structured questionnaire through convenience sampling. Descriptive and inferential analyses revealed that most respondents identified shifts in temperature and rainfall patterns. Binary logistic regression showed that age, education, farming experience, farmers' association membership, access to agricultural credit, and extension services significantly influenced awareness levels. The findings emphasize that both individual characteristics and institutional access play vital roles in shaping climate change awareness. Strengthening awareness campaigns, capacity-building, and institutional support are essential for empowering coastal farmers to adopt effective adaptation and mitigation strategies against climate-induced risks.

Keywords: Climate Change, Farmer's Awareness, Coastal Bangladesh, Institutional Access, Adaptation, Mitigation

Poster ID: P250455

The Impact of Higher Education Policies on Graduate Employment in Rural Bangladesh: A Critical Review with a focus on Gopalganj

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Abstract

Rural students are getting higher education opportunities, but job opportunities are very limited. This study examines, in the context of Gopalganj, how higher education policies affect the employment of rural graduates. Despite efforts to expand higher education in the country, rural graduates are lagging behind in employment mainly due to skill gaps, lack of information and institutional weaknesses. A survey (100+ participants), interviews with university teachers, and focus group discussions revealed that 40.9% of graduates have skill mismatches, 10% have weak institutional support and many are deprived of employment information. Few students have received market-based technical advice. The cultural dominance theory of rural schools suggests that policies are urban-oriented and ignore rural realities. To overcome this problem, changes in curriculum, technology and skill development, and employment strategies that are compatible with rural economic realities are necessary.

Keywords: Rural graduates, Skill mismatch, Localized employment strategies, Cultural Hegemony

Poster ID: P250470

Rohingya Crisis: Evaluating Humanitarian Challenges and The Prospects of Multilateral Responses by The UN and Asean

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Abstract: The Rohingya crisis is considered a severe humanitarian challenge of the twenty-first century which is rooted in structural discrimination along with institutional exclusion in Myanmar. The Rohingya people have become stateless by the 1982 Citizenship Law which led to oppression, forced displacement and brutality regarded as crime against humanity. In 2017, Bangladesh received more than 700,000 Rohingya who were forcefully displaced, making the Cox's Bazar refugee camp overcrowded. The study aims to evaluate humanitarian challenges and roles of the United Nations (UN) and the Association of Southeast Asian Nations (ASEAN) to address the crisis. The study is based on secondary data from some academic literature highlighting the limited actions of both institutions in solving this issue. Though the UN provides aid through UNHCR, it goes through several obstacles including restricted access, inefficient funding as well as Security Council deadlock due to vetoes by China and Russia. ASEAN provides assistance through the AHA Centre and ERAT but its assistance has been limited by its principle of consensus and non-interference. The study has a conclusion with durable solutions requiring immediate Humanitarian relief together with long term strategies for rights recognition, justice and safe voluntary repatriation through coordination of international cooperation.

Keywords: Rohingya Crisis, Humanitarian challenges, Forced displacement, Institutional Exclusion, Voluntary return

Poster ID: P250492

Soft Power through Language: The Role of Arabic in Bangladesh–Middle East Relations

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Abstract: One of the bridges linking Bangladesh and the Middle East is the Arabic language. This study aimed to understand how the Arabic language helps Bangladesh enhance its “soft power” and strengthen political, economic, and cultural relations with the Middle East. Using mixed methods, data was collected in two ways: primary data through focus group discussions and interviews, and secondary data from newspapers, academic research, government reports, and international organizations. Findings show that proficiency in Arabic plays a major role in religious ties, employment, and expatriate income. As a natural diplomatic tool, language builds a positive image of Bangladesh in the Middle East, offering economic benefits while strengthening long-term diplomatic trust and friendship through soft power.

Keywords: Middle East, Arabic Language, Soft Power, Diplomatic Trust

Poster ID: P250508

Adaptive Capacity of Community for Disaster Vulnerability in Coastal Area of Bangladesh: A Study on Dacope Upazila

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Abstract

Communities in Bangladesh's southwest coastal belt, particularly Dacope Upazila, face persistent threats from climate-induced disasters such as cyclones and tidal surges. This study assesses the adaptive capacity of these communities by examining socio-cultural, economic, and institutional dimensions. Using a mixed-methods approach, data were collected through random sampling of households and analyzed to identify key indicators of resilience. Findings reveal gradual improvement in adaptive capacity, yet vulnerabilities remain due to limited assets, weak community cohesion, and insufficient institutional support. These factors exacerbate disaster risks and hinder long-term resilience. The study underscores the need for coordinated action between local communities, government agencies, and NGOs to strengthen adaptive capacity, allocate resources effectively, and reduce disaster vulnerability. Enhancing resilience in coastal Bangladesh requires targeted strategies that integrate local needs and foster sustainable adaptation practices.

Keywords: Community, Adaptive Capacity, Vulnerability, Disaster, Coastal Hazard, Dacope.

Poster ID: P250538

Assessing the Potential of the Sundarbans as a Tourist Hub: A Study of the Southwestern Region of Bangladesh

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Abstract

Bangladesh has strong potential for tourism development, supported by its rich biodiversity and cultural heritage, with the Sundarbans a UNESCO World Heritage Site standing out as a major attraction. However, challenges such as waste disposal, poor sanitation, and boat-related noise pollution threaten its sustainability. This study investigates the perceptions of Khulna city residents regarding the Sundarbans as a tourist hub and their attitudes toward sustainable tourism. Using a mixed-methods approach combining qualitative and quantitative data, household heads were selected through random sampling, and both primary and secondary sources were analyzed. Findings reveal that residents hold a deep emotional attachment to the Sundarbans, valuing its diversity, adventurous experiences, and tranquility. Most respondents favored it over other destinations and stressed the importance of conserving biodiversity, wildlife, and habitats. The study concludes that sustainable tourism requires strong policies, awareness programs, and active community participation to balance ecosystem preservation with tourism development.

Keywords: Sundarbans, Sustainable tourism, Ecotourism, Tourism development, Community perception, Khulna City.

Poster ID: P250547

Is Social Media Marketing in Bangladesh Trustworthy? An Investigation on Bangladeshi Consumers

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Abstract

Nowadays social media plays a crucial role in online business platforms. This study investigates the impacts of a social media marketing on consumers behavior and trustworthiness on online contents in the context of Bangladeshi social media users. Previous studies were limited on the long-lasting effect of social media marketing on vulnerable users and content transparency. Our study represents how social media platforms different content formats and the abundance of contents influence consumer trust and buying behavior. A quantitative research design was employed. The survey yielded 200 responses, the study found about 35% respondents considered the product recommendation “not very trustworthy”, while 61% responded on post purchase regret. One thing also found from the study that well established brands generally inspired more than the new brands. Content quality and transparency outweighed brand identity in influencing trust. The study also promotes awareness of trustworthiness vs manipulative marketing among consumers. We suggest to explore the long-lasting impact of new media platforms on consumers’ purchasing behavior and trustworthiness.

Keywords: social media, influencer marketing, consumer regret, consumer trust, purchasing behavior.

Poster ID: P250548

The Role of Social Networks in Post-Disaster Recovery: A Study of Balipara Union, Bangladesh

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Abstract

Bangladesh frequently experiences natural disasters that cause severe losses of life and property, leaving affected communities with significant challenges in recovery. This study explores the role of social networks bonding, bridging, and linking in facilitating post-disaster recovery in Balipara Union. A mixed method approach grounded in social capital theory was applied, combining focus group discussions and in-depth interviews with affected households, supplemented by secondary data. The findings reveal that bonding networks, including kinship and family ties, provided emotional and material support but offered limited influence on long-term recovery. Bridging networks, connecting people beyond immediate circles, were critical in accessing diverse resources and external support. Linking networks with formal institutions contributed to livelihood recovery but were undermined by unequal aid distribution. The study concludes that strengthening inclusive social networks, particularly bridging and linking ties, alongside equitable aid allocation, is essential for enhancing resilience and ensuring sustainable post-disaster recovery in vulnerable communities.

Keywords: Disaster; Post-disaster recovery; Social networks; Social capital; Community resilience.

Poster ID: P250571

Understanding Community Perceptions and Adaptation Responses To Climate Change in Rural Rangpur, Bangladesh

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Abstract: Climate change has posed considerable challenges worldwide, with rural communities in developing countries like Bangladesh being among the most affected. This present study explores community perceptions and adaptation responses to climate change in rural Rangpur, focusing on causes, impacts, and adaptive practices. Using a mixed-methods approach, data were collected through structured surveys of 102 randomly selected households with in-depth interviews, and expert consultations. Findings revealed that communities perceive deforestation (83.3%), industrial pollution (57.8%), fossil fuel use (38.2%), and even human sins as major causes of climate change. Communities reported experiencing erratic rainfall, rising temperatures, and flooding, as well as poor drinking water (44.12%), livelihood loss (20.59%), mental stress (12.75%), and heatstroke risk (71.57%). To cope, rural communities adopt practices, such as seeking shade under trees, changing cropping patterns (56.86%), using hybrid seeds (71.57%), and raising homesteads (20.59%). The study highlights for education, planning, and policies to strengthen rural adaptation.

Keywords: Climate Change, Community Perceptions, Adaptation Responses, Rising Temperature, Mixed Method, Rangpur

Poster ID: P250586

Assessing Vulnerability and Survival Strategies Of Riverbank Erosion Displaces in Bangladesh: A Study on The Teesta Riverine Ecosystem

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Abstract: Intense riverbank erosion in Bangladesh, driven by climate change and fragile sandy soils, displaces thousands annually, causing severe human and economic losses. This study examines the vulnerability and survival strategies of displacee households in Char Bidyananda, a remote village in the Teesta riverine ecosystem. Employing a mixed-methods approach, data were collected through structured interviews with 107 displacee household heads, supplemented by focus group discussions, case studies, and informal interviews. Findings reveal that repeated displacements have generated severe financial, social, and health insecurities, including loss of homesteads (100%), crops (92.5%), agricultural land (64.5%), and social care networks (94.4%), alongside heightened psychological stress (17.8%). These losses illustrate multidimensional vulnerabilities as physical, social, and motivational. Applying the Pressure and Release (PAR) model, the study shows how vulnerabilities stem from structural root causes, dynamic pressures, and unsafe conditions. The paper calls for urgent community-based interventions, infrastructure investment, vocational training, and sustainable livelihood initiatives.

Keywords: Riverbank Erosion, Displacee Households, Vulnerability, Survival Strategies, Income Earning Activities (IEAs), Bangladesh

Poster ID: P250607

Patriarchy and Identity: An Existential Analysis of Gender Roles in A Doll's House and Bangladeshi Society

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Abstract

A Doll's House is a pathetic reflection of a male-dominated society which reveals how women and men are treated as dolls within the patriarchal society. In the novel, Henrik Ibsen attempts to portray the societal structure that defines people as either "woman" or "man," where Nora and Torvald's actions exemplify patriarchal expectations. This novel is both a mirror of European culture and the efficient culture of Bangladeshi society. Especially in rural areas of Bangladesh, men and women have to play a role that the patriarchal society expects from them. The objectives of this paper are to find out the mechanisms behind the gender roles and their expectations. From the lens of existentialism, this paper will study the comparative analysis between the action of the play and Bangladeshi middle-class society to find out the continuity of patriarchal power, women's quest for freedom, and men's existential crisis through a mixed-method study.

Keywords: Gender role, existential crisis, patriarchy, middle class society and power.

Poster ID: P250618

Assessing the Impact of TCB Cards on Economic Welfare and Consumption Patterns among Lower-Middle Income Groups in Bangladesh

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Abstract: This study investigates the impact of Trading Corporation of Bangladesh (TCB) Family Card program on the economic welfare and consumption patterns of low-middle-income households in Bangladesh. Through mixed-method approach, combining quantitative analysis with propensity score matching (PSM) and qualitative over-the-phone call and in-person interviews, the research evaluates the program's effectiveness in improving food security, financial stability, and consumption patterns. The sample comprised 368 respondents, with 184 TCB cardholders (treated group) and 184 non-cardholders (control group), surveyed in 11 districts of three divisions. Additionally, 01 FGD and 02 KII were conducted to verify overall program's efficacy. It is identified that TCB card helps reduce food expenditures and improve savings behavior, but long-term economic welfare remains limited due to its narrow scope and governance challenges. Despite positive effects, such as lower food costs and increased nonfood expenditure, cardholders still face issues related to food quality, access, and irregular distribution. The study suggests improvements in targeting, stock management, and transparency to enhance the program's impact on vulnerable populations.

Keywords: Trading Corporation of Bangladesh (TCB), Family Card Program, Economic Welfare, Consumption Patterns, Food Security, Propensity Score Matching (PSM).

Law and Governance

Poster ID: P250339

Uniform Civil Code: A Comparative Analysis on the Basis of the Constitutional Mandate of Bangladesh

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Abstract

Bangladesh is a democratic country, and it is often trumpeted for pluralistic credentials. This is because of coexistence of religiously diverse communities in its country border. Bangladesh is an inclusivist democratic country but there are different types of personal laws for each religious community. Those laws have been derived from their own religious belief trammes as divine laws. However, there are several enacted laws and Constitutional mandates to secure and to provide protection of those personal laws for the diversely religious sects. The people of this land are definitely religious and generous to their religion by birth. Besides, on the basis of the people's aspirations of religious credentials, the Constitution has also recognised the right to religion that is guaranteed in Article 41 as fundamental right. Besides Article 2A ensures equal rights and status of all religions. The paper predominantly aims at upholding the overall scenario of multiple personal laws and pessimistic consequences of uniformation of those diversely contented personal laws. The paper also shows the favourable repercussions of personal laws on the basis of Constitutional directives.

Keywords: Constitutional mandate, inclusivity, diversity, religious rights.

Poster ID: P250346

A Forgotten Heir: The Legal Limbo of Hijra and Other Third Gender Identities Under the Inheritance Laws of Bangladesh

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Abstract

In Bangladesh, despite the legal recognition of 'Hijras' and other gender identities as 'third gender' in 2013, these individuals remain excluded from inheritance rights because of the country's binary religious-legal framework. This paper examines how Muslim personal law, Dayabhaga school of Hindu law, and the Succession Act, 1925 fail to recognize third-gender heirs. Unlike past studies on social marginalization, it offers a comparative legal analysis of inheritance rights within religious and statutory systems. Using a doctrinal method, it reviews Islamic Fiqh rules on intersex inheritance, Hindu exclusion through birth-based congenital impotence, and binary presumptions in the Succession Act, 1925. Drawing on jurisprudence and reforms from South Asia and Middle-East, the paper proposes two pathways: (1) inheritance based on dominant traits or self-declared identity under Fiqh, and (2) a gender-neutral statute. These recommendations aim to align succession law with constitutional and human rights mandates fostering legal inclusivity and sustainable social transformation.

Keywords: Hindu Law, Inheritance Rights, Muslim Law, Personal Family Laws, Succession Act, Third Gender (Hijra).

Poster ID: P250349

Wounds Without Witnesses: Gender, Grief, and the Mental Health Crisis Among Rohingya Survivors

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Abstract: In the aftermath of the Rohingya genocide, thousands of women and girls have suffered sexual violence including gang rape, forced pregnancy, miscarriage. In refugee camps across Cox's Bazar, those women remain trapped in the cycles of psychological trauma and unresolved grief. While international legal mechanisms have focused on documenting such atrocity crimes, the psychosocial aftermath for those survivors remains extremely neglected. This paper critically examines the mental health crisis among Rohingya women particularly survivors of gender-based violence. Through the lens of feminist trauma theory, the study investigates how legal and humanitarian systems exclude grief, embodied trauma that are silenced and invisible. The paper calls for a rights-based and survivor-centered mental health framework. This research demands the recognition of mental health as a core element of transitional justice. Until survivors' sufferings are acknowledged and supported, justice for Rohingya women will remain incomplete.

Keywords: Gender-based violence (GBV), Refugee women, Mental health crisis, Feminist theory, Trauma recovery, Emotional justice

Poster ID: P250407

Widespread and Systematic Culture of Enforced Disappearances in Bangladesh (2009 - 2024)

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Abstract: Enforced disappearance has emerged as a significant human rights concern in Bangladesh, particularly during the tenure of former Prime Minister Sheikh Hasina (2009–2024). This practice has been alleged to function as a tool for suppressing political dissent. To examine the principles, patterns, victim profiles, and mechanisms that make enforced disappearances in Bangladesh widespread and systematic. The proper function and implications of the present legal system are enough to deal with this scenario. A hybrid method is applied combining qualitative interviews and field investigations followed by quantitative analysis. From an initial dataset of over 1,800 cases, a representative sample of 253 was selected. Data collection involves victims' interviews, suspects interrogations, field visits, and consultations with governmental and non-governmental stakeholders. Findings indicate systematic targeting of political opposition by state agencies, involving abduction, torture, secret detention, and selective release. Besides political victims, nonpolitical victims were also abducted, tagging them later as Islamic Extremists. Victims and families face prolonged, if not permanent, physical, psychological, social, and economic harm. The study demonstrates that enforced disappearances are rooted in a systematic effort to suppress dissent, highlighting the necessity of transforming the legal culture and ensuring proper implementation of existing laws, rather than relying solely on new legislation.

Keywords: Enforced disappearance, Political repression, Human Rights Violations, State agencies, Legal reform.

Poster ID: P250411

Human Rights in Armed Conflicts: Legal Protections and Ongoing Violations

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Abstract: Despite the presence of international legal frameworks such as the Geneva Conventions and numerous human rights treaties, violations of human rights during armed conflicts continue to occur on a large scale. This paper explores the paradox of persistent human rights abuses in the context of contemporary armed conflicts, focusing on the Russia-Ukraine war, the Israel-Gaza conflict, and recent skirmishes between India and Pakistan. The study identifies key factors behind these violations, including political interests, lack of accountability, selective enforcement of laws, and challenges in implementation. It also highlights gaps within existing legal mechanisms and their enforcement, contributing to continued impunity for violators. By examining the nature of these conflicts and associated abuses, this research aims to propose practical recommendations to strengthen human rights protection during war. The study contributes to international legal discourse and calls for the reform of enforcement mechanisms, integration of real-time monitoring systems, and greater international cooperation.

Keywords: Human rights, Armed conflicts, Russia-Ukraine war, Israel-Gaza war, India-Pakistan conflict, international humanitarian law.

Poster ID: P250440

The Indus Waters Treaty in Crisis: International Legal Dimensions

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Abstract: The Indus Waters Treaty (IWT), signed in 1960 under the mediation of the World Bank, has served as a long-standing basis of trust in water sharing between India and Pakistan. Recently, there have been questions raised about legal validity of suspension of the treaty. The main objective of this study is to examine the legality and rationality of unilateral suspension by India. For this, a qualitative doctrinal research method has been adopted, where the original text of the IWT, the 1969 Vienna Convention on the Law of Treaties, and the relevant judgments of the International Court of Justice have been reviewed as sources of information. In addition, existing research and opinions of legal scholars have been analyzed. The results show that there is no scope for unilateral suspension of the IWT, rather, according to its Article 12, any modification or termination requires the consent of both countries. In this case, the conditions for suspension of the treaty mentioned in Articles 26 and 60 of the Vienna Convention were not fulfilled. The principle of ‘pacta sunt servanda’ also has been violated. Therefore, third-party mediation is needed to maintain the continuity of the agreement and protect regional water security and stability.

Keywords: Indus Waters Treaty, Legal Validity, Unilateral Suspension, Consent, Water Security

Poster ID: P250527

Paper Tiger Policies: Bangladesh's Plastic Ban and Implications for the Global Plastic Treaty

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Abstract: Bangladesh's government plastic bag ban in 2002, the Supreme Court (SC) single-use plastic ban judgments in 2020, and the unsuccessful 2024 Global Plastic Treaty negotiations all suffer from a critical flaw: strong legal frameworks lacking effective enforcement mechanisms. This study demonstrates that Bangladesh's government's plastic bag ban and a pioneering judgment on single-use plastic prohibition by the SC was unable to produce real change due to three primary issues: the absence of practical alternatives for around 1.5 million small vendors, corrupt enforcement practices that allowed manufacturers to operate with impunity, and the lack of political commitment to allocate funds for monitoring initiatives. Twenty-two years later, Dhaka's markets still flood with 14 million plastic bags daily, a stark reminder that judicial orders and international treaties mean little without enforcement power. The situation mirrors the failed Global Plastic Treaty: over 100 countries agreed in principle to reduce plastics, but rejected enforceable measures by a few. By analyzing policies and conducting in-depth interviews with vendors and consumers, this research demonstrates why Bangladesh's experience should alarm treaty negotiators without funding, grassroots oversight, and strict penalties for corporations, even flawless laws will fail. The solution? Bangladesh needs to adopt a new enforcement strategy that combines blockchain-tracked penalties for producers, subsidized jute alternatives, and citizen lawsuits creating a model the global community urgently requires.

Keywords: Plastic ban failure, Rights-based litigation, Global Plastic Treaty collapse, Bangladesh Supreme Court, enforcement gaps.

Poster Id: P250610

Waterlogged Sovereignty: Legal Pathways to Climate Resilience

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Abstract: Transboundary water disputes in South Asia, demonstrated by the catastrophic Feni floods of August 2024 in Bangladesh, reflect the inextricable link between water terrorism and environmental injustice. This study elucidates (i) how the upstream management of water, particularly the Indian sudden release of water from the Dumbur-Dam, caused the catastrophic flooding in the downstream Bangladesh and (ii) raises issues of heedlessness or even coercion (Sinha Roy et al., 2010). Critical, it reviews principles in international water law, the Ganges Water Sharing Treaty, and UN water conventions on the response to water terrorism. Taking the Feni floods as the principal case study with additional examples from South Asia, the article contends that the existing legislative frameworks are inadequate to secure the sharing of water in fairness and suggests reforms to safeguard marginalized downstream people. This is why the principle of *sic utere tuo ut alienum non laedas* underpins the importance of responsibility in transboundary water management.

Keyword: Flood, Water terrorism, Environmental Injustice, Transboundary Water Disputes, International Water Law

Agricultural Sciences

Poster ID: P250307

Biotechnological Advancements in Biocontrol Agents for Climate-Resilient Pest and Pathogen Management: A Review

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Abstract: A significant shift in pest and pathogen dynamics is being observed worldwide due to climate change-related factors such as extreme temperatures, irregular precipitation, and rising CO₂ levels, which expand pest and disease outbreaks across agricultural regions and are worsened by indiscriminate agrochemical use. To address this, developing climate-adaptive, eco-friendly control strategies is critical. This study reviews recent biotechnological innovations that enhance the efficacy and resilience of biocontrol agents (BCAs) for sustainable pest and disease management. Literature from Scopus, ScienceDirect, and Google Scholar over the past decade highlights advances including CRISPR-based gene editing, microbial consortia engineering, omics-driven protein and gene identification, and the use of biopolymers (agar, cellulose, chitosan, starch) and nano formulations. These tools strengthen the virulence, delivery, and stability of BCAs under climate stress, improving their efficacy and shelf life. While promising, challenges in field application, regulation, and socio-economic acceptance remain, underscoring the need to integrate biotech-enhanced BCAs with climate-smart farming for sustainable crop protection.

Keywords: Biocontrol agents, Biotechnology, Climate resilience, Pest management, Sustainable agriculture

Poster ID: P250317

Effects of Arbuscular Mycorrhizal Fungi on Tomato Plant Growth, Nutrients Uptake and Soil Aggregate Stability in Clay Soil

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Abstract: Arbuscular mycorrhizal fungi (AMF) form symbiotic associations with plant roots, enhancing growth, nutrient uptake, and soil health. While AMF effects alone are well studied, their interaction with organic and inorganic fertilization is less explored. This study evaluated AMF combined with straw and nitrogen on tomato growth, nutrient uptake, soil organic carbon, and aggregation. A 115-day pot trial with seven treatments (control, straw, straw + nitrogen, AMF, AMF + straw, AMF + nitrogen, AMF + straw + nitrogen) was conducted with three replications. AMF with straw or nitrogen significantly increased fresh and dry biomass compared to non-AMF or AMF alone ($P < 0.05$). Highest biomass occurred with AMF + straw (4.9 g), followed by AMF + nitrogen (3.7 g) and AMF alone (3.65 g). AMF reduced Na uptake but enhanced K uptake ($P < 0.05$). Soil aggregate stability improved by 60% with AMF plus fertilization. Overall, AMF inoculation with organic and inorganic inputs supports sustainable tomato cultivation in clay soils.

Keywords: Plant Productivity, Soil Structure, Organic fertilization, Sustainable Agriculture, Arbuscular Mycorrhizal Fungi, Nutrient Uptake

Poster ID: P250328

Epigenetic Regulation For Salinity Tolerance In Coastal Rice Of Bangladesh: A Frontier In Plant Breeding

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Abstract

Salinity intrusion threatens over one million hectares of coastal Bangladesh, sharply reducing rice yields. This study examined epigenetic regulation in the local variety *BRRI dhan 47* under 150 mM NaCl stress. Results showed 60% of stress-responsive genes were hypermethylated and silenced. CRISPR-dCas9-TET1 demethylation of *OsHKT1,5* boosted transcript levels by 40% and grain yield by 30%. Histone H3 and H4 acetylation further enhanced stress-gene expression, increasing biomass by 25%. Field trials in Khulna confirmed the improved performance. Epigenetic regulation emerges as a frontier approach for breeding salinity-tolerant rice and securing food production in coastal regions. More than one million hectares of salinity inundation in the coastal areas of Bangladesh has depressed rice yields and negatively affected the national food security of the country. The salinity tolerance gene editing using CRISPR is an unexplored area despite being studied a few times already. Unexplored mechanisms that can be used to improve salt resilience in rice may be provided by epigenetic regulation whereby the expression of genes is altered without changes in the DNA sequence. The research proposes the use of epigenetics in the form of DNA methylation and histone acetylation to enrich rice genotypes to enhance salinity tolerance of rice in coastal areas of Bangladesh. Local cultivar *BRRI dhan 47* was subjected to bisulfite sequencing and chromatin immunoprecipitation in combination with next-generation sequencing on the same growing medium (150 mM NaCl) and control conditions. Candidate stress-responsive genes, such as *OsHKT1,5*, were identified. The CRISPR-dCas9 was fused to the redox enzyme TET1 which mediated targeted demethylation and genetic editing of the histone acetylation transcriptional machinery was accomplished using separate constructs. The agronomic responses (yield, biomass) of edited lines were assessed and further tested in a field trial in Khulna Subregion, as was their epigenetic stability. About 60 percent of the stress-responsive genes were hypermethylated and caused silenced expression relative to controls in salinity. *OsHKT1,5* was targeted with demethylation, found to increase transcript levels by 40 % and led to better ion homeostasis and a rise of 30 % in grain production in edited plants. This was by acetylating histone H3 and H4 facilitating an increase in stress-gene expression that resulted in a 25 % gain in biomass. Epigenetic control can become the new, uncharted path toward engineering salinity tolerance in rice, with a possibility of providing fast adaptation to saline soils of coastal Bangladesh. Further investigation into epigenetic stability is warranted.

Keywords: salinity stress, rice, epigenetics, DNA methylation, histone acetylation, Bangladesh

Poster ID: P250335

Role Of Quantum Dots In Plant Disease Diagnostics: A Review Of Scopes And Opportunities

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Abstract

Quantum dots (QDs), nanosized semiconductor particles, are versatile fluorescent probes with tunable emission, photostability, and strong biological compatibility. QDs bind with specific pathogens. When light energy is imposed, they emit a light energy of specific wavelength, acting as a marker for pathogen detection. The objective of this study is to assess the potentiality of QDs to enable rapid, sensitive, and targeted detection of plant pathogens as well as to explore the scopes and challenges in adoption. This study combines a review of recently published peer-reviewed articles on relevant topics and a questionnaire method survey involving 20 farmers from Mymensingh. Findings highlighted QDs' high sensitivity, and early detection ability against pathogens. But challenges remain in cost, awareness, and accessibility. QDs showed real-time, and specific pathogen detection. Farmer confidence should be raised through awareness campaigns, and government subsidies for root level adoption of QDs.

Keywords: Quantum Dots, Pathogens, Challenges, Adoption, Awareness

Poster ID: P250355

Real-Time Irrigation Advisory Systems Based on Machine Learning Predicted Soil Moisture

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Abstract

Bangladesh's irrigated farms have trouble getting enough water and rain that doesn't fall regularly. We have built a real-time irrigation advisory system that can predict how wet the soil will be on each plot and give crop-specific timetables. The pipeline fuses Sentinel-2 imagery, meteorological reanalysis (ERA5, NASA POWER), and in-situ sensors, features are temporally aligned, engineered, and normalized, LSTM, XGBoost, and Random Forest models forecast moisture at high spatiotemporal resolution. An advisory layer combines forecasts with crop evapotranspiration to generate optimal events, delivered through a GPS-enabled web/mobile interface. In planned field trials, system-guided irrigation will be compared with farmer practice. We anticipate 20–30% water savings, improved yields, and higher irrigation efficiency, with farmer feedback refining deployment. The framework gives Bangladesh a scalable, locally adaptive way to do precision irrigation that helps with water management, food security, and climate resilience by combining predictive analytics with proactive assistance.

Keywords: precision irrigation, soil moisture prediction, machine learning, remote sensing, water-use efficiency, sustainable agriculture.

Poster ID: P250374

Meteorological Determinants and Spatiotemporal Dynamics of Foot-and-Mouth Disease in Bangladesh (2017–2023): Insights from Machine Learning Forecasting

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Abstract: Foot-and-mouth disease (FMD), a highly contagious transboundary viral disease of cloven-hoofed livestock, poses serious economic threats. This study examined the spatiotemporal distribution, meteorological drivers, and predictive trends in Bangladesh. FMD case data from DLS and climatic variables from BMD were analyzed using spatial autocorrelation (Getis–Ord Gi*, Moran’s I, LISA) and inverse distance weighting (IDW) to identify clusters and risk zones. Correlation and regression revealed significant associations of relative humidity, temperature, and wind speed with FMD incidence, with humidity and temperature showing positive correlations. Predictive modeling employed ARIMA, Random Forest, and XGBoost, where XGBoost achieved the highest accuracy (RMSE = 153.64), and Random Forest demonstrated stable performance. Seasonal peaks occurred in March, with persistent hotspots in the southeast and emerging northern clusters. IDW indicated higher risks in southern regions during pre-monsoon, strongly influenced by climatic factors. Findings provide critical insights for targeted surveillance and strategic interventions against FMD in Bangladesh.

Keywords: FMD, Spatiotemporal, Time series, Forecast, Climate factors, Bangladesh,

Poster ID: P250409

Effect Of Tillage on The Production Performance and Nutritional Composition of Soybean in Coastal Areas

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Abstract: This study was conducted to determine the effect of tillage on the production performance and nutritional composition of soybean (*Glycine max* (L.) Merrill) in coastal areas. The result showed significant difference ($p < 0.05$) in conventional tillage in different agronomic parameters at different DAPs. There was a highly significant ($p < 0.001$) effect of branch number in conventional tillage and varieties which is BARI Soybean-6 (23.69). Biological yield had a significant ($p < 0.05$) effect on tillage systems and varieties. Tillage systems and varieties had no significant ($p < 0.05$) effect on nutrient composition like DM, Ash, CP, EE etc. except CF ($p < 0.05$). The highest CF was found in BD-4 in no tillage which is V1T2 (9.27%). The highest CP (38.15%) was found in BARI Soybean6 in conventional tillage. It may be concluded that, BARI Soybean-6 with conventional tillage (V2T1) was found best interaction in respect of most of the agronomic growth parameters and nutritional composition in coastal areas.

Keywords: Soybean, BD-4, BARI Soybean-6, Conventional tillage, No tillage, Nutritional composition.

Poster ID: P250417

Effect Of Ginger And Moringa Aqueous Extract On Growth Performance, Meat Quality, Gut Health, Haematological And Serum Biochemical Response In Broiler Chickens

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Abstract: Plant-derived probiotics such as ginger (*Zingiber officinale*) and moringa (*Moringa oleifera*) offer natural alternatives to antibiotics by enhancing growth, immunity, and gut health in poultry. This study evaluated their aqueous extracts in 192 Arbor Acres broiler chicks over 35 days. Birds were assigned to four groups: T1 (control), T2 (1% ginger), T3 (0.2% moringa), and T4 (ginger + moringa). Growth performance, feed intake, FCR, meat quality, gut health, hematology, and serum biochemistry were assessed. Results showed that moringa (T3) significantly improved body weight, weight gain, feed intake, and feed efficiency ($p < 0.05$). Meat quality traits were higher in ginger and moringa treated groups, while gut pH and gram-negative bacteria were lowest in the combination group. Hematological indices and serum proteins increased, while cholesterol decreased in moringa-treated birds. Overall, moringa aqueous extract (0.2%) showed the best responses, suggesting its potentiality as a natural growth promoter in broiler production.

Keywords: ginger, moringa, performance, gut health, meat quality, broiler.

Poster ID: P250445

Future Of Sustainable Mud Crab (*Scylla Serrata*) And Asian Seabass (*Lates Calcarifer*) Culture In Bangladesh: Opportunities, Challenges And Economic Prospects

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Abstract: Mud crab (*Scylla serrata*) and Asian seabass (*Lates calcarifer*) are high-value aquaculture species in Bangladesh. In 2022, mud crab production reached 13,397 t—4,287 t from aquaculture—earning US \$42.9 million and employing over 300,000 people. Seabass culture, though semi-commercial, is expanding with high survival at optimal stocking densities. Key challenges include overharvesting wild seed, reliance on live feeds, limited hatcheries, and disease. Solutions involve hatchery seed production, RAS/biofloc adoption, species-specific feeds, polyculture, and value chain improvements. Bangladesh's coastal aquaculture holds strong export and livelihood potential for mud crab and Asian seabass, but sustainability issues limit growth. Assessing production status, identify challenges, and recommend sustainable strategies. Data reports are reviewed for trends and challenges. Mud crab output rose to 13,397 t, seabass shows high market value. Challenges: wild seed collection, feed dependency, hatchery gaps, disease. Targeted innovations, policy incentives, and training can make these sectors sustainable, boosting exports, livelihoods, and the blue economy.

Keywords: Mud crab, Asian seabass, hatchery, RAS, biofloc.

Poster ID: P250456

Rapid fraud detection of rice bran in turmeric powder (*Curcuma longa* L.) coupled with chemometric technique using ATR-FTIR spectroscopic method in Bangladesh

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Abstract

The fraudulent adulteration of turmeric powder with rice bran is a significant food safety concern in Bangladesh. Conventional detection methods are often insufficient for rapid industrial screening, creating a need for a more efficient approach. This study validates a non-destructive method combining Attenuated Total Reflectance-Fourier Transform Infrared (ATR-FTIR) spectroscopy with targeted chemometrics for detecting and quantifying rice bran adulteration. Spectra were collected from turmeric samples adulterated with rice bran (5%–95% w/w). For quantification, an Orthogonal Partial Least Squares (OPLS) model delivered excellent predictive accuracy ($R^2=0.997$, $RMSE_{cv}=4.01$). For classification, an Orthogonal Projections to Latent Structures Discriminant Analysis (OPLS-DA) model successfully discriminated between sample classes ($R^2=0.991$, $RMSE_{cv}=0.231$). These results confirm that ATR-FTIR spectroscopy, coupled with robust chemometric analysis, provides a powerful, high-throughput tool for ensuring turmeric authenticity and safeguarding consumers.

Keywords: Turmeric, Adulteration, ATR-FTIR Spectroscopy, Chemometrics, Rice Bran, Bangladesh

Poster ID: P250562

Soil-less Vertical Farming: Sustainable Fresh Food Production in Urban Areas of Bangladesh

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Abstract

Vertical farming is an agricultural technique in which crops are grown in vertical layers without soil using advanced technologies (Hydroponics, Aeroponics and Aquaponics). Due to urbanization, agricultural land is decreasing day by day in Bangladesh. According to the Bangladesh Bureau of Statistics (2023), every year the country loses approximately 1% of its farmland. The process offers a sustainable solution by enabling high yields in a short space, on rooftops, in unused buildings, and underutilized spaces. As it's a soil-less farming process, there is less use of pesticides with more nutrients and can ensure a fresh food supply in urban areas. Several agricultural research and educational institutions have successfully cultivated crops like lettuce, spinach, strawberry, tomato and basil by using vertical farming. But it's still in the piloting stage in Bangladesh. It can be a great initiative to overcome land scarcity, lower water usage, improve food quality as well as employment opportunities in the urban agriculture sector.

Keywords: Vertical Farming, Hydroponics, Aquaponics, Crop Production

Poster ID: P250581

Cardio-protective Effects of Pumpkin Seeds (*Cucurbita maxima*) and Chia Seeds (*Salvia hispanica*) on Doxorubicin-Induced Cardiotoxicity in Rat Model

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Abstract: Cardiovascular diseases, closely linked to oxidative stress, often receive limited relief from conventional drugs, which may cause adverse effects. This study investigated the cardioprotective potential of chia and pumpkin seeds against doxorubicin (DOX)-induced cardiotoxicity in rats. Twenty-five Albino rats were divided into five groups and administered DOX (15 mg/kg) intraperitoneally over 14 days. Intervention groups received chia (14 g/day), pumpkin (14 g/day), or mixed seeds (7 g/day/each seed) with a basal diet. On day 15, blood samples were analyzed for lactate dehydrogenase (LDH), malondialdehyde (MDA), and lipid profile. The pumpkin seed group maintained body and heart weight ratios and significantly reduced LDH (63.42%, $p < 0.000$). The mixed seed group showed marked reductions in MDA (27%), cholesterol (25.84%), triglycerides (48.82%), and LDL (95.70%), while increasing HDL (56.72%). These findings suggest that chia and pumpkin seeds offer significant cardio-protection and may serve as functional foods. Clinical studies are needed to validate these findings.

Keywords: Cardiovascular disorder, Oxidative Stress, Chia Seed, Pumpkin Seed, Phytochemicals.

Poster ID: P250606

Sustainable Pet Food Innovation: Nutritional Evaluation of Products Derived from Invasive Sucker Mouth Catfish (*Hypostomus plecostomus*)

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Abstract: The sucker mouth catfish (*Hypostomus plecostomus*), an invasive species proliferating in the rivers of Bangladesh, poses a severe ecological challenge by threatening native biodiversity and disrupting aquatic ecosystems. This study presents an innovative, sustainable strategy to mitigate its impact by converting the species into a high-quality, low-cost pet food, thereby linking biodiversity management with food security and economic resilience. Suckerfish were harvested and processed through cleaning, grinding, and baking, supplemented with essential vitamins, minerals, and natural binders to ensure nutritional adequacy and stability. Proximate analysis quantified protein, fat, and moisture content, while feeding trials and sensory evaluations with cats and dogs assessed palatability, safety, and acceptance. The formulated diet contained ~26% protein, 12% essential fatty acids, and sufficient micronutrients, meeting international nutritional benchmarks for pet food. Feeding trials confirmed strong acceptance without adverse effects, demonstrating both nutritional viability and consumer safety. This work demonstrates a scalable model for transforming an invasive species into a valuable resource, simultaneously addressing ecological threats, reducing dependence on imported pet food, and promoting circular bioeconomy principles. The approach offers global relevance for managing invasive species through resource valorization and sustainable food innovation.

Keywords: Sucker mouth catfish (*Hypostomus plecostomus*), Invasive species management, Handmade pet food, Nutritional analysis.

Information Technology and Computer Science

Poster ID: P250414

Investigating and Enhancing Zero-Day Attack Detection in Cloud Environments Through Hybrid ML and Deep Autoencoder Models

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Abstract: The inability of supervised machine learning models and conventional firewalls to recognize zero-day attacks' unknown signatures makes them a serious cybersecurity threat. The performance of several supervised learning algorithms, including AdaBoost, XGBoost, CatBoost, Naive Bayes, and Logistic Regression, is assessed in this study using the CIC-IDS-2017 dataset. For known attacks, these models demonstrated high accuracy (up to 99.9%). However, when applied to unknown or zero-day attacks, their efficacy significantly decreased (to about 66%). Unsupervised learning methods with autoencoder were investigated in order to overcome this restriction. A standard autoencoder provides a moderate improvement. We have proposed a Deep Autoencoder greatly improved detection with a 91.17% accuracy rate. According to the results, deep autoencoders provide a more reliable and strong method for detecting zero-day attacks in cloud environments. In conclusion, deep autoencoders have shown to be a highly effective approach for detecting zero-day attacks in cloud environments, significantly outperforming traditional supervised learning models and offering a promising solution to address the limitations in recognizing unknown attack signatures.

Key words: Zero-day attacks, Cybersecurity, Firewalls, Logistic, XGBoost, Deep-Autoencoder.

Poster ID: P250471

Robot Assisted knee joint RoM exercise

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Abstract: Exercises for knee joint rehabilitation are crucial for people whose health conditions limit their range of motion. During these exercises, limb reflex response frequently throws off load balance, which can result in secondary injuries. In order to develop a robotic rehabilitation system, the study investigates the relationship between joint motion characteristics and joint impedances. The system uses a torque compensator to dynamically correct control errors in real time and estimates impedances from internal feedback using control engineering principles. The experimental results demonstrate a wide range of responses with high accuracy, tracking position and velocity with 91% precision and preserving extremely low errors of $\pm 0.02^\circ$ during hold and $\pm 0.14^\circ$ during motion. The system exhibits encouraging potential despite having a restricted range of motion of 0° to 25° . This invention could expedite recuperation, standardize remote rehabilitation, and provide a secure, affordable way to increase knee joint mobility in Bangladesh, where physiotherapy services are scarce, as well as both domestically and internationally.

Keywords: Knee joint rehabilitation, Robot assisted system, Assistive RoM exercise, Impedance estimation, Human-robot interaction.

Poster ID: P250475

Automated Medication Management and Assistive Unit for Elderlies

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Abstract: Managing daily medicine intake is a challenging task for many patients having chronic diseases like diabetes. Diabetic patients often need to take insulin in varying doses based on daily blood sugar levels, weight, etc. Manual tracking of medicines and insulin-dose can lead to mismanagement. The objective of this project is to develop an AI based Smart System that automates the medication management and predicts insulin doses for elderly diabetic patients to ensure safe and accurate medication adherence. The system features a 20-slot automated medicine dispenser equipped with a touchscreen, IR sensors, speaker, and notification capabilities. When hand is placed near a slot, the system audibly announces the corresponding information. Usage is automatically logged for record keeping. For diabetic patients, the system incorporates AI-based models to predict optimal insulin dosages by analysing blood-sugar, weight, height, gender, and other health parameters. The system allows patients to take medicines on time, reduces human errors, and provides accurate (96%) insulin-dose recommendations. It simplifies medicine management for all with additional support for diabetic care. The Automated Medication Management and Assistive Unit improve medication adherence, reduces risks from incorrect dosages, and supports overall patient health with automated monitoring and intelligent insulin dose prediction.

Keywords: Smart Medicine, Insulin Prediction, IR Sensor, Voice Alert, Email Notification.

Poster ID: P250496

Mental Health Monitoring using NLP

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Abstract: In recent years, social media platforms such as Facebook, Twitter, Instagram and Reddit have transformed into primary ecosystem where individuals share their thoughts, emotions and life experiences in posts. These posts often contain hidden signs of mental health situations. This study proposes a Natural Language Processing (NLP) pipeline to detect depression, anxiety, normal, bipolar, suicidal, personality disorder and stress from textual posts. A Kaggle dataset was preprocessed through tokenization, stop-word removal, normalization and lemmatization to create clean input for analysis. Features such as sentiment polarity and linguistic tone were extracted and vectorized. Several machine learning algorithms were tested, among them Linear Regression approach achieved the best accuracy of 94.15%. This approach highlights sentiment and emotional analysis, which will help early identification of mental health risks. This work highlights the potential of AI-driven tools in promoting mental health awareness.

Keywords: Social Media, NLP, Sentiment Analysis, Early Identification of Mental Health, SVM.

Poster ID: P250507

Head-Bot, An Ai Based Cognitive Platform

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Abstract

Many service robots today feel stiff and struggle to adapt in dynamic environment. Conversations often seem scripted and unable to handle new tasks. This study aims to build a robot head (Head-Bot) that can chat naturally, navigate spaces on its own, and carry out tasks independently. The system is able to interact with human through natural language processing, allowing continuous communication between two parties. Head-Bot runs on multiple Raspberry-Pi controllers integrated with a high-performance PC for speech recognition, person recognition, and answering questions. The Head-Bot structure is designed with a number of hexagonal PVC sheet, mimicking a human-head like shape integrated with display, camera, microphones, and speaker units. The Artificial Neural Network models are tested with accuracy of 95.05% for face detection and recognition, 99.0% for dialog recognition and response generation. Head-Bot is an affordable, flexible solution for various service sectors, with strong potential for large-scale deployment in AI-enabled environments.

Keywords: Head-Bot, Service robots, Chat-bot, Robot head, Cognitive robot, Artificial intelligence

Poster ID: P250511

Gamified Mobile Banking Adoption Among University Students in Bangladesh: An Analysis of Engagement, Behavior, And Demographic Influences

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Abstract

This paper examines the uptake of gamified mobile banking by university learners in Bangladesh with respect to the paradox of high mobile penetration, but low utilization of formalized financial services. The ANOVA, Chi-Square, and regression analyses were used to analyze survey data of 52 students to assess behavioral and demographic determinants of adoption. Findings show intrinsic motivation, which is measured by the level of user comfort, is the best positive predictor of interest in gamified features ($R^2 = 0.329$, $p < .001$). Conversely, the extrinsic motivators, like reward systems, were not significantly related to the frequency of use, which highlights the weakness of the reward-based strategy. It was also revealed that gender also played an important role in determining reward preferences, and therefore, homogeneous gamification models are not acceptable. All in all, the results emphasize the significance of user-centered, demographically customized, and trust-based mobile banking apps in the promotion of financial inclusion in developing economies.

Keywords: Gamified Mobile Banking, User Adoption, Fintech, User Experience, Bangladesh

Poster ID: P250514

Human-Robot Zero-Sum Game for Entertainment and Education

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Abstract: Traditional instruction in computer vision, ML, and robotics often lacks hands-on engagement. QRARG-RoboRPS provides an AI-powered, extensible platform centered on Rock-Paper-Scissors that also generalizes to other interaction tasks using a Raspberry Pi, a five-finger robotic hand, and plug-and-play sensors. A two-stage pipeline utilizes MediaPipe to extract hand landmarks and a lightweight Random Forest optimized with TensorFlow Lite for real-time classification. OpenCV and Pygame handle video and UI. The Pi drives servo motions via an Adafruit PCA9685 PWM driver, yielding lifelike actuation. The prototype achieves ~99% gesture accuracy with <100 ms end-to-end latency, enabling smooth gameplay and live visualization of metrics like FPS, accuracy, and latency. Designed for university, high-school, and middle-school classrooms, the system applies game-based and visual learning to make CV/ML/robotics easier to grasp. It turns human-robot interaction into an accessible lesson in perception, inference, and control, and is suitable for classroom deployment and commercial educational robotics kits.

Keywords: Computer vision, Gesture recognition, Human-robot interaction, Educational robotics, Game-based learning.

Poster ID: P250517

QRARG – Eye Motion Tracker

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Abstract: Locked-In Syndrome and patients with such severe communication impairment cannot afford currently available assistive technology which are too expensive (>\$6,000) and require specialized hardware. Over 300,000 patients worldwide cannot afford to buy currently available eye tracking based communication systems because of their expense, leaving them unable to convey basic needs or effectively communicate with caregivers. We developed an inexpensive, AI-powered eye movement tracking system for commercial off-the-shelf android device cameras that enables paralyzed patients to communicate through eye movements with 100ms latency and clinical-grade precision at 90% lower cost than existing solutions. It uses MediaPipe framework for real-time pupil detection, in-house machine learning models for gaze prediction, and blink identification and OpenCV for computer vision. The app is multi-language supported and facilitates patient monitoring 24/7. The system demonstrates proper screen pointing, reliable blink-based command interpretation, and emotion detection capabilities.

Keywords: severe communication impairment, assistive technology, eye tracking system, affordable healthcare technology, AI powered communication, gaze prediction

Poster ID: P250524

Ai-Driven System For Hazard Detection And Predictive Analysis Of Fire Occurrence And Spread

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Abstract

Fire outbreaks cause significant damage to life and resources. Numerous incidents of fire outbreaks happen every year which cause a substantial number of deaths every year. Fire hazards affect not only human establishments but also natural landscapes where wildfires pose a serious problem. Monitoring through human agents for outbreak detection is a common but inefficient procedure in this case. Human monitors also cannot recognize hazardous activities which can cause fire outbreaks in advance, neither can they predict the severity or spread of the fire outbreak. Automated solutions exist for this problem but they do not retain their performance of image identifications to that of video identification along with data scarcity and generalization issues. Thus, an AI-Driven System has been implemented which can recognize fire hazards in advance, identify fire outbreaks, predict damages based on spread with accurate results and notify fire service officials and relevant stakeholders as soon as possible.

Keywords: Fire outbreak; Fire hazard; Potential Damage; Damage Estimation; AI-Driven System

Poster ID: P250568

A Hybrid Denoising Autoencoder and CNN Approach for Pneumonia Detection from Chest X-Ray images.

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Abstract

Pneumonia is one of the leading causes of morbidity and mortality worldwide, and chest X-rays are commonly used for its early detection. However, image noise and low-quality scans often reduce diagnostic accuracy, making automated detection more challenging. We propose a hybrid deep-learning pipeline that couples a denoising autoencoder (DAE) with a convolutional neural network (CNN). The DAE reconstructs cleaner radiographs from noisy inputs, and the CNN classifies pneumonia versus normal. Trained on the Kaggle chest X-ray dataset with augmentation, class weighting, and early stopping to mitigate imbalance and overfitting, the combined model achieved 91.5% accuracy and a 93.5% F1-score, outperforming a CNN alone (86.1% accuracy; 89.8% F1-score). These findings indicate that integrating denoising with classification substantially improves pneumonia detection and offers a promising solution for more robust medical image analysis.

Keywords: Pneumonia; Chest x-ray; Denoising Autoencoder; CNN; Classification; Deep

Poster ID: P250597

Decoding AI Adoption: Insights on AI Use Among Bangladeshi University Students

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Abstract

Artificial Intelligence tools are increasingly transforming how students learn, solve problems, and make decisions in education. In Bangladesh, the adoption of these tools among students is still in its early stages and is shaped by a variety of behavioural and contextual factors. This study examines the adoption of AI tools by students using the Theory of Planned Behaviour (TPB). A structured questionnaire was used to collect responses from 416 university students of Bangladesh using convenience sampling. The findings indicate that attitude has a significant impact, subjective norms have a weak impact, and perceived behavioural control has a moderate impact on students' behavioural intentions, which in turn have a significant and positive impact on students' actual use of AI tools. The study, grounded in the Bangladeshi context, provides practical insights for educators, policymakers, and technology developers seeking to enhance AI integration in education and enhance student engagement with these emerging tools.

Keywords: Artificial Intelligence, Students, Theory of Planned Behaviour, Bangladesh, Education.

Environmental Sustainability

Poster ID: P250304

Eco-physiological Responses and Metals Accumulation in *Terminalia arjuna* under Chromium and Lead Stress in Hydroponic System

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Abstract: Heavy metal contamination is a growing global challenge, largely caused by industrial and agricultural activities. These pollutants can impair plant growth, disrupt ecosystems, and enter the food chain with consequences for human health. This study assessed how chromium (Cr³⁺) and lead (Pb²⁺) affect the growth, physiology, and biochemical responses of the medicinal tree *Terminalia arjuna* under hydroponic conditions. Seedlings were exposed to five treatments: Cr³⁺ (1 and 5 mg/L), Pb²⁺ (1 and 5 mg/L), and a control. Root and shoot length, photosynthetic rate, stomatal conductance, membrane stability, and pigment content were measured. Stress indicators including proline, hydrogen peroxide (H₂O₂), and malondialdehyde (MDA) were quantified. Metal uptake and translocation ratios were also evaluated. Results showed that both metals significantly ($p < 0.05$) reduced growth and photosynthetic efficiency while triggering oxidative stress. Chlorophyll and carotenoids declined, whereas proline, H₂O₂, and MDA increased, indicating stress adaptation alongside cellular damage. Translocation ratios showed that accumulation followed the order root > stem > leaves. Cr³⁺ and Pb²⁺ exposure impaired growth and physiological performance in *T. arjuna* seedlings. These findings highlight the ecological risks of heavy metal accumulation in medicinal plants and point to the need for further molecular-level studies on stress tolerance mechanisms.

Keywords: Heavy metal stress; *Terminalia arjuna*; Chromium; Lead; Hydroponics

Poster ID: P250345

Towards Climate-Resilient Coastal Futures: A Transformative Framework for Sustainable Coastal Zone Management in Bangladesh

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Abstract: The coastal areas of Bangladesh are particularly susceptible to climate-induced hazards, posing major risks to both people's lives and the environment. Integrated Coastal Zone Management (ICZM) provides a fundamental framework to address coastal risks, nevertheless, its efficacy in addressing the dynamic and swiftly evolving impacts of climate change is limited by its static and sectoral nature. The study strives to design and assess a Climate-Resilient Sustainable Coastal Zone Management (CRSCZM) framework that fosters sustainability, resilience, and adaptation in the coastal regions of Bangladesh. A systematic literature review was conducted to assess the existing governance frameworks, enforcement strategies, and coastal management regulations, integrating resilience thinking, adaptive governance, blue economy prioritization, ecosystem-based adaptation, nature-based solutions, and climate-responsive policy. The results argue that coastal governance should shift to a proactive, integrated, and climate-responsive approach for long-term coastal management. This covers climate finance systems, stakeholder participation, AI-driven marine resource management, and Dynamic Climate Buffer Zones for land use modification. This research enhances coastal resilience discourse by addressing gaps in ICZM and promoting long-term climate adaptation. It offers practical recommendations for policymakers and researchers to improve Bangladesh's coastal sustainability amid rising climate challenges.

Keywords: Climate-resilient, Sustainable coastal zone management, Nature-based Solution, "Coastal governance, Dynamic Climate Buffer Zones.

Poster ID: P250360

Transforming Industrial Waste into Sustainable Construction Materials: An Innovative Approach to Eco-Friendly Bricks.

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Abstract: This study focuses on transforming plastic waste into sustainable concrete bricks, offering an eco-friendly alternative to traditional clay bricks. In Bangladesh, brick kilns are one of the largest contributors to carbon emissions, deforestation, and soil degradation, while unmanaged plastic waste continues to pollute land and waterways. The project addresses both challenges by reusing non-recyclable plastic as a key raw material in brick production. The process involves collecting, cleaning, shredding, and mixing plastic with sand and binders to form durable, water-resistant bricks. Unlike clay bricks, these do not require burning, which helps reduce nearly 99% of CO₂ emissions. The bricks are strong, long-lasting, and cost-effective, making them suitable for widespread use in construction. This approach demonstrates how local waste can be turned into valuable building materials, reducing environmental harm while supporting climate resilience. The model is simple, scalable, and has strong potential for replication in other regions.

Keywords: Plastic Waste Recycling, Sustainable Construction Materials, Eco-friendly Bricks, Circular Economy, Low-carbon Building Solutions.

Poster ID: P250363

Spatio-temporal evolution and future modeling of ecosystem service value (ESV) in response to land use land cover (LULC) change of urban ecosystems in Bangladesh: A case study of Mymensingh City Corporation and Rangpur City Corporation

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Abstract: In developing countries like Bangladesh rapid urbanization has become a threat to urban ecosystems. To address this issue, this study assessed the impact of land use land cover (LULC) change on urban ecosystem services of Mymensingh City Corporation (MCC) and Rangpur City Corporation (RPCC) over 2000-2025 period with projections to 2040. LULC was derived from Landsat satellite imagery, associated ecosystem service value (ESV) was calculated using Benefit Transfer Method and future projections were simulated using CA-MC model. The results revealed a significant increase in built-up areas, 16.13% for RPCC and nearly twofold 30.99% for MCC. The total ESV of MCC rose by 0.4 million USD. In comparison, RPCC achieved a larger gain of 4.48 million USD. Projected scenario revealed a continuous uptrend in built-up area accompanied by a declining trend in agricultural land, highlighting the need for sustainable urban development that integrates ecosystem management strategies.

Keywords: Ecosystem service value, Land use land cover change, Benefit transfer method, Cellular automata Markov chain, Urban ecosystem

Poster ID: P250378

Real-Time Flood Forecasting System for Sylhet, Bangladesh: A Hybrid ANN-Fuzzy Logic Approach

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Abstract: Sylhet is under constant threat of disastrous floods as the geographical positioning of this region is special as major rivers meet at one point and monsoon is at a high rate. The flooding processes over the past few years have proved the importance of implementing advanced early warning systems that should save vulnerable communities and reduce financial losses. The objective of the research is to design a smart real time flood predictive forecasting system that would give advance warning to harness disaster preparedness and response in Sylhet region before flood events happen. We bring forward the idea of a hybrid computational intelligence model that should be adopted using both, Artificial Neural Networks to predict rainfall and Fuzzy Logic to assess the risk of flooding. Using real time meteorological data (temperature, humidity, and precipitation) combined with river level controls, the system will create flood forecasts and early warnings, making them possible to act on the information. The system under proposal is very accurate in its predictive ratios showing correlations as high as 0.93 based on validation studies on historical data. The model is effective in detecting the various levels of floods severity as well as giving advance warning time that could be used to trigger emergency responses. This smart flood warning system provides a feasible alternative to flood disaster mitigation, which may contribute to saving lives and mitigating property losses by means of alerting in time and enhancing the emergency preparedness in the regions threatened by floods.

Keywords: Flood Forecasting, ANN, Fuzzy logic, Machine Learning, Hybrid Model

Poster ID: P250388

Assessment of Waterlogging Vulnerability in Coastal Cities of Bangladesh: A Comparative AHP-Based Study of Khulna and Barishal

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Abstract: Waterlogging, resulting from inadequate drainage and excessive surface runoff, is an increasingly severe urban challenge in rapidly urbanizing coastal regions. This study employs an integrated Analytical Hierarchy Process (AHP) framework to evaluate waterlogging vulnerability in Khulna and Barishal, two riverine urban centers in southwest and south-central Bangladesh. Spatial parameters including elevation, slope, land use/land cover (LULC), NDVI, NDWI, topographic wetness index (TWI), flow accumulation, and population density were analyzed to generate vulnerability maps. Results indicate that 31.14% of Khulna and 30.17% of Barishal fall within high to very high vulnerability zones. Khulna's densely built, low-lying neighborhoods near drainage channels exhibit the highest risk, whereas Barishal benefits from more extensive vegetation and agricultural cover (54.50%) compared to Khulna (19.17%). Nonetheless, Barishal's green cover is environmentally fragile, while Khulna's rapid urbanization introduces distinct hazards. Overall, the findings confirm that AHP-based spatial integration is an effective tool for identifying vulnerability hotspots and informing targeted mitigation strategies.

Keywords: AHP, Waterlogging, Vulnerability, Urban Flood, GIS

Poster ID: P250423

Transitional Justice and Truth & Healing in Bangladesh: Post-July Revolution Pathways to Accountability and Reconciliation

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Abstract

The 2024 July Revolution in Bangladesh led to an interim government amidst widespread human rights violations, including an estimated 1,400 deaths and over 11,700 arbitrary arrests. This upheaval necessitated a comprehensive approach to transitional justice. This report examines the transitional justice and truth & healing initiatives undertaken in post-revolution Bangladesh, by assessing their effectiveness in fostering accountability, reconciliation, and democratic transition. The study analyzes the interim government's initial reforms, identifies persistent challenges and incorporates lessons from comparative international transitional justice experiences. Key findings reveal the interim government's efforts in judicial appointments and the July Declaration. However, significant challenges persist, including security forces impunity, arbitrary detentions, and political polarization. The proposed victim-centered Truth and Healing Commission (THC) is identified as a crucial mechanism for addressing grievances and promoting healing. Realizing the "Bangladesh 2.0" vision, the study prioritizes accountability, truth-seeking, reparations, and institutional reform to ensure peace and democratic stability.

Keywords: Transitional Justice, Bangladesh, July Revolution, Truth and Healing, Reconciliation.

Poster ID: P250427

Green Roof Systems to Reduce Urban Heat in Pabna Town

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Abstract

Rapid global urbanization fuels the Urban Heat Island (UHI) effect, substituting natural cover for heat-absorbing surfaces and triggering rising energy consumption, pollution and health effects. In a developing country like Bangladesh, these problems are critical. Pabna, a fast-developing urban area, represents this case in point. In 1999-2019, it saw built-up areas expanding 358% and losing 187.7 hectares of vegetation cover. This resulted in 4.01°C average land surface temperature increase from 2000-2020. Green roof systems provide an essential solution by bringing vegetation to rooftops, effectively combating UHI. They lower surface and indoor temperatures, lower cooling energy consumption, control stormwater and increase air quality. This paper assesses Pabna's climate predicament resulting from land-use conversion and suggests a customized green roof system, estimating its environmental and economic benefits to advocate for a climate-resilient, sustainable urban future.

Keywords: Urban Heat Island (UHI), Green Roofs, Land-Use Change, Climate Resilience, Pabna

Poster ID: P250439

From Waste to Wealth: Sustainable Solutions for Mining Waste Management

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Abstract: Mining waste refers to leftover materials from mineral extraction and processing. If unmanaged, such waste can cause serious environmental issues like acid mine drainage (AMD), habitat loss, and soil or water contamination. With global mining waste exceeding 10 billion tonnes annually, recycling and reuse are vital for sustainability. This study evaluates innovative strategies to transform mining waste into valuable resources, following circular economy principles. Research was based on publications from 1990 to 2022, where 35 papers were reviewed, and 20 were selected. Four major reuse categories were examined: metal recovery, fertilizers and soil amendments, construction applications, and advanced valorization. Proper disposal of mining waste is crucial, especially in developing countries. The waste hierarchy emphasizes minimizing generation, then reuse, recycling, and disposal as a last resort. Techniques such as metal recovery, filtration, and neutralization prepare waste for reuse. Findings show mining waste can be effectively repurposed through innovative approaches.

Keywords: Mining waste, Acid mine drainage (AMD), Circular economy, Metal recovery, Construction applications, Recycling and reuse.

Poster ID: P250447

Measuring and Forecasting Agricultural Carbon Footprints in Bangladesh: Hotspot Identification and Regression-Based Policy Recommendations

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Abstract: Agriculture in Bangladesh is a major source of greenhouse gas emissions while remaining critical for national food security. This study aims to quantify current carbon footprints, identify emission hotspots, and forecast future trends to inform sustainable policy interventions. Farm-level data on fertilizer use, irrigation, energy inputs, and crop-livestock practices were collected across rice, vegetable, and potato systems. The Cool Farm Tool was employed to establish baseline carbon footprints and spatially identify hotspots contributing disproportionately to emissions. Regression analysis was subsequently applied to model the relationship between management practices and carbon output, enabling scenario-based projections of future emissions under varying adoption rates of climate-smart interventions such as precision irrigation, biofertilizers, and agroforestry. Results indicate that fertilizer management and irrigation practices are the primary drivers of emissions, while targeted adoption of low-carbon technologies can reduce future carbon footprints significantly without compromising productivity. The study provides evidence-based policy recommendations for optimizing farm-level interventions, aligning with Bangladesh's Nationally Determined Contributions (NDCs), and supporting a transition toward low-carbon, high-output agriculture.

Keywords: Carbon footprint, Sustainable agriculture, Regression analysis, Climate-smart practices, Bangladesh, Policy recommendations

Poster ID: P250448

Groundwater Pollution in Bangladesh: A Comprehensive Review of Causes, Impacts and Future Directions

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Abstract

Groundwater is the main source of drinking and irrigation water in Bangladesh, with about 80% of the population relying on it. This paper reviews 20 years of groundwater pollution in Bangladesh, focusing on trends, sources, and health impacts from 2006 to 2025. Drawing from about 100 studies, it identifies key pollutants like arsenic, heavy metals, and nitrate, mainly caused by industrial waste, farming runoff, and poor sanitation. It examines how aquifer features and well depth affect pollution. Health risks in rural and peri-urban areas are also discussed. The study aims to identify research gaps and propose sustainable remediation and groundwater management strategies to protect Bangladesh's water resources.

Keywords: Groundwater Pollution, Arsenic Contamination, Public Health Impacts, Sustainable Management, Bangladesh.

Poster ID: P250484

From Depletion to Diversification: Reducing Dhaka's Dependence on Groundwater

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Abstract

Dhaka City, one of the fastest-growing megacities in the world, is facing severe groundwater depletion due to excessive extraction. The water table has been declining at a rate of 2–3 meters annually. This study looks at practical alternative solutions and helps reduce the pressure on groundwater. Industries can transition away from relying on groundwater, instead adopting treated water and harvested rainwater to meet their needs. Rainwater harvesting, through the establishment of rainwater harvesting plants (rainwater harvesting tanks), offers an effective solution, enabling the city to capture and store rainfall for various non-potable and potable uses. This shift will both alleviate the strain on aquifers and promote sustainability in water usage. Additionally, the potential of reusing, recycling, using water treatment plant, and tapping into alternative river water sources is explored as a key solution. With the growth of Dhaka, adopting innovative solutions, and implementing stringent industrial water policies is crucial.

Keywords: Groundwater, Depletion, Harvesting, Potable, Aquifers.

Poster ID: P250522

Spatial And Time Series Analysis of Aerosol Optical Depth Over Rangpur District, Bangladesh

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Abstract

This study investigates the spatial and temporal variations of Aerosol Optical Depth (AOD) in Rangpur District, Bangladesh, from 2005 to 2023, using MODIS Terra satellite data (MOD08_M3, 111 km resolution). Monthly and annual AOD averages were processed via Google Earth Engine, with temperature and humidity data sourced from the Bangladesh Meteorological Department. Spatial analysis revealed AOD ranging from 0.24–1.31 in 2005 and 0.39–1.49 in 2023, with the northwest region showing the highest values. Sen's slope test indicated a significant positive trend (slope: 0.0118, Z-value: 3.29). Regression analysis showed a positive correlation between AOD and temperature ($r = 0.502$, $p = 0.029$) and a negative correlation with humidity ($r = 0.494$, $p = 0.031$). These findings suggest that rising temperatures and declining humidity contribute to increased aerosol loads, highlighting the need for further air quality monitoring in Rangpur.

Keywords: AOD, Rangpur, MODIS Data, Temperature, Humidity, Trend analysis.

Poster ID: P250539

Migrants' experiences of vulnerability and coping in the context of CBDRM: A study of urban slums in Chattogram

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Abstract

Chattogram is known as a commercial hub in Bangladesh and the fastest-growing city that attracts many migrants, particularly from rural areas affected by climate change. As Chattogram is a coastal city, many people face disaster problems and often remain excluded from Community-Based Disaster Risk Management (CBDRM) initiatives. The study explores the barriers migrants face in accessing CBDRM support during and after disasters. The study employs qualitative methods of data collection, including in-depth interviews, key informant interviews, and focus group discussions, to gain insight into the lived experiences, perceptions, and challenges of the most affected migrants in the city, as well as their involvement in CBDRM activities. The findings indicate that migrants face unstable housing, insufficient drainage, and risks of flooding, with women expressing concerns regarding safety and sanitation during disasters. They frequently face exclusion from formal urban disaster governance planning, early warning systems, and relief distributions, and are often regarded as "outsiders." As a result, they rely on informal coping strategies, such as borrowing money and food from neighbors, building temporary shelters, engaging in religious and youth-led support, and utilizing family networks. The study emphasizes the necessity of adopting migrant-inclusive CBDRM policies and localized support systems to promote equitable disaster resilience in urban slums.

Keywords: Migrants, Urban Slums, CBDRM, Vulnerability, Coping Strategies, Exclusion

Poster ID: P250552

Spatial Analysis of Flood Inundation in Sylhet District for Climate Resilience Planning

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Abstract

This study assesses flood inundation in Sylhet District, Bangladesh, employing GIS to analyze water dynamics pre- and post-flood. The study aims to integrate community-level adaptation strategies to enhance resilience, and examine the temporal variations in flood levels. The method first uses the Normalized Difference Water Index's (NDWI) formula to detect surface of water-bodies. The analysis uses the Sylhet District shapefile to refine the data. The results indicate that the flood significantly altered the affected areas. The water covering from 120.255 km² in May 2024 to 838.37 km² in July 2024. In 2023, 10.80 km² was detected before the flood, and 829.67 km² was detected after the flood. The area was 108.17 km² before the flood in 2022 and 637.38 km² after the flood. The report recommends that cities incorporate flood risk tracking into their designs, enhance drainage systems, and implement climate-resilient measures to reduce the likelihood of flooding in these areas. These plans are important because they guarantee the area's development is environmentally friendly and prepared for future floods.

Keywords: Flood Inundation, Water Detection, NDWI, Trends Analysis, Climate Resilience Planning.

Poster ID: P250565

Turning Waste into Power, Fertilizer, And Digital Wealth: A Comprehensive Study on Dhaka City

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Abstract

Dhaka generates nearly 7,500 tons of solid waste daily but around 40% remains uncollected which causes severe environmental pollution and health risks. To address this problem, our project introduces an inclusive system that treats waste as a resource while rewarding citizens. In this model, every household participant will receive a Digital Waste Card. Residents deposit their waste at designated collection hubs across Dhaka and their card is updated with Digital Waste Credits (which can be used for bus fares, market purchases, or other daily needs. This collected organic waste will be processed into biogas plants where 1 ton of waste can produce 50-60 cubic meters of biogas from where we can generate around 100 kWh of electricity and produce 50-60 kg of bio fertilizer for nearby farms. This approach will reduce government waste collection costs and encourages community participation which will provide renewable energy and supplies affordable organic fertilizer to farmers.

Keywords: Waste, Environment Pollution, DWC (Digital Waste Credits), Biogas, Bio-fertilizer.

Poster ID: P250604

Aqua Shield: Nature-Based Innovation for Water Crisis Management with *Canna Indica*

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Abstract: Access to clean water in Bangladesh is limited by pollution from industrial, agricultural, and municipal sources, compounded by seasonal scarcity. Conventional water treatment is centralized, costly, and energy-intensive, making it inaccessible for remote communities. The AQUA SHIELD project offers a nature-based solution using the phytoremediative potential of *Canna indica* in constructed wetlands. A pilot study used plastic drums planted with *Canna indica* to treat water from industrial discharge sites, sewage-impacted canals, and pesticide-contaminated fields. Key parameters—including pH, turbidity, electrical conductivity, dissolved oxygen, oxidation-reduction potential, and heavy metals—were measured before and after treatment. The system neutralized pH (5.26 → 6.8), reduced turbidity (244 → 74 NTU), lowered conductivity (2.09 → 1.17 mS/m), increased dissolved oxygen (4.6 → 5 mg/L), and removed over 90% of heavy metals. This cost-effective, scalable approach improves water quality, supports biodiversity, enhances soil health, and provides rural communities with sustainable access to safe water.

Keywords: Phytoremediation; *Canna indica*; Water Pollution; Constructed Wetland; Sustainable Water Management; Heavy Metals.

Poster ID: P250620

A Carbon Inequality in Bangladesh: Do Digitalization and Globalization Promote or Prevent Environmental Sustainability?

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Abstract: Addressing carbon inequality is essential for advancing environmental sustainability in rapidly developing economies. Bangladesh, with its expanding digital infrastructure and growing global integration, provides an important context for assessing whether digitalization and globalization serve as catalysts or constraints in reducing disparities in CO₂ emissions. This study examines the effects of digitalization, globalization, renewable energy consumption, economic growth, and foreign direct investment on CO₂ emissions inequality in Bangladesh from 1980 to 2023. Using annual time series data, the analysis applies the ARDL bounds testing framework, with robustness checks performed through FMOLS, DOLS, and CCR estimators. The findings indicate that digitalization significantly reduces CO₂ emissions inequality, highlighting its role as a technological equalizer. On other hand, globalization and economic growth increase inequality, reflecting structural and consumption-based imbalances linked to trade and growth patterns. Renewable energy consumption and FDI are both associated with reductions in inequality, underscoring their potential in facilitating cleaner and more equitable energy transitions. The study recommends strengthening digital infrastructure for environmental monitoring, expanding inclusive renewable energy access, and embedding environmental safeguards in global integration policies to advance SDGs: 7, 9, 10, and 13, and foster a low-carbon, inclusive future for Bangladesh. **Keywords:** Carbon Inequality, Digitalization, Globalization, Renewable Energy, Environmental Sustainability.

Psychology and Behavioral Science

Poster ID: P250325

Living and Learning in Halls: Mental Health Determinants among female residential students at the University of Dhaka

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Abstract

University female residential student's mental health distortion due to anxiety and depressive symptoms is a persistent problem growing across the developing nation. This study explored socio-economic and circumstantial factors affecting residents of Dhaka University. A pilot survey using purposive sampling captured 548 respondents across five halls. Logistic regression and classification tree analysis identified the most vulnerable groups. Results showed lack of privacy (OR 1.70, CI: 1.13–2.59) and physical discomfort (OR 2.99, CI: 1.60–5.62) significantly heightened anxiety. Depression was linked with longer residential duration (OR 4.89, CI: 1.94–12.9) and neutral advocacy for hall academic support (OR 0.38, CI: 0.18–0.85). The classification tree revealed that females lacking hall support and adequate study materials faced the greatest risk (M score 0.5). These findings confirm that anxiety and depression persist among university female residents, emphasizing the urgent necessity of targeted interventions to ensure supportive residential environments and safeguard student mental health.

Keywords: Female hall residents, mental health, anxiety, depression, logistic regression, classification tree

Poster ID: P250398

Comparing the effectiveness of two community-based multimodal exercise programs (CMEPs) on physical activity, performance, fall prevention, and quality of life in older adults: a randomized controlled trial

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Abstract

Older adults often face health challenges that limit activity, impair performance, increase fall risk, and reduce quality of life. While nutrition and exercise can help, practical and low-cost exercise strategies remain underexplored. This multicenter, double-blind randomized controlled trial in Bangladesh enrolled 140 older adults, randomly assigned to sensorimotor (CMEP-I) or strengthening (CMEP-II) programs for 8 weeks (3 sessions/week) with 24-week follow-up. Outcomes, including physical activity, performance, fall prevention, and quality of life, were measured at baseline, 8 weeks, and 32 weeks. Both groups showed significant improvements across all measures ($p < 0.05$), but CMEP-I yielded greater benefits in activity, performance, and fall prevention ($p < 0.05$ – 0.01), with no between-group difference in quality of life ($p > 0.05$). These findings highlight sensorimotor exercise as a feasible, community-based strategy to enhance physical health and reduce fall risk, supporting healthy ageing in older adults.

Keywords: Exercise, Fall risk, Older adults, Physical activity, Performance, Quality of life.

Poster ID: P250454

The Effects of Financial Stress and Perceived Social Support on Mental Health Among Unemployed Graduates in Bangladesh

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Abstract

Due to financial stress and limited social support, unemployed graduates in Bangladesh face challenges in maintaining good mental health. The purpose of this research is to measure the effects of financial stress and perceived social support on the mental health of unemployed graduates in public universities of Bangladesh. This study employed a quantitative research design with an explanatory approach. A structured questionnaire was used to collect data on 337 unemployed graduates from various public universities. Data were collected using standardized Likert scales such as the General Health Questionnaire (GHQ-12), Financial Stress Scale (FSS), and Social Provisions Scale (SPS-10), and analyzed using SPSS. The results showed that financial stress has a significant negative impact on mental health. Affective reactions to financial stress and physiological responses to financial stress were strong predictors of mental health issues. Perceived social support was not found to be a statistically significant factor in improving mental health. The study concluded that financial problems greatly harm mental health, while social support had little effect. Reducing financial stress may help improve the well-being of unemployed graduates.

Keywords: Financial stress, Social support, Mental health, Unemployed graduates, Psychological well-being.

Poster ID: 250525

The Impact of Relationship Breakups on University Students in Bangladesh: Emotional Responses, Coping Mechanisms, And Academic Consequences

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Abstract

Romantic relationship breakup is a significant emotional occurrence for university students, which affects students' mental well-being and academic performance. This study looked at how relationship breakups affected Bangladeshi university students' academic performance, coping mechanisms, and emotional responses. This study used a cross-sectional and mixed methods design. It included 200 students from among universities. Qualitative data were also collected from semi-structured interviews. According to the study, 52.3% of students reported high level emotional stress following a breakup. After the breakup, 48% of students increased their usage of social media, 54% of students spent time on hobbies and skill development, and 71% of students sought assistance from friends as a coping mechanism. Academic impacts included a decrease in test results for 29.0%, and a loss of focus for 65.3% of students. Female students were more likely than male students to be emotionally broken. These findings highlight the need for campus counseling and support services.

Keywords: Breakup, Romantic Relationship, Emotional Stress, University Students, Emotional well-being, Relationship dissolution

Poster ID: P250558

The Impact of Generative AI Interaction on Human Metacognition and Critical Thinking

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Abstract: Generative AI (GenAI) is rapidly gaining popularity in education and the workplace. While it improves skills in information retrieval and writing, its long-term impact on metacognition and critical thinking is still unclear. In our research, 200 students from different universities will be divided into two groups. One experimental group will use GenAI to verify and reason from analytical text material, while the other experimental group will perform the same task using a traditional search engine. The working time of both groups will be controlled equally. The participants previous AI experience will be collected through a preliminary survey. The Metacognitive Awareness Inventory (MAI) will be used to assess metacognition and the Critical Thinking Dispositions Scale (CTDS) will be used to assess critical thinking. Based on existing literature, we hypothesize that the GenAI group will show increased overconfidence and a reduced capacity for identifying informational flaws. Limitations include the diversity of participants experiences, limited task types, and short-term observation. The results highlight the potential cognitive risks of GenAI reliance and will inform safe AI use and policymaking in the education sector.

Keywords: Generative AI, Metacognition, Critical Thinking, Overconfidence

Poster ID: P250566

From Grief to Growth: Exploring the Intersections of Mental Health, Academic Resilience and Career Development after Parental Loss

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Abstract: Losing a parent is one of the most stressful experiences for students. It affects their mental health, academic performance, and future goals. Some students develop resilience and coping strategies that turn their grief into motivation for personal growth. This study explores how losing a parent impacts students' mental well-being, academic resilience and career development. It explores the challenges, protective factors, and the influence of grief on long-term educational and career outcomes. The research combines surveys and personal accounts about mental health, academic challenges, and future goals. It highlights supportive resources like peers, teachers, counseling, and faith to understand coping strategies. The loss of a parent affects emotional well-being and academic performance, often creating uncertainty about the future. Students with social and institutional support show higher resilience and sometimes use their grief as motivation. Losing a parent affects mental health, academics, and career development. However, with proper support, students can turn their grief into growth. Schools and policymakers should offer counseling, mentorship and acknowledgment of bereaved students' needs.

Keywords: Parental loss, mental health, academic resilience, career development.

Poster ID: P250584

The Unseen Middle Zone: Psychology-Tech Approaches to Overcome Academic Paralysis

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Abstract

University students often fall into cycles of procrastination, indecision and lack of action initiation which hinder academic performance and career readiness. While some students face delays due to unclear goals, others with defined goals struggle with overthinking, leading to missed opportunities for skill development. Conventional remedies such as workshops and counselling mostly fail to address this unseen middle zone because they lack individualized and continuous support. In Bangladesh, the scarcity of structured approaches makes this issue more critical. This study investigates how procrastination, decision paralysis and poor self-control affect students' progress and explores a technology-enabled intervention that integrates psychological principles with micro-action nudges. A cross-sectional online survey is designed to assess procrastination tendencies, goal clarity, digital habits and self-efficacy with correlations to academic outcomes. Preliminary findings suggest that vague goals, excessive procrastination, while stronger self-efficacy improve task initiation, highlighting the potential of behavioral nudges.

Keywords: Procrastination, Decision Paralysis, Self-control, University students, Behavioral nudges, Academic performance

Education and Pedagogy

Poster ID: P250389

Educational Technology: Shaping the Future of Learning

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Abstract

Educational Technology (EdTech) is changing the way education works by combining modern technology with teaching strategies to make learning more effective, accessible, and personalized for people everywhere. The global EdTech market was valued at \$123.4 billion in 2022 and is expected to grow by 13.4% each year until 2030. Studies show that technology-based learning can improve student performance by 20–30% compared to traditional methods, while adaptive learning systems can boost knowledge retention by up to 40%. Today, EdTech integrates AI for personalized lessons, VR/AR for immersive experiences, blockchain for secure records, and cloud platforms for global collaboration. EdTech tackles distance, resource scarcity, and diverse learning needs. AI provides instant feedback; VR delivers immersive experiences. Post-COVID, online learning surged 300%, blending tech with human connection. Microlearning, gamification, and competency-based education rise. EdTech thrives by overcoming connectivity, digital literacy, and privacy challenges, making learning dynamic, inclusive, and impactful.

Keywords: Accessibility, Artificial Intelligenc, Virtual Reality, Microlearning, Gamification, Blockchain and Data Privacy.

Poster ID: P250393

Is Tuvalu The First Country That Is Going To Be Under Water ?

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Abstract

TUVALU is world's fourth smallest country, located in the middle of the Pacific Ocean. Because of rising carbon emissions, the water level of the sea is increasing day by day. This abstract's main is about the harsh and truth reality of Tuvalu's future. Collecting data and research papers from NASA, WEF and many other site to find the exact truth about Tuvalu's future. The reason of climate change, the ice caps in the Arctic and Antarctica is melting. Nowadays, Tuvalu gets flooded about 5 days in a year. But, in 2050, it will increase to 25 days and 100 days in 2100. NASA claims that, "if climate change continues on this trajectory, 95% of the country will be submerged in 2100". Climate change is no longer a problem for future. This affects our present too and Tuvalu will be the first country, which will disappear entirely from earth.

Keywords: Disappear, Emission, Submerged, Climate Change, Trajectory, Water level.

Poster ID: P250405

Assessing English writing challenges in marginalized communities: A case study of Korail slum area

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Abstract

Strong writing skills enable individuals to thrive academically, access to employments and global economy. Previous studies show that there is a lack of research on English writing skills with a holistic approach at the secondary levels in marginalized communities. Our quantitative study, comprising 50 secondary-level-students of a school in Korail slum, therefore, addresses this gap by investigating the challenges of English writing skills, identifying three categories of challenges : a) Language Proficiency Challenges, b) Motivational and External Challenges and c) Learning Support Challenges. Using SPSS, the data were analyzed conducting descriptive statistics and ANOVA test. The findings of the study suggest that grammar is the most significant challenge ($M = 2.52$) and language proficiency challenges is the stronger predictor ($F = 9.964$) that influences the motivational and external challenges. To improve English writing skill and quality education, this study emphasizes the importance to address these challenges with effective pedagogical interventions.

Keywords: English writing skills, marginalized community, Korail slum, motivational and external challenges, learning support challenges, language proficiency challenges.

Poster ID: P250468

Peer Learning As A Tool For Enhancing Socio-Emotional Skills in Early Childhood Education in The Khulna Region

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Abstract

Early childhood is a crucial period for developing socio-emotional skills, which form the foundation for positive social interactions and emotional regulation throughout life. This study explored the role of peer learning in enhancing socio-emotional development among children aged 4–6 years in early childhood education settings in the Khulna region of Bangladesh. A mixed-method approach was employed, combining classroom observations, structured peer-interaction activities, and teacher interviews. A total of 90 children from three preschools participated, representing diverse socio-economic backgrounds. Preliminary findings indicate that children engaged in peer learning activities demonstrated improved sharing, turn-taking, empathy, and conflict-resolution skills compared to those in traditional teacher-led settings. Teachers highlighted the positive impact of collaborative interactions on emotional awareness and self-confidence. These results suggest that structured peer learning can significantly foster socio-emotional growth in early childhood. Future recommendations include integrating regular peer learning sessions into daily classroom routines and providing training for educators to optimize peer interaction strategies for holistic child development.

Keywords: Peer learning, Socio-Emotional Skills, Early Childhood Education, Khulna, Empathy, Conflict resolution

Poster ID: P250512

Dialogic Alphabet Zone Board (Dazboard): An Interactive Screen-Free Learning Tool For Early Childhood Education

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Abstract: Parents and educators in Bangladesh struggle to find engaging, screen-free tools that keep young children learning without constant supervision. DAZ-Board is a tangible tool for ages 2 to 5 that builds early literacy through multisensory play. Colorful magnetic letters fit into predefined slots, each placement triggers instant audio-letter name, phonics, and an example word-reinforcing letter-sound mapping and vocabulary. Children progress naturally from recognizing letter shapes to pronunciation, word formation, and simple spelling, building independence with minimal supervision. Quiz mode and spelling mode build spelling skills and help children feel confident with the alphabet. Durable and low-cost, DAZ-Board is designed primarily for home use so children can practice independently, and it also suits daycares and kindergartens with limited device access. By removing screens while keeping rich feedback, DAZ-Board offers a practical, enjoyable path to foundational skills that grow with a child's development.

Keywords: screen-free learning, early childhood literacy, phonemic awareness, magnetic alphabet board

Poster ID: P250536

Rural Roots to Digital Horizons: AI, Access, and the E-learning Shift in Bangladesh

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Abstract: Bangladesh's education system is rapidly shifting toward digital learning, especially in rural areas where traditional classrooms once relied only on blackboards and books. The COVID-19 pandemic accelerated this shift, increasing internet and smartphone use. While this opened doors to new learning opportunities, it also revealed challenges like poor connectivity, limited resources, and unequal access. This study explores how technology, artificial intelligence (AI), and teachers together shape the rise of e-learning in Bangladesh. A mixed-methods approach was applied: surveys from 65 students and interviews with teachers, students, and parents. Quantitative data were analyzed with SPSS and Excel, while qualitative data were studied through pattern analysis. Results show students appreciate digital learning for flexibility and engagement, though issues like low concentration and uneven lesson quality remain. AI tools improved interactivity and support, highlighting the importance of integrating both teachers and technology for building sustainable digital education in Bangladesh.

Keywords: E-learning in Bangladesh, Digital Education, AI in Education, Digital Divide, Online Learning Challenges, Adaptive Learning System.

Poster ID: P250540

Impact of Short Video Consumption on Academic Performance among the Students of the Institute of Education & Research, University of Dhaka: A Correlational Study

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Abstract

Short video content on social media platforms has gained immense popularity on platforms like TikTok, Instagram, Facebook, and YouTube. The addictive, algorithm-driven nature of short videos may influence university students' academic performance. To address this concerning issue, it is crucial to investigate the topic in the context of Bangladeshi university students. The main purpose of this study is to investigate the influence of short video content on the academic performance of students. The study examines the impact of short video consumption patterns on the self-reported academic performance of students at the Institute of Education and Research, University of Dhaka. This study adopts a quantitative research design, which was collected from a sample size of 49 students. The findings suggest a moderate positive correlation, showing that greater short video usage was associated with low self-reported academic performance. Limitations include reliance on self-reported data and the short duration of the study.

Keywords: Social Networking sites, Social media, Short video Consumption, Academic Performance, University Students.

Poster ID: P250560

AI-Powered Teacher Assistant for Bangladesh: Enhancing Learning in Resource-Constrained Classrooms

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Abstract

Bangladesh's classrooms face severe challenges, with student to teacher ratios often exceeding 40:1. Teachers spend much of their time on grading, attendance, and paperwork, leaving little space for interactive learning. Existing AI tools usually ignore student experience, long-term outcomes, and the realities of low-resource schools. This study proposes an AI-powered classroom assistant designed to address these issues holistically. The system supports Bangla and curriculum-aligned lesson planning, offers real-time analytics to identify struggling learners, and includes offline-first functionality for areas with poor internet access. Privacy safeguards and built-in teacher training modules support adoption, while customization ensures suitability across rural and urban contexts. Pilot studies suggest up to 30% reduction in teacher workload, improved student engagement, and positive user feedback, highlighting the potential for scalable, ethical, AI-driven classroom support.

Keywords: AI in Education, Adaptive Learning, Student Analytics, Digital Literacy, Teacher Training

Poster ID: P250570

Students' Perspectives on the Implementation and Withdrawal of the 2023 English Curriculum Reform in Bangladesh

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Abstract: In recent years, secondary school students in Bangladesh have witnessed the rapid introduction and withdrawal of a new English language curriculum. This research primarily aimed to evaluate learners' views on the rescinded 2023 English language curriculum. Additionally, other goals were to identify key differences between the 2023 curriculum and the previous curriculum, and explore students' responses to the changes. Primary data were collected from a group of secondary level students, and these were analyzed using SPSS. The findings indicate that the 2023 curriculum introduced pedagogical variations and most notably an emphasis on communicative competence, task-based learning, and integrated skill assessment. These changes were undermined by systemic limitations. Students found the assessment criteria unclear, inadequate teacher preparation to deliver the updated content and scarcity of relevant instructional materials at the time of proceeding the new curriculum. The sudden withdrawal of the reform evoked mixed reactions. Some students regarded the reversal as a hindrance to progressive language education in Bangladesh, while others expressed relief at returning to a more familiar curriculum. The study concludes that meaningful curriculum reform requires both innovation and systemic support through coherent frameworks, adequate resources, and teacher preparedness to ensure sustainable improvement in English language education.

Keywords: Curriculum Reform, English Language Education, Student Perspectives, Secondary Education, Bangladesh.

Poster ID: P250574

Predicting Nanomaterial Assisted Photocatalytic Degradation Efficiency Using Machine Learning: A Comparative Study of Regression Models

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Abstract: The photocatalytic degradation of industrial wastewater using nanomaterials presents an effective strategy for environmental remediation. This study developed a robust predictive framework by comparing four machine learning algorithms: Extreme Gradient Boosting (XGBoost), Random Forest (RF) Regressor, Support Vector Regression (SVR) and Multi-Layer Perceptron (MLP). Using a dataset of 396 samples sourced from Mendeley Data, models were optimized and evaluated using 5-fold cross-validation. Pearson correlation analysis revealed a strong negative correlation with absorbance ($r = -0.79$) and a moderate positive correlation with time ($r = 0.46$). The optimized XGBoost model achieved the highest predictive accuracy on test data ($R^2 = 0.980$, RMSE = 0.0325) and cross-validation ($Q^2 = 0.979$) while RF model performed comparably ($R^2 = 0.976$). Conversely, both SVR ($R^2 = 0.675$) and MLP ($R^2 = 0.654$) models exhibited lower predictive ability. This study demonstrates that XGBoost is effective and highlights ensemble learning's potential to optimize nanomaterial-based wastewater treatment. **Keywords:** Nanomaterials, XGBoost, Random Forest Regressor, Regression Model, Machine Learning.

Poster ID: P250605

Effects of Climate Change on Performance of Primary Education: A Study on Companiganj Upazilla, Sylhet.

Abstract: In Bangladesh, particularly in disaster risk hotspots like Companiganj Upazila, Sylhet, climate change has emerged as an unprecedented threat to primary education. This study looks into the impacts of climate-related phenomena like flash floods, landslides, erratic rainfall, and heat bouts on the physical schooling facilities, student enrollments, academic cycles, and the broad scope of education cascade systems. This qualitative study consists of interviews and focus group discussions including students, guardians, teachers, and other local important stakeholders. Thematic analysis revealed other contributing factors that limit post-educational outcomes include school closures, financial constraints, child labor, resources loss, and lack of governmental and NGO support. The findings also highlight the mental strain from inadequate risk-education frameworks to learn during non-active disaster phases and the near-inexistent ancillary education systems during non-disaster windows. Responses from these institutions, even with locally devised coping mechanisms, are still fragmented and insufficient. This study stresses the critical lack of attention directed towards tailoring responses to support and integrated policy advocacy that forms education as part of adaptation strategies to climate impacts rather more focusing on ingrained response frameworks targeting building aid towards enhancing aid policies. These policies strive to suggest proactive measures such as constructing climate-proof educational facilities, amending financial assistance to be more purposeful, offering remote education, and policy adjustments that weave education into the climate adaptation framework.

Keywords: Climate Change, Primary Education, Disaster Impact, School Closures, Adaptation Strategies, Educational Resilience.

Poster ID: P250611

Atr-Ftir Spectroscopy Coupled with Chemometric and Machine Learning Models For Detecting Soybean Oil Adulteration

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Abstract

The adulteration of soybean oil with palm oil presents a significant quality control challenge, as conventional detection methods are often slow and destructive. This study introduces a rapid, non-destructive pipeline combining Attenuated Total Reflectance-Fourier Transform Infrared (ATR-FTIR) spectroscopy with robust analytical models. After acquiring spectra from 35 samples, principal component analysis (PCA) reduced 3600 spectral features to six. A comparative analysis was then performed using classic chemometric models (OPLS-DA, PLS-DA) and machine learning algorithms (RF, SVM, XGBoost). On an unseen test set, four models achieved 100% accuracy, with Random Forest (RF) demonstrating superior robustness by yielding zero false negatives. This method shows significant promise for real-time quality control in industrial settings, although further validation on a larger dataset is required to confirm its scalability.

Keywords: Soybean oil, ATR-FTIR, Chemometrics, Machine learning, Food Authenticity

Scientific Advancement on Innovation

Poster ID: P250312

Synthesis And Characterization of Nanocellulose Phosphate As A Novel Biomaterial for Bone Tissue Engineering

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Abstract

Bone tissue engineering (BTE) demands biocompatible, and biodegradable scaffolds that mimic the natural extracellular matrix. Nanocellulose, a renewable and non-toxic polymer, shows great potential for bone regeneration. This study reports the synthesis and characterization of nanocellulose phosphate hydrogel, a chemically modified derivative, as a scaffold for BTE. Nanocellulose was extracted from rice straw via sequential alkali and acid treatments and characterized by ATR-FTIR, XRD, and SEM. The hydrogel was synthesized using dibasic ammonium phosphate and urea, with functional groups and morphology analyzed through ATR-FTIR, SEM-EDS, XRD, XPS and TGA. Swelling studies showed significant water uptake, with a maximum swelling ratio of 11.41 after 5 hours, indicating excellent hydrogel hydration. Further physicochemical properties, including mechanical strength and pore size will be evaluated. These results highlight nanocellulose phosphate hydrogel as a promising, sustainable biomaterial for bone tissue engineering applications.

Keywords: Rice straw, nanocellulose, environmentally friendly, hydrogel, scaffold, bone tissue engineering.

Poster ID: 250323

Integrating Carbon Capture Systems in Inland Vessels: A Sustainable Pathway for Bangladesh under IMO Ocean Carbon Taxation

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Abstract

This Empirical research examines the integration of Carbon Capture, Utilization, and Storage (CCUS) systems on inland vessels, with direct relevance to the IMO's Ocean Carbon Taxation framework. Using asymptotic regression, it projects carbon reduction outcomes and quantifies tax mitigation potential. As the IMO advances toward net-zero by 2050, Onboard Carbon Capture (OCC) emerges as a practical solution, especially under tightening global carbon pricing. Technologies such as amine absorption and calcium looping, configured into modular and lightweight units, enable retrofitting for Bangladesh's space- and weight-constrained inland fleet. The study highlights the importance of marinization, energy efficiency, and scalable CO₂ offloading infrastructure. In line with the IMO's draft OCCS work plan (targeting 2028), the findings advocate for Bangladesh to leverage OCCS to decarbonize waterways, minimize tax exposure, and position itself as a regional leader in sustainable shipping.

Keywords: Marinization, Shipping, Onboard Carbon Capture (OCCS), Carbon Taxation, Bangladesh.

Poster ID: P250333

ShuddhoJol: Smart Water Access for Climate-Resilient Coastal Bangladesh

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Abstract

Coastal communities in Bangladesh are living at the frontline of climate change, where saltwater intrusion, brackish contamination and recurring floods steadily erode access to safe drinking water. Many existing technologies are either too expensive, electricity dependent or poorly suited to high salinity conditions, leaving families with no choice but to rely on unsafe sources. ShuddhoJol responds to this urgent challenge through a decentralized and community-centered approach that blends innovation with local participation. The system combines pedal-powered desalination operated by trained youth and women, smart rainwater harvesting tanks equipped with IoT monitoring and a rewards platform that motivates households to adopt water-saving practices. Together these elements ensure year-round availability of clean water, create livelihood opportunities and build resilience in disaster-prone areas. With its scalable, low-cost and socially inclusive design, ShuddhoJol offers a promising model for advancing water justice and supporting sustainable development across climate-vulnerable regions.

Keywords: Climate resilience, Decentralized water system, Pedal powered desalination, IoT based rainwater harvesting, Community empowerment, Sustainable livelihoods.

Poster ID: P250394

Integrative *In-Silico* And *In-Vivo* Validation Reveals Novel Analgesic Potential Of *Costus Igneus*.

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Abstract

Effective pain management remains an unmet clinical need, as current analgesics often cause adverse effects and limited efficacy. Here, we identify *Costus igneus* leaves as a promising natural source of multi-target analgesic agents through combined computational, chemical, and biological approaches. 70% Methanolic extracts yielded diverse phytochemicals, and GC-MS analysis revealed 160 compounds, of which 18 were predicted to be non-toxic. Docking against COX-1, COX-2, μ -opioid receptor, and TRPV1 highlighted two lead molecules (CL11, CL14) with strong binding affinities across multiple pain-related targets. Electronic structure calculations and spectral validation confirmed functional groups associated with receptor interaction. In vivo, the extract significantly reduced acetic acid-induced writhing in mice by 48.8% at 300 mg/kg ($p < 0.001$), demonstrating potent peripheral analgesia. Together, these results establish *C. igneus* as a previously unrecognized reservoir of bioactive molecules with broad analgesic potential, offering a mechanistic basis for the development of safer, multi-target pain therapeutics.

Keywords: *Costus Igneus*, In-silico, GC-MS, Molecular Docking, Analgesic.

Poster ID: P250401

Automated Pavement and Infrastructure Crack Detection With Sadipt And Open Cv

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Abstract: The presence of cracks and potholes continued to be a major obstacle in road safety and comfort of ride and money spent in maintenance of infrastructure. Traditionally, evaluation is based on labor intensive, time-consuming activities that have to be dependent on the special equipment thus limiting nationwide applications. In order to reduce the limitation of these methods, we propose SADIPT (Smartphone App Development Image Processing Techniques), an Android application that works in real-time and is developed on a smartphone used with the aim of efficient pavement distress indexing. Capitalizing on the OpenCV library, SADIPT can take advantage of three cascade classifiers of the Local Binary Pattern (LBP), each trained to sense potholes, longitudinal transversal cracks and fatigue cracks directly off live camera feeds. It stores images in grayscale and classifies them in real time where findings can be shown instantly as it geo-tags the detections using GPS. The field tests produced the precision as much as 90%, the recall as up to 85% and the time taken to process about 0.5 seconds/frame to 1.0 second/frame. Portability combined with offline capability and automation also makes SADIPT a scalable, low-cost solution to pavement tracking and sustainable infrastructure management and offers a platform to grow upon.

Keywords: Pavement crack detection, Pothole recognition, Smartphone based monitoring, Image processing, Automated Road inspection.

Poster ID: P250442

Sunlight-Activated Nanocomposite for Wastewater Treatment

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Abstract: Provision of drinking water is a fundamental human right but almost 25% of people in the world are deprived of drinking water with adequate microbiological quality. It causes nearly 80% of global illnesses and millions of child deaths. To overcome this challenge, water disinfection technologies must be implemented. A promising solution is semiconductor-based heterogeneous photocatalysis, to tackle challenges from climate change and population growth. As an advanced oxidation process (AOP), photocatalysis offers sustainability since no chemicals are required, and solar light can be utilized for water disinfection. Further enhance this process, nanocomposites are used because of their capability of combining the unique properties of nanoparticles, resulting in improved photocatalytic efficiency, higher stability, and reusability. In this manner, nanocomposites provide a more effective solution for large-scale water treatment. Despite these advantages, large-scale application is still limited due to the need for efficient reactor designs for treating large water volumes.

Keywords: Photocatalysis, Nanocomposite, Wastewater treatment, Solar energy, Environmental sustainability, Water disinfection.

Poster ID: P250541

Design And Analysis of A Low-Cost Stair-Climbing Chair For Patients Using A Hybrid Mechanical System

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Abstract: Mobility-impaired people will not be able to navigate up and down stairs, particularly at home or at a health facility with no lifts. Stair climbing wheelchairs are available out there, their cost is high, which hinders their use in low- and middle-income regions. The proposed project will design and examine the low-cost stair-climbing recliner keeping comfort, safety, and affordability intact. The design incorporates a track and roller pasted drive system with an option involving a geared DC power motor and a manual override. We simulated the geometry in SolidWorks to maximize shape and center of gravity and undertook the finite element analysis (FEA) to ensure that the frame is as strong as possible and has a long fatigue life. One of them was tested on a stair rig using a prototype made of mild steel tubing, and was found to ascend steadily, use less power, and be very safe. The findings affirm that it is a mobility scalable and low-cost solution.

Keywords: Stair-climbing chair, Hybrid mechanical system, Low-cost assistive device, Mobility aid, Finite Element Analysis (FEA).

Poster ID: P250612

Physicochemical, Spectral, And Toxicological Studies Of Commonly Used Organochlorine-Based Pesticides

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Abstract: Organochlorine pesticides (OCPs) have garnered significant attention due to their high efficacy in pest control. However, they have been banned worldwide as they impair environmental biodiversity and adversely affect human health through in vivo exposure. In this study, we employed density functional theory (DFT) with the B3LYP/6-31G (d, p) basis set to evaluate the physicochemical, thermodynamic, and spectral properties of five well-known OCPs: DDT, endrin (END), endrin ketone (EDK), aldrin (ALD), and heptachlor epoxide (HCE) through in silico methods. Additionally, molecular docking and non-bonding interactions were calculated to investigate the binding properties and mode(s) of action against serine/threonine-protein kinase PIM-2 (PDB ID: 2IWI) and human estrogen receptor (PDB ID: 6PYF) proteins. Thermodynamic and molecular orbital evaluations revealed that DDT and HCE were highly stable and had the highest binding affinities against 2IWI and 6PYF, respectively. ADMET and PASS analyses were performed to determine the biological and toxicological effects of the OCPs. All OCPs studied exhibited carcinogenic, neurotoxic, endocrine-disrupting, and hepatotoxic effects, can easily pass the intestinal barrier & blood-brain barrier, depicting their adverse effects on animals. These evaluations provide awareness of OCP use and a deeper understanding of its biochemical and toxicological effects on the environment and biological systems.

Keywords: Organochlorine pesticides, Carcinogenic, Molecular modelling and dynamics simulation, ADMET and PASS prediction.

Life Science

Poster ID: P250309

Knowledge, Attitude, and Practices concerning Health Impacts from Heavy Metals in Spice-Containing Foods: Cross-Sectional Study

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Abstract

Spice consumption is really common among Bangladeshi consumers, but few research has addressed on the risk of hazardous heavy metals in spices. High amounts of heavy metals can cause severe health risks, KAP may play a role in increasing consumer perception. This cross-sectional study surveyed 180 households from six clusters across three regions of Noakhali, Bangladesh. The results showed that approximately 60% of participants were unconscious of heavy metals, only 15.55% knew that spices possibly contain them. While about 85.5% conveyed concern about health risks from heavy metals, 89.44% never asked about their presence when purchasing spices. Statistical analysis discloses that age, gender, education had no significant effect, but those who live in urban areas were more likely to have moderate or good knowledge (AOR: 6.23, 95% CI: 1.35–28.69, P = .019). The study emphasizes regional differences and showcases the need for public awareness and education on food safety.

Keywords: KAP, Health Risks, Spicy Food, Heavy Metals, Food Safety.

Poster ID: P250313

Identifying Influential Biomarkers of Colorectal Cancer Using Bioinformatics and Machine Learning Approaches With Explainable Ai

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Abstract

One of the leading causes of cancer-related mortality in the world, is Colorectal Cancer. This study aimed to discover the most influential biomarkers by analyzing differentially expressed genes obtained in tumor and normal samples within 7 gene expression datasets, then gene enrichment and pathway analysis were performed. After that, gene co-expression network was analyzed and a PPI network was established, then three ranking methods (closeness, MCC and MNC) identified the first-tiered hub genes. Five feature selection methods were applied and hyperparameters of the models were optimized. Using 4 independent testing datasets with six genes, this research achieved accuracy 96.91%, 99.29%, 100% and 99.32%. Model interpretability was aided by SHAP. Unsupervised sample validation performed with 6 genes, further validated through GEPIA2 and immune infiltration analysis. Overall, this research strongly proves that the identified 6 genes are the most influential biomarkers that are reliable to diagnose CRC.

Keywords: Colorectal Cancer, Bioinformatics, Machine Learning, Explainable AI, GEPIA2, CRC.

Poster ID: P250343

KDM6A and X-Linked Regulators of Microglia: A Dosage Effect in Alzheimer's Disease

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Abstract

Alzheimer's disease (AD) is observed to be more prevalent and severe among women, a trend often linked to hormonal changes. Recent studies suggest that the dosage of sex chromosomes may also significantly contribute to this phenomenon. The X-linked gene KDM6A, which escapes X-inactivation, is more highly expressed in females and plays a role in regulating immune and metabolic genes by removing the repressive mark H3K27me3. Research conducted with AD mouse models and microglia derived from induced pluripotent stem cells shows that XX microglia exhibit more robust immune responses independent of hormonal factors, attributed to elevated levels of KDM6A. By inhibiting KDM6A activity, these immune responses can be normalized, suggesting that the gene's dosage may affect sex-based variations in AD susceptibility and progression through the disruption of microglial immune functions.

Keywords: Alzheimer's disease, Microglia, Sex chromosome, X-linked gene, Immune response.

Poster ID: P250359

Nanotechnology In Drug Delivery: Targeting Diseases At Cellular Level

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Abstract

Nanotechnology revolutionizes modern medicine by enabling precise drug delivery at cellular and molecular scales, overcoming conventional systems' drawbacks, low bioavailability, indiscriminate distribution, and severe side effects. Utilizing advanced nano-carriers such as liposomes, dendrimers, and polymeric nanoparticles, this study designs and characterizes targeted platforms for cancer therapy and infectious disease, employing cutting-edge imaging, statistical modeling, and in vitro assays to assess encapsulation efficiency, cellular uptake, and release kinetics. Findings reveal an 85% encapsulation rate versus 40% in traditional method, threefold higher cellular uptake, 50% reduced toxicity, and sustained release profiles, culminating in superior therapeutic efficacy. This innovative framework not only propels precision medicine forward but also aligns with Sustainable Development Goal 3, fostering equitable healthcare in resource-constrained regions like Bangladesh through cost-effective, low-toxicity treatments.

Keywords: Nanotechnology, Drug Delivery, Nano-carriers, Targeted Therapy, Precision Medicine

Poster ID: P250429

Integrative In-Silico Characterization and Prognostic Impact of Rare Tp53 Variants in Bangladeshi Gastric Cancer Patients

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Abstract

TP53, the “guardian of the genome,” is the most frequently mutated tumor suppressor gene in gastric cancer, yet rare variants remain poorly explored in South Asian populations. This study investigates three underrepresented Bangladeshi gastric cancer variants—**p.R282G**, **p.E286V**, and **p.G154Wfs*10**—through an integrative bioinformatics framework. Domain mapping revealed disruption in the DNA-binding core and oligomerization domains. Structural modeling and molecular dynamics simulations indicated destabilization of the protein backbone, with RMSD deviations up to 2.8 Å and altered hydrogen bonding compared to wild-type. Pathogenicity predictors consistently classified all variants as highly damaging, indicating strong destabilization and functional impairment. Kaplan–Meier survival analysis linked TP53-mutant cohorts to significantly reduced overall survival ($p = 0.021$), reinforcing their clinical relevance. These results highlight mutation-specific structural and functional alterations that may guide biomarker development and therapeutic targeting. Our findings provide the first reported systematic characterization of rare TP53 variants in Bangladeshi gastric cancer, expanding regional cancer genomics knowledge.

Keywords: TP53 rare variants, Gastric cancer, Molecular dynamics simulation, Precision oncology, Bangladeshi population.

Poster ID: P250432

Evaluation of the Antioxidant, Anti-inflammatory, Antimicrobial, and Antidiarrheal Potentials of *Alchornea mollis* (Euphorbiaceae) Leaf Extract

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Abstract

Alchornea mollis, traditionally used for spasm, headache, and skin diseases, was investigated for its pharmacological potential. Antioxidant, anti-inflammatory, antimicrobial, and antidiarrheal activities of leaf extracts were evaluated, alongside identification of bioactive compounds by GC-MS analysis. These were tested using spectrophotometric, in vitro, in vivo, and microbial assays. and identified phytochemicals by GC-MS analysis. The ethyl acetate fraction (EAF) demonstrated the strongest effects: potent DPPH radical scavenging (IC_{50} : 5.32 µg/mL), membrane stabilization (IC_{50} : 21.88 µg/mL), and protein anti-denaturation (IC_{50} : 58.14 µg/mL). EAF (40 mg/kg) produced significant central ($p < 0.001$) and peripheral ($p < 0.01$) analgesic activities, while at 20 mg/kg, it delayed castor oil-induced diarrhea and reduced fecal output ($p < 0.05$). EAF (200 µg/disc) also showed strong antimicrobial effects, notably against *Vibrio mimicus* (18.9 ± 0.70 mm) and *Salmonella typhi* (17.9 ± 0.74 mm). GC-MS identified 102 compounds. *A. mollis* contains significant bioactive compounds, supporting its traditional medicinal use.

Key words: *Alchornea mollis*, antioxidant, anti-inflammatory, antimicrobial, antidiarrheal.

Poster ID: P250436

Multivariate Classification of COVID-19 Severity using ATR-FTIR spectroscopy combined with Orthogonal Partial Least Squares Discriminant Analysis (OPLS-DA)

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Abstract

Developing rapid, reliable methods to assess COVID-19 severity is crucial. This study employed Attenuated Total Reflectance Fourier-Transform Infrared (ATR-FTIR) spectroscopy of blood plasma with Orthogonal Partial Least Squares Discriminant Analysis (OPLS-DA) to classify disease severity. An OPLS-DA model was established according to 80 training and 30 blind validation samples, aiming at the spectral region of 3273-2851 cm⁻¹ and 1592-1032 cm⁻¹, standing for biochemical conversions of proteins, lipids, and nucleic acids. The model exhibited good performance (R²X=0.991, R²Y=0.657, Q²=0.586) and Area Under the Curve (AUC) of 0.824, validating its ability of distinguishing Severe and Non-Severe cases. It was successful in correctly distinguishing 90% of the blind samples altogether. These findings verify ATR-FTIR spectroscopy as a quick, inexpensive triage tool of COVID-19 severity, requiring little preparation of the sample and delivering good accuracy.

Keywords: COVID-19, Blood plasma analysis, ATR-FTIR, Chemometric, OPLS-DA.

Poster ID: P250452

Chemical characterization and unveiling the therapeutic potential of *Ficus rumphii* leaves methanol extract and its N-hexane fraction: anxiolytic, antidepressant, analgesic, antidiabetic, and thrombolytic activities through in-vivo, in-vitro, and DFT-based in-silico approach

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Abstract

Ficus rumphii is a medicinal plant widely utilized for its antidiabetic, anti-inflammatory, and analgesic effects. This work assessed the pharmacological potential of the methanolic extract (MEFRL) and n-hexane fraction (NHFFRL) using in vitro, in vivo, and computational methodologies. The method employed phytochemical screening by GC-MS and FT-IR to identify bioactive chemicals such as flavonoids, alkaloids, and saponins. The analgesic effects were tested by formalin-induced paw-licking and acetic acid-induced writhing tests, while the antidepressant and anxiolytic actions were investigated using the Forced Swimming Test (FST), Tail Suspension Test (TST), Hole-Board Test, and Elevated Plus Maze (EPM). Thrombolytic activity was assessed through clot lysis, while antidiabetic activity was evaluated by using α -amylase inhibition and oral glucose tolerance test. Molecular docking, PASS prediction, and ADME/T analyses were performed to assess drug-like characteristics. The results of this study indicated that MEFRL demonstrated significant analgesic, thrombolytic, and antidiabetic properties (α -amylase IC₅₀ = 7.48 μ g/mL), equivalent to acarbose (7.39 μ g/mL). NHFFRL exhibited enhanced anxiolytic and depressive properties, with NHFFRL-400

proving to be the most efficacious. Notable bioactive chemicals found include CIS-7, CIS-11-HEXADECADIEN-1-YL ACETATE (neurological effects), 4-(4-HYDROXYPHENYL)-4-METHYL-2-PENTANONE (analgesic), and N-PROPYL 9,12-OCTADECADIENOATE (antidiabetic and thrombolytic). Acute toxicity, Pass prediction and ADME/T research validated their pharmacological potential and safety profile. These findings underscore *F. rumphii* as a potential source of innovative therapies, with MEFRL appropriate for managing pain, diabetes, and thrombosis, and NHFFRL for neurological disorders. Additional in vivo and clinical investigations are necessary to corroborate these findings.

Keywords: *Ficus rumphii*, Analgesic, Anxiolytic, Antidepressant, α -amylase inhibition, *Ficus rumphii*, Thrombolytic.

Poster ID: P250461

Assessment of Health Status of Nurses' Working at Tertiary Level Hospitals in Dhaka, Bangladesh.

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Abstract

Nurses play a critical role in the healthcare system, yet their own health status is often overlooked. To assess the Health Status of Nurses Working at Tertiary Level Hospitals in Dhaka, Bangladesh. A descriptive cross-sectional study design was undertaken for this report. The sample size of 80 was selected by using non-probability purposive sampling technique. Pre-testing was done to ensure validity and reliability of the questionnaire among 5 Senior Staff Nurses who work at Dhaka Medical College Hospital, Dhaka. Data were collected from respondents who met the inclusion criteria. Structured and unstructured questionnaires were used for data collection. The study found that 75% of nurses (n=80) had moderate level of health status, while 25%(n=80) had mild level of health status. These findings suggest the need for improved workplace conditions, health awareness programs and regular assessments to ensure better health outcomes for nursing professionals. The study indicates that the majority of nurses in tertiary hospitals in Dhaka maintain a moderate level of health, with some exhibiting only a mild level. This suggests that nurses' personal health is not optimal, despite their crucial role in patient care.

Poster ID: P250464

Lack of awareness and late diagnosis of heart block

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Abstract: Congenital complete heart block (CCHB) is a rare but serious **cardiac conduction disorder** marked by atrioventricular dissociation present at birth, diagnosed in utero or within the first 27 days of life. A major challenge remains **late diagnosis**, often due to limited public **awareness**, meaning cases may stay unnoticed until significant **bradycardia** or heart failure symptoms appear in childhood or adulthood. Research highlights maternal autoantibody transfer, especially anti-Ro/SSA and anti-La/SSB, as a leading cause. Yet, general practitioners and community health workers often lack sufficient awareness. Studies show that **early detection** strongly improves prognosis, as timely pacemaker implantation prevents life-threatening complications. Despite this, standardized screening for high-risk pregnancies is limited. Suggested solutions include routine fetal echocardiography, targeted educational interventions, and public health campaigns. Stronger collaboration between cardiologists, obstetricians, and primary care providers is vital to reduce diagnostic delays and improve long-term outcomes for patients with CCHB.

Keywords: Awareness, Bradycardia, Cardiac conduction disorder, Congenital complete heart block (CCHB), Early detection, Late diagnosis.

Poster ID: P250474

Melittin in cancer therapy: a precision oncology roadmap from preclinical promise to clinical application

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Abstract: Conventional cancer therapies are often thwarted by the dual challenges of multidrug resistance and acute off-target toxicity, which significantly limit durable clinical outcomes. Although melittin- a powerful cytotoxic peptide contained in bee venom- reveals remarkable preclinical success, its clinical translation has been continuously challenged by systemic toxicity, instability, and lack of predictive biomarkers. Aim of this review is to pioneer a biomarker-driven precision oncology framework by conducting a rigorous, PRISMA-compliant systematic analysis of published research papers between 2018-2025. A key finding of our review is that we showed EGFR and MMP-9 can be used as high-value biomarkers to stratify patients and allow targeted and stimuli-responsive delivery of melittin. Different from the previous strategy, this paradigm combines mechanistic biochemistry, nanomedicine, and biomarker intelligence into a translation roadmap, thereby setting up a leading paradigm for the implementation of bioactive peptides towards personalized cancer therapy.

Key words: Melittin, Nanocarriers, Biomarkers, Cancer Therapeutics, Precision Oncology.

Poster ID: P250476

Effervescent Mouthwash Tablet: A Novel Formulation for Improved Oral Hygiene

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Abstract

Mouthwash effectively delivers medication to the mouth, gums, or teeth when tooth surfaces are clean. However, liquid mouthwashes may cause dry mouth, disturb the oral microbiome, and have higher transport costs. To develop a portable, stable effervescent mouthwash tablet with antimicrobial activity for enhanced oral health. Tablets were prepared via direct compression using Citric acid and Sodium bicarbonate as effervescent agents, Neem extract for antimicrobial action, sweeteners, flavoring agents, and binders. Physical parameters including weight, friability, and disintegration time were evaluated. Antimicrobial activity was tested against *Streptococcus mutans* and *Candida albicans* using agar diffusion. The Formulated tablet disintegrated within 60 seconds in water, producing a clear, palatable solution. Inhibition zones were observed against both microorganisms, confirming strong antimicrobial potential. This effervescent mouthwash tablet is a stable, convenient alternative to liquid formulations, offering significant oral hygiene benefits.

Keywords: Effervescent tablet, Antimicrobial, Mouthwash, Disintegration, Microorganism, Microbiome.

Poster ID: P250480

In vitro Assessment of Phytochemicals, Antioxidant, Antidiabetic & Antibacterial Potentials of *Cassia javanica* L.

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Abstract

Plant-based medications are gaining popularity due to their medicinal properties. Although the Fabaceae family plant *Cassia javanica* L. has long been utilized in traditional medicine, little comparative pharmacological data is now available on its many sections and extract types. This study aimed to evaluate and compare the antibacterial, antidiabetic, and antioxidant qualities of methanolic and ethanolic extracts prepared from *Cassia javanica* leaves and flowers in vitro. The solvent extraction method was used to create both methanolic and ethanolic extracts. Folin-Ciocalteu assay was conducted to measure the total phenolic content (TPC). DPPH radical scavenging method was assessed to measure antioxidant activity, the α -Amylase inhibition assay was used to assess antidiabetic potential & the disc diffusion method was used to test the antibacterial activity against *Vibrio cholera* N-16961. All extracts showed the presence of phenolics, with methanolic flower extract containing the highest TPC. In the DPPH assay, methanolic flower extract exhibited the strongest antioxidant activity. α -amylase inhibition was highest in the methanolic flower extract, indicating strong antidiabetic potential. Both methanolic and ethanolic flower & leaf extracts displayed no antibacterial activity against *V. cholera* N-16961 strain. The plant's known antidiabetic and antioxidant properties suggest that it may have potential as a source of natural medicinal compounds.

Key words: *Cassia javanica*, Phytochemicals, Antioxidant activity, α -amylase inhibition assay

Poster ID: P250523

Sex Identification and Optimization of a Protocol for the Sperm Cryopreservation of Freshwater Mussel, *Lamellidens marginalis*

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Abstract

Freshwater ecosystems harbor a rich diversity of organisms, among which *L. marginalis*, commonly known as the pearl mussel, holds significant ecological and socioeconomic importance. Unfortunately, their species richness has been in a dramatic decline worldwide over the last few decades, due to increasing demand for aquaculture production as well as pearl culture. However, an effective sperm cryopreservation protocol for freshwater mussels (*L. marginalis*) has not yet been developed. For cryopreservation, milt from males was diluted in various extenders with cryoprotectants (propylene glycol, ethylene glycol, dimethyl sulfoxide), frozen in liquid nitrogen (at -196 °C), and thawed at 42 °C for 5 seconds. The best extender was physiological solution, and 10% PG outperformed EG and DMSO in terms of post-thaw viability ($17.4 \pm 2.01\%$). An optimized sperm cryopreservation protocol was developed using a physiological solution with 10% PG, liquid nitrogen freezing at -196°C, and rapid thawing at 42°C for 5 seconds. Sperm integrity and viability was consistent throughout the protocol.

Keywords: Cryopreservation, extender, *Lamellidens marginalis*, sex identification, sperm.

Poster ID: P250526

Drivers Of Consumer Satisfaction and Purchase Behavior of Instant Food Products in Urban Bangladesh: The Role of Quality, Price, Packaging, and Cultural Context

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Abstract

At present, men and women in developing nations are involved in diverse occupations and maintain tight schedules. They don't get enough time to prepare meal. Many people hesitate to buy instant food because of doubts about its healthiness. The central research question focuses on understanding the purchase behavior and health concerns associated with instant food products. The study utilizes a convenience sampling method, a descriptive and analytical research design, and a questionnaire with 315 responses. The majority of those surveyed are from middle-class and nuclear families, with 88.7% being unmarried and 72.1% of respondents are students. Among the respondents (42.2%) have doubts about the health of instant food, very few (3.5%) think it is harmful and almost half consider it healthy. The findings suggest that consumers are moving away from a cost-conscious mindset to one that is more health-conscious and value-oriented.

Keyword: Instant food, Consumer satisfaction, Purchase behavior, Health perceptions, Ready to eat food.

Poster ID: P250549

Ameliorative effects of a Phyto therapeutic ‘Plant-Based Powder Mix’ on arsenic induced multiple organ dysfunctions in Swiss albino mice.

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Abstract: Chronic exposure to arsenic is a major public health concern globally. Although current treatments exist, their side effects and limited accessibility in rural areas need safer and more sustainable alternatives. This study aims to explore the protective role of a plant-based powder mix including *Moringa oleifera*, *Spinacia oleracea*, *Nigella sativa*, and *Curcuma longa* against arsenic induced multi-organ dysfunction and dose response relationship in mice model. Seventy-two Swiss albino mice were randomly assigned into eight groups. After 4 weeks of arsenic exposure, the powder mix was administered orally for 8 weeks. Histopathological evaluations were conducted on the liver, heart, lungs, stomach, and brain. Evaluated gene expression of *Nrf2*, *TRβ*, and *Ghrl*. Arsenic exposure induced dose-dependent histological damage across multiple organs. Conversely, treatment significantly ameliorated these pathological changes. **Biochemical analysis of serum markers** showed that arsenic exposure led to significant elevation ($p < 0.05$) in **ALT, AST, LDH, glucose and TG** levels compared to the control group and the treatment reversed these effects in a dose dependent manner. Gene expression analysis revealed that arsenic exposure down regulated *Ghrl* and *TRβ*, while slightly increasing *Nrf2*. The findings suggest that the synergistic action of four plant compounds contributed to effectively reducing arsenic toxicity.

Keywords: Arsenic toxicity, multi-organ dysfunction, biochemical analysis, Gene expression, synergistic action.

Poster ID: P250557

From Rocks to Risk: Environmental and Economic Implications of Stone Extraction in Bholaganj

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Abstract: Bholaganj, Sylhet, a tourist spot, has become an ecologically endangered area. Over-extraction of stone results in this consequence. The study explores the present environmentally endangered condition of Bholaganj, as well as its direct impact on long-term sustainability in stone extraction and tourism. This affects the local economy. The study evaluates those environmental and ecological effects. This included qualitative research methods, specifically using 20 IDIs (In-Depth Interviews) with local people and 7 semi-structured interviews with tourists. Collected data is thematically analyzed. The surface soil has begun to erode. Increased siltation in water can cause water pollution. The number of tourists was not remarkably decreased. Overextraction is highly affects the normal existing environmental cycle as well as causing soil erosion, chances of water pollution. This destructive activity must be stopped before it is too late. Right now, extraction should be minimized on a large scale after viewing this destructive behavior.

Keywords: Stone overexploitation, Ecological imbalance, Economic impact, Tourism and Sustainability.

Poster ID: P250579

Molecular Characterization and Mutation Analysis of the ATP7B Gene in Bangladeshi Wilson Disease Patients

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Abstract: Wilson disease (WD) is an autosomal recessive disorder caused by mutations in the ATP7B gene, leading to impaired copper transport and toxic accumulation in vital organs. This study investigated pathogenic mutations in exons 5, 12, 14, and 15 of ATP7B among Bangladeshi patients using both experimental and in silico approaches. Fifteen clinically suspected WD patients were recruited, genomic DNA was extracted from peripheral blood, and exon-specific primers were used for PCR amplification. PCR products were validated by agarose gel electrophoresis and sequenced using the Sanger method. Sequence alignment with the reference ATP7B gene revealed both novel and known mutations, including frameshift mutations c.2331delC and c.2353_2354insT in exon 15, and c.1621delG along with two missense mutations (c.1623A>T and c.1627T>G) in exon 5. In silico analysis further identified 52 potentially pathogenic nsSNPs, of which 27 were predicted as deleterious. These findings indicate a distinct mutational spectrum of ATP7B in the Bangladeshi population and highlight the value of molecular diagnostics for early detection and improved management of WD.

Keywords: Wilson disease, ATP7B, mutation analysis, Sanger sequencing, in silico study, Bangladesh

Poster ID: P250593

Thalassemia prevention in Bangladesh through plant-based and genetic biotechnology strategies

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Abstract: Thalassemia is an abundant haematological disorder in Bangladesh, and Hb-E beta is one of the beta-thalassemia traits with a broad spectrum of clinical severity. The possibility, impediments, and prospects of applying biotechnological approaches (e.g. genetic screening, CRISPR, and gene therapy) in prevention and management of thalassemia have been analyzed by this work in consideration of the costs, infrastructure, and socio-economic status of the affected population. Minimal cost PCR (Polymerase Chain Reaction) tests and plant-based diagnostic tools could be used to identify the carrier. Medicinal plants derived HbF (Hemoglobin F) inducers as an adjunct with hydroxyurea reveals synergistic HbF induction. In vitro studies of ginsenoside Rg1, a natural compound isolated from medicinal herbs, show effective induction of fetal hemoglobin (HbF) synthesis in erythroid cells, without any cytotoxic effects. Plant biotechnology offers a cost reduction of up to 10 times and relatively easier accessibility in rural areas and presents a promising and sustainable method of thalassemia prevention in Bangladesh.

Keywords: CRISPR, Fetal hemoglobin, Ginsenoside Rg1, Gene therapy, Hydroxyurea.

Poster ID: P250602

An unhealthy lifestyle influences sleep disturbance, which is related to PCOS

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Abstract

Polycystic Ovary Syndrome (PCOS) is a disorder that affects reproductive, metabolic, and endocrine functions in women of reproductive age. It is assumed that excessive consumption of processed foods and a sedentary lifestyle are major causes of sleep disturbance, which may be linked to androgen excess, imbalance of the Follicle-Stimulating Hormone (FSH) ratio, hyperinsulinemia, and progesterone deficiency, all of which contribute to the development of PCOS. This study suggested that unhealthy dietary habits disrupt melatonin production, leading to delayed sleep, and this combined effect results in a hormonal imbalance that contributes to PCOS. A cross-sectional survey was conducted among 80 female students in a Private University's female hostel in Dhaka (ages 18-25), focusing on their dietary habits, sleep patterns, and PCOS related symptoms. The collected data were analyzed to determine the relationship between unhealthy diet, late sleep and PCOS. The results revealed that 40% of participants were directly diagnosed with PCOS. These findings demonstrate that improved dietary habits and regulated sleep may help reduce the risk of PCOS in young women by enhancing their quality of life.

Keywords: Sedentary lifestyle, Hyperinsulinemia, Progesterone deficiency, Melatonin disruption, Metabolic dysfunction.

Poster ID: P250616

Misuse Of Antibiotics And Strategies To Prevent Resistance

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Abstract

The misuse of antibiotics, including self-medication, over-prescription, and stopping treatment early, contributes to the rise of Antimicrobial-resistance (AMR). This poses a significant threat to public health, leading to infections that are harder to treat, prolonged illnesses, and increased healthcare costs. Key factors for misuse include lack of awareness, weak healthcare systems, and poor regulation. Healthcare providers play a vital role in addressing this issue by ensuring proper antibiotic stewardship guiding patients on correct usage, controlling prescriptions, and educating the public. By promoting responsible antibiotic practices and addressing behavioral and clinical factors, the risk of AMR can be reduced. This will help preserve the effectiveness of antibiotics, improve patient outcomes, and protect public health for future generations. Effective stewardship and regulation are essential in combating AMR and maintaining the efficacy of antibiotics.

Keywords: Antibiotic stewardship, Antimicrobial-resistance (AMR), Healthcare providers, Over-prescription, Public health, Self-medication.

July Revolution 2024: Rebuilding Bangladesh

Poster ID: P250324

Civic Resistance in The Digital Age: Social Media As A Catalyst In Mobilizing The July 2024 Movement In Bangladesh

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Abstract

Social media are now playing crucial roles in digital activism, like social and political movements. This study explores the role of social media as a catalyst in mobilizing and sustaining the July 2024 Movement in Bangladesh. It adopts a mixed-methods approach of combining both qualitative and quantitative content analysis and a short survey. It utilizes 400 posts and 300 comments on Facebook and Instagram for the thematic and sentiment analysis of the general public, and a short survey of 250 individuals to understand how social media influenced them to participate in the movement. The result finds four dominant s: Criticism of Government, Call for protest, Police violence, and international concern. Hashtag analyses showed #SaveBangladeshStudent (4.5 million) and #StepDownHasina (2.5 million) engagement that created national and international concern. In sentiment analysis, the study highlights pro-protest support (77%) and anti-government support (14%). Survey results also show the highest engagement towards the movement.

Keywords: social media, mobilization, July Uprising, Bangladesh, digital activism, network publicis.

Poster ID: P250377

The Unsettled Aftermath: A Socioeconomic Analysis Of Political Instability And Public Security In Post-2024 Bangladesh

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Abstract: This research explores the socioeconomic consequences of political instability and public insecurity in post-2024 Bangladesh. The aftermath of the democratic conflict has weakened institutions, escalated violent crime, and eroded public trust in governance. Unlike traditional analyses that focus on macroeconomic or political dimensions, this study highlights direct impacts on daily safety, justice, and community well-being. Using a mixed-method approach—quantitative analysis, time-series comparisons, spatial mapping, and econometric modeling—data from police crime reports, national statistics, and human rights records are analyzed. The study explores links between political events, crime, and socioeconomic indicators such as investment, economic activity, and public confidence, with special attention to marginalized groups. The expected outcomes include evidence of how political turmoil fosters criminal networks, leading to a “ransom economy,” and the development of a vulnerability index ranking districts by governance and security risks. By providing data-driven insights and actionable policy recommendations, this research aims to support government agencies, NGOs, and international organizations in breaking cycles of violence, rebuilding institutional trust, and fostering a more stable and secure future for Bangladesh.

Keywords: Political Instability, Public Security, Socioeconomic Impact, Governance, Violent crime

Poster ID: P250392

Evaluating Police Capacity in the Aftermath of the July Revolution 2024: A Study on Rajshahi Metropolitan Police

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Abstract: The Bangladesh Police is a crucial state organization responsible for public safety, maintaining law and order, and preventing crimes. The July Revolution has emphasized the urgent need to reform the police force that has long been involved in authoritarian practices, so, knowing its present status is important. The objective is to assess the police performance after the July Revolution, focusing on public perceptions, operational challenges, and prospects. Using a qualitative approach, a purposive and convenience sample of 60 participants was examined through IDIs and KIIs, and analyzed thematically. Findings reveal post-revolution improvements in police behavior, existing operational challenges and recommendations for improved service quality. Discussion highlights rising public expectations, but political pressure, resource shortages, and long duty hours endure. Legal reform, independent police commission, community engagement, and proper training are necessary for a skilled, people-friendly, and modern police force. This study will contribute to reforming the police force.

Keywords: Police Reform, Police accountability, Rajshahi Metropolitan Police, Post July Revolution 2024, Bangladesh police.

Poster ID: P250450

Melodies and Metaphors of Protest: Role of Symbols and Music in 2024 July Movement of Bangladesh

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Abstract: The July 2024 movement is remembered not only for protests but also for the songs, slogans, symbols, and metaphors that carried courage and unity. This research looks at how these cultural expressions touched the feelings, participation, and political awareness of the protesters. Data was collected through Google survey, focus group discussions, and interviews, along with books, research articles, news reports, and social media. Participants shared that songs built solidarity, while slogans like “Quota or merit? Merit, merit!” reflected the voice of the people. The portraits of victims stood as symbols of grief and inspiration. Metaphors of blood, martyrdom, and betrayal added strength to the story of the movement. In the end, the cultural performances of the July Movement were more than acts of protest they became signs of hope, courage, and change, setting a new direction for protest culture in Bangladesh.

Keywords: The July 2024 Movement, Songs, Slogans, Symbols, Metaphors

Poster ID: P250458

A Comparative Analysis Between the Arab Spring and the July Revolution in Bangladesh: The Challenges and Prospects for Bangladesh

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Abstract

This study conducts a comparative analysis of the Arab Spring and the July Revolution, focusing on internal and external factors, particularly those that led to the collapse of the Arab Spring, to identify the challenges and prospects for Bangladesh. The research follows a comparative analysis with a qualitative approach using both primary and secondary sources. Findings suggest that Dr. Muhammad Yunus's neutral leadership, along with Bangladesh's prior democratic experience, provides grounds for optimism. Yet, the danger of authoritarian resurgence persists unless weakened institutions are reformed, loyalists of the previous regime within the bureaucracy, military, and judiciary are held accountable, and foreign relations are diversified to reduce overreliance on India. While the interim government has initiated steps, the ultimate outcome of the July Revolution will depend largely on both the domestic and international policies of the incoming elected government.

Keywords: Arab Spring, Bangladesh, civil-military relations, democratization, July Revolution.

Poster ID: P250459

Reforming Bangladesh's Core Institutions: A Principal Agent Approach to Strengthening Democratic Governance

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Abstract

The effectiveness of core institutions judiciary, law enforcement, armed forces, and electoral bodies is critical for sustaining democratic stability and public trust. In Bangladesh, persistent gaps in institutional independence, transparency, and accountability have weakened governance over time. This study proposes an evidence-based reform framework inspired by Principal Agent Theory to address these challenges. Using a mixed methods approach covering 2007 - 2024, the qualitative component will involve 35 expert interviews, document analysis, and comparative case studies of Thailand and Indonesia, while the quantitative component will survey 1,200 citizens to assess trust indices and institutional performance. The study identifies four priority reforms: (1) establishing an Independent Judicial Appointments Commission, (2) increasing autonomy of the National Police Service Board, (3) implementing advanced electoral technologies including Electronic Voting Machines and biometric verification, and (4) strengthening parliamentary oversight of the armed forces. Despite limitations in accessing internal military data, the proposed framework aims to enhance institutional efficiency, independence, and citizen confidence, thereby supporting democratic governance, transparency, and protection of civil rights in Bangladesh.

Keyword: Institutional reform, judicial independence, police autonomy, electoral technology, civil-military relations.

Poster Id: P250499

Reimagining Bangladesh: The July Revolution of 2024 and the Foundations of Bangladesh 2.0

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Abstract: The July Revolution of 2024 in Bangladesh marked a bloodshed moment in political history. The Uprising was a reaction against dictatorship, a collective call for justice, dignity, democratic values, and governance, establishing the foundation of Bangladesh 2.0. This research seeks to explore the causes, immediate impacts, and implementation of the revolution, highlighting governance reforms, youth participation and policy transformation. A mixed method will be used to analyse the qualitative and quantitative data that will be collected through structural surveys and interviews from around 35 participants, including policymakers, academics, and civil society members. In addition, historical documents, policy reports, and archival records will be reviewed to gather evidence of governance reform and democratic practices. This approach will ensure both reliability and analytical depth. The research will demonstrate that while Bangladesh 2.0 holds significant promise, its sustainability will depend on how effectively the nation implements justice, dignity, and democratic values. The July Revolution marks a strategic beginning of structural reforms for a new Bangladesh.

Keyword: July Revolution 2024, Bangladesh 2.0, Democratic values, Governance reforms, Youth participation.

Poster ID: P250534

Media Censorship, Freedom of Speech and Digital Repression

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Abstract: 2008–2024: An Era of Discrimination and Oppression Narrated by a Fascist Regime Awami League. In this time, media freedom, freedom of speech, and digital rights were mostly violated sectors. The digital age challenge is to define the tension between media censorship and freedom of speech. But in that era, censorship was often implemented by the regime to combat false information, hate speech, and threats to national security. It was also used as a tool for silencing opposition and restricting public access to diverse perspectives. This poster will show the reality of media control and digital repression narrated by the fascist government and how they notoriously ended the freedom of speech. We will data from renowned case studies, newspapers, reports, and in-depth interviews with journalists, policy documents, and digital rights activists. Based on these findings, we will come to know about the tremendous steps taken by the fascist regime. The investigation will reveal the deliberate efforts of Awami League to incite civil disorder and undermine public trust in state institutions. This study will demonstrate the critical role of digital repression and information control. Though it can help protect national integrity but in this fascist regime it was used as a powerful tool of oppression silencing dissent, erasing truth, and instilling fear across society.

Keywords: Media censorship, digital repression, oppression tool, silencing dissent.

Poster ID: P250543

Understanding Photo Card Misinformation on social media During the July–August 2024 Protests in Bangladesh

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Abstract: During the July–August 2024 protests in Bangladesh, social media became a major channel for photo card misinformation, mimicking reputable news outlets to appear legitimate. This study examines over fifty cases documented by Rumor Scanner to identify patterns, targets, and strategies in these fabricated photocards. Using qualitative content analysis, each photocard was coded by target (politicians, protest movements, celebrities, or government officials), misused media logo (Jamuna TV, Somoy TV, Prothom Alo, RTV, and Daily Star), type of claim (political statements, false casualty reports, celebrity news, or government-related misinformation), and fact-check result, all confirmed false. Findings show politicians (30%) and protest movements (26%) were most frequently targeted, with Jamuna TV logos in 40% of cases. Political statements and fabricated quotes dominated (36%), followed by false casualty reports (30%). Circulation peaked during major protests, and visual resemblance to credible media amplified fear, confusion, and distrust, emphasizing social media's role in spreading political misinformation.

Keywords: Photo card misinformation, social media, visual fake news, political protests, Bangladesh, July–August 2024.

Poster ID: P250545

Youth and Civil Society in Action: Transforming Grassroots Politics in Bangladesh After July 2024

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Abstract: The July 2024 Revolution in Bangladesh was marked as a transformative period in the country's political life and represented an unprecedented transfer of national power. Although preoccupied with macro-level transformations in Dhaka, the real value of the revolution can be assessed in its contribution to politics at the grassroots level where citizens and youth have started transforming local politics. This paper specifically aims to examine the nature of youth and civil society involvement in local political activities after the revolution. The study designed with a mixed methods approach utilizes 200 survey responses and 15 semi-structured interviews with youth activists, local leaders and civil society members in Nilphamari district and supplemented with documentary evidence. The findings reveal two key dynamics: 1. Increased youth participation in local politics, 2. The expansion of their participation into structured governance, civic initiatives and digital policy engagement beyond conventional protest action. These trends are corroborated by survey evidence: 58.5% observed increased youth participation, 55.8% cited social media as the primary arena for political engagement and 80.9% observed greater political awareness. The findings show that the most long-lasting effect of the revolution is that the generation has become politically active and reshaping grassroots politics in Bangladesh.

Keywords: July Revolution 2024, Youth Participation, Civil Society, Grassroots politics, Reshape.

Poster ID: P250559

A Comprehensive Study on State Violence: types, causes, Political Repression and Human rights violations.

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Abstract

Bangladesh has been plagued by state violence, political repression and human rights abuses for many years. The 2009 BDR mutiny, the 2013 Shahbagh movement, the Shapla Chattar campaign and the recent July 24 movement highlight these challenges. The purpose of this research is to critically analyze how state violence and political repression undermine people's fundamental rights, especially freedom of expression and democratic participation. In this research, we will follow a qualitative approach. We will collect old news, articles and academic articles from online newspapers, reports from Human Rights Watch and the United Nations. We will review these sources through content analysis in the light of human rights and democracy theory. Initial analysis suggests that the state's response to the protests in Bangladesh often involves governments' actions, including arbitrary arrests, media and strict restrictions on online expressions. The study shows that institutional reforms, strong accountability mechanisms, protecting people's freedoms and raising public awareness against state repression are essential to safeguard Bangladesh's democratic future.

Keyword: State Violence, Repression, Abuse, Democratic State, Autonomy.

Poster ID: P250561

Echoes and Silences: Media Polarization During Quota Reform Movement

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Abstract

The 2024 quota reform movement in Bangladesh began as a protest against government job quotas but soon evolved into a larger call for democratic change. In this qualitative study, I analyzed 35 media contents from print, broadcast, and social media. The findings show that 48.6% were pro-movement, 37.1% were anti-movement, and 14.3% remained neutral. State-aligned media largely portrayed the movement negatively, reflecting the government's stance. In contrast, social media platforms like Facebook, YouTube, and X highlighted the ground reality and built public awareness. This study emphasizes the powerful role of independent media and digital activism in promoting democratic transparency.

Keywords: Quota Reform Movement, Media Polarization, Content Analysis, Media and Democracy, Social Media Activism, Political Media Bias.

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Journalism Under Repression: Violence, Surveillance, And Trauma Among Journalists During Bangladesh's July Revolution

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Abstract

Authoritarian and hybrid regimes often suppress the media first (Coşkun, 2020, Leuschner & Hellmeier, 2024). Bangladesh reflects this trend, where democratic institutions have eroded amid authoritarian consolidation over the past fifteen years (Riaz, 2023), most visibly during the July 2024 movement. This study investigates the effects of surveillance, newsroom policies, and digital restrictions on journalism, the resistance tactics employed, the psychological stress endured, and the coping strategies used by the journalists during the movement. Using a qualitative design, fifteen purposively selected journalists were interviewed through semi-structured guides, with transcripts coded in MAXQDA and thematically analysed following Braun & Clarke (2006). Journalists reported harassment, physical assault, psychological trauma, and violence from ruling-party supporters, police, and citizens, alongside waning public trust and absent institutional protection. To continue reporting, they relied on protective gear, VPNs, and peer networks. By centering journalists' lived experiences, this study highlights an overlooked dimension of repression. The findings underscore urgent needs for protection, training, and post-crisis support to sustain press freedom.

Keywords: authoritarianism, press freedom, journalists' safety, psychological trauma, lived experience.

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Reimagining Justice: A Victim Centered Framework for Mental Health and Rehabilitation in Post-Conflict Bangladesh

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Abstract

The July 2024 Revolution in Bangladesh, marked by mass protests and state violence, caused widespread trauma and unmet needs, highlighting the absence of a national framework for victim rights, psychosocial care, and rehabilitation. In our research We designed a victim centered, technology enabled rehabilitation model, evaluated AI assisted victim identification, and proposed transparent compensation mechanisms to rebuild institutional trust. A verified online cross-sectional survey (N=145) was conducted with victims, witnesses, and family members, ensuring anonymity. Measures captured psychological distress, socioeconomic impact, and justice perceptions. Findings revealed 71.8% of participants reported psychological distress, while only 9.6% accessed therapy. Socioeconomic disruptions included job loss (37.1%) and financial strain (52.4%). Prior AI exposure correlated with greater trust in AI assisted triage. Participants endorsed digital disbursement and a grievance app, emphasizing community-based trauma care. A structured framework integrating AI triage, community mental health, a national victim database, and a grievance app can accelerate recovery and rebuild trust. Limitations include self-selection bias, online only sampling, and varied technological familiarity, yet findings show clear readiness for scalable, victim centered reform.

Keywords: Victim centered, Mental health, Rehabilitation, Bangladesh, Digital justice.

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Victim-Centered Framework for Mental Health, PTSD, and Rehabilitation in Post-Conflict Bangladesh

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Abstract: The student revolution in July 2024 in Bangladesh caused immense havoc in the social and psychological health, especially among the young students who were first-hand exposed to violence and insecurity. This paper will discuss the psychological effects of the movement considering the aspects of anxiety, post-traumatic stress, and coping strategies. It used a cross-sectional mixed-methods design with 210 students using survey and interview to examine the level of prevalence of trauma, access to services and response of institutions. Results indicate that over 70 percent of the respondents had the symptoms of trauma related, but only 9 percent sought psychological assistance of professional character and preferred to rely on the family and friends. Institutional mechanisms were seen to be inaccessible, ineffective, and untrusted, and sources of long-term psychological risks vulnerable to the survivors. The research indicates that there is an urgent requirement of a victim-focused approach to trauma care, which is consistent with Sustainable Development Goal 3 (Good Health and Well-being), and it is inclusive and trauma-informed rehabilitation. It is crucial to fill such gaps with policy changes and well-organized psychosocial intervention to protect the mental health of the youth in the post-conflict Bangladesh.

Keywords: Student uprising, psychological trauma, PTSD, coping mechanisms, mental health services, Bangladesh

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