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PROCEEDINGS OF INTERNATIONAL CONFERENCE ON TECHNOLOGY ADVANCES FOR GREEN SOLUTIONS AND SUSTAINABLE DEVELOPMENT

09TH & 10TH AUGUST 2024

2024

Dept. of Computer Science and Engineering
NIST University
Institute Park, Palur Hills,
Berhampur, Odisha,
India - 761008
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International Conference
on
Technology Advances for Green Solutions and Sustainable Development

(ICT4GS-2024)

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Organized by

Department of Computer Science and Engineering

NIST University

Institute Park, Pallur Hills, Berhampur – 761008, Odisha, India

ABOUT THE NIST

The NIST Institute of Science and Technology (Autonomous), Institute Park, Pallur Hills, Berhampur, Odisha, was established in 1996 as first NRI higher educational venture in the state of Odisha. It is promoted by SM Charitable Educational Trust - a nonprofit Trust. It was the vision and dream of the founding members to have NIST as a center of academic and research excellence at par with International Research Universities in their home state of Odisha, India. Today NIST is a premiere research institute in the country offering undergraduate, graduate, master, and Ph.D. programs in Engineering, Science and Management and Liberal Arts. NIST is NACC "A". Over years it ranked highly in the country by NIRF, MHRD (Govt. of India), Atal Ranking of Institutions on Innovation Achievements (ARIIA) by Ministry of Education (Govt. of India) and other ranking organizations. In 2023 it ranked 49th in the country in engineering by Times Engineering ranking. NIST has set benchmarks for its outstanding multi-disciplinary research in the areas such as VLSI Design, Data Science, IoT, Renewable Energy, 5G and Future Communication, Robotics, AR/VR and Multimedia, and computer Vision etc. NIST faculties are among BOYSCAST and Fulbright scholars, INSA fellows, USRI scientist award recipients including other achievements. NIST has research collaboration with many Universities around the globe [e.g., IAMS (Taiwan), Univ. of Electro-Communication (Japan), Brunel University (London), and NJIT (USA) and has strong industry-academia partnership with multiple industries in different sectors.

Department of Computer Science & Engineering:

The department of Computer Science and Engineering was established in the year 1996 with student strength of 60. Now the Student strength in the department of CSE is 180. The Computer Science graduate is specialized in the theory of Computing and designing Computational Systems. As a discipline it focuses on Computer Science engineers with upgraded technical skills required to solve computing problems of industry and society in general. At the same time there is tremendous demand and App Development which has kept research work alive and attracting many students to opt for higher studies.

The Department of Computer Science runs the following programs:

1: B.Tech. (CSE / IT / AI-ML / Data Science)
2: Bachelor of Computer Application
3: B.Sc. (Computer Science)
4: B. Sc. (Information Technology Management)
5: M.Tech. (Computer Science and Engineering)
6: Master of Computer Application (MCA)
7: M. Sc. (Computer Science)
8: M. Sc. (Data Science)
9: Ph.D. (Computer Science and Engineering)

International Conference on
Technology Advances for Green Solutions and Sustainable Development
(ICT4GS-2024)

ABOUT THE CONFERENCE

In a world grappling with pressing environmental challenges, the International Conference on Technology Advances for Green Solutions and Sustainable Development is a crucial gathering. This conference offers a dynamic platform for researchers, industry professionals, policymakers, and academicians to converge, share insights, and explore pioneering technological advancements. It aims to foster collaborative efforts and innovative approaches that drive sustainable development and green solutions. Participants will engage in thought-provoking discussions, present groundbreaking research, and explore practical applications that contribute to a sustainable and eco-friendly future. Join us in shaping a greener world through technological innovation and sustainable practices.

All presented papers will be published in conference proceedings by Springer ISEM (Electronic: 3004-9598; Print ISSN: 3004-958X). Indexed by Google Scholar. All books published in the series are submitted for consideration in the Web of Science. https://www.springer.com/series/17396

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INVITED TALKS

Sustainable Advancement in Green Technology

Dr. Sandeep Poddar

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Green technology promotes sustainable development by discovering environment friendly sources of growth, fostering the creation of new eco-friendly sectors, and generating employment opportunities and technological advancements. In order to attain sustainable development and create new economic prospects, it is imperative to enhance investments and innovations, which serve as the bedrock of green growth. Sustainable green technologies contribute significantly to the establishment of a sustainable society by simultaneously fostering environmental preservation and economic advancement. The adoption of green technology should reinforce the global movement towards enhancing individual well-being and promoting social equality in the context of the fifth industrial revolution (IR 5.0), while simultaneously mitigating environmental dangers. The utilisation of renewable or alternative energy sources represents a significant shift in green technologies. The emergence of sustainable development factors has unveiled a contradictory reliance on the advancement of digital technology. A complete framework is necessary for the use and implementation of green technology. This framework should enable cross-sectoral integration, the utilisation of local practices and knowledge, stakeholder participation, and the empowerment of organisations with the support of the Government.

Challenges and Obstacles of Digital Ecosystems for Precision Agriculture

Prof. Dr. Bedir Tekinerdogan

Wageningen University & Research, The Netherlands

Precision Agriculture (PA) represents the application of modern information and communication technologies (ICT) into agriculture to increase production and economic returns, often with the goal of reducing environmental impact. PA builds on the adoption of advanced technology such as cloud computing, remote sensing, data-driven farming, big data analytics, and the Internet of Things (IoT). It also relies on the integration of multiple systems within a digital ecosystem, where different elements co-evolve in the same environment. This digital ecosystem can be structured and operated in various ways, presenting significant challenges and obstacles.

This talk will explore the diverse challenges and obstacles encountered in implementing digital ecosystems for precision agriculture. Drawing from various contexts and practical experiences, the discussion will cover the complexities of integrating advanced technologies into agricultural practices. Several case studies will be presented to provide real-world examples and insights into the multifaceted issues faced. By examining these challenges, the talk aims to shed light on the critical considerations necessary for advancing precision agriculture through effective digital ecosystems.

Material Removal Rate Optimization in EDM: Implications for Promoting Sustainable Manufacturing Practices in Papua New Guinea

Dr. Kamalakanta Muduli

Associate Professor & Head of the School of Mechanical Engineering
Papua New Guinea University of Technology
Lae, Morobe Province

Electrical Discharge Machining (EDM) is a widely used non-traditional machining process known for its ability to machine hard and complex materials with precision. However, the optimization of Material Removal Rate (MRR) in EDM presents significant challenges, particularly in the context of promoting sustainable manufacturing practices. This study focuses on MRR optimization in EDM with an emphasis on its implications for sustainable manufacturing in Papua New Guinea. Given the country's commitment to sustainable development and environmental conservation, optimizing EDM processes is crucial for minimizing resource consumption and environmental impact.

This research investigates the key parameters influencing MRR in EDM, such as pulse duration, discharge current, and dielectric fluid composition. By employing advanced optimization techniques, including Response Surface Methodology (RSM) and genetic algorithms, the study aims to identify optimal parameter settings that maximize MRR while minimizing energy consumption and waste generation. The findings demonstrate that through careful parameter tuning, MRR can be significantly enhanced without compromising sustainability objectives.

Furthermore, the study explores the potential benefits of integrating EDM with sustainable practices in Papua New Guinea, such as using biodegradable dielectric fluids and recycling electrode materials. These approaches align with the country's environmental policies and contribute to reducing the carbon footprint of manufacturing operations. The research highlights the importance of adopting a holistic approach that balances productivity and sustainability in machining processes.

Movement from Green Revolution to Millet Revolution: A Need in Indian Agriculture

Dr. Minati Sahoo

HoD (I/C) & Asst. Professor, Department of Economics, Central University of Odisha

Climate change poses a significant risk to Indian agriculture. The changing weather patterns, extreme temperatures, and rainfall variations are causing unpredictability in crop production, leading to food insecurity. On the other hand, the world population is also rising in a vertical way putting threat to the food availability for every mouth. Along with that a huge section of the population depends on the cereal for their staple consumption like paddy, wheat, maize etc. But focusing only on these preferred cereals may not serve the purpose of food security to the vast population of the world. The first Green Revolution in the 1960s characterized by the use of high-yielding varieties and more intensive farming techniques transformed the agricultural landscape in the country. It played a key role in preventing mass starvation and hunger deaths in India in the face of a growing population and an increasing food demand. However, its non-sustainable nature coupled with its limited scope and subsequent impact on the ecosystem, have led to a quest for a more sustainable and greener alternative. India needs a second green revolution to make agriculture more climate-resistant and environmentally sustainable. Shifting our agricultural system towards wider variety of under-valued and locally produced crops and cereals like millet can provide assurance food security with nutritional support to a degree. Millet is a comprehensive term used for indicating a wide variety of small-seeded grasses that are mainly cultivated on hilly and marginal lands on dry and temperate, tropical and sub-tropical regions as grain crops. India is one of the largest producers of different varieties of milletswith 41.04% global production share. Realizing the role towards food security and nutrient richness of these millet grains they are now considered as "nutria-cereals".Significantly, millets have been closely linked with the attainment of many significant United Nations' Sustainable Development Goals (SDGs)—primarily, SDG 2 (Zero Hunger), SDG3 (Good Health and Well-being), SDG 12 (Sustainable Consumption and Production), and SDG 13 (Climate Action). With these backgrounds, an attempt has been made in this paper to analyse the need for second green revolution in Indian agriculture and how millets can help to cope up the present crisis.

Keywords: Green Revolution, Millet, Agriculture, Sustainable, Food Security, Nutrition

Building a Sustainable Digital Landscape: Technical Solutions for Online Safety

Dr. Kirti Kumari

Asst. Professor, Dept. of CSE, Indian Institute of Information Technology (IIIT), Ranchi, India

"Social media platforms have become integral to our lives, offering benefits like communication and support. However, they also provide a breeding ground for harmful activities like cyberbullying, hate speech, aggression, and misinformation. India, in particular, faces significant challenges in combating these issues due to the sheer volume of online content. Manual identification of such harmful activities is simply not scalable. This talk will explore the need for an automated system to identify online aggression, hate speech, and bullying posts. We will discuss existing traditional and computational methods for the identification of the posts, and also highlights the future computational models that leverage multi-modality and linguistic diversity for improved accuracy. By developing a robust identification system, we aim to equip parents and policymakers with the tools they need to address online bullying effectively and prevent further damage."

Dr. Kirti Kumari is currently working as an Assistant Professor in the Department of Computer Science and Engineering, Indian Institute of Information Technology Ranchi (IIIT Ranchi), Jharkhand, India. Prior to joining IIIT Ranchi, she worked as an Assistant Professor in the Department of CSE at Siksha "O" Anusandhan Deemed to be University, Bhubaneswar, Odisha. She has obtained a Ph.D. degree in Computer Science & Engineering from the Department of CSE of the NIT Patna, India. Her research interests include machine learning, deep learning, natural language processing, and social networks. She has published articles in different Journals, including Soft Computing, Future Generation Computer Systems, Transaction of Emerging Telecommunication Technology and Multimedia Systems. She contributed in these field and some of the key publication are as follows:

1. ***Kirti Kumari**, Jyoti Prakash Singh, Yogesh Kumar Dwivedi, and Nripendra Pratap Rana, "Towards Cyberbullying-free social media in smart cities: a unified multimodal approach", Soft Computing, Springer, volume 24, number 15, 11059-11070, 2020, SCIE,[IF: 3.628]*
2. ***Kirti Kumari**, and Jyoti Prakash Singh, "Identification of Cyberbullying on Multimodal Social Media Posts using Genetic Algorithm", Transactions on Emerging Telecommunications Technologies, Wiley, volume 32, number 2, e3907, 2020 , SCIE,[IF: 2.638]*
3. ***Kirti Kumari**, Jyoti Prakash Singh, Yogesh Kumar Dwivedi, and Nripendra Pratap Rana, "Bilingual Cyber-aggression Detection on Social Media using LSTM Autoencoder", Soft Computing, Springer, volume 25, 8999–9012, SCIE, [IF: 3.628]*
4. ***Kirti Kumari**, Jyoti Prakash Singh, Yogesh Kumar Dwivedi, and Nripendra Pratap Rana, "Multi-modal Aggression Identification using Deep Learning and Binary Particle Swarm Optimization", Future Generation Computer Systems, Elsevier, volume 118, 187-197, 2021, SCIE [IF:7.187]*
5. ***Kirti Kumari**, and Jyoti Prakash Singh, "Multi-modal Cyber-aggression Detection with Feature Optimization by Firefly Algorithm", Multimedia Systems, Springer, 2022, volume 28, issue 6, 1951-1962. SCI, [IF: 2.156]*
6. ***Kirti Kumari**, and Jyoti Prakash Singh, "AI_ML_NIT_Patna @ TRAC - 2: Deep Learning Approach for Multi-lingual Aggression Identification", In Proceedings of the Second Workshop on Trolling, Aggression and Cyberbullying, Language Resources and Evaluation Conference (LREC 2020), European Language Resources Asso. (ELRA), pp. 113-119, May 2020.*
7. ***Kirti Kumari**, Shaury Srivastav, Rajiv Ranjan Suman, "Bias, threat and aggression identification using machine learning techniques on multilingual comments", In Proceedings of the Third Workshop on Threat, Aggression and Cyberbullying (TRAC 2022), Association for Computational Linguistics (ACM 2022), Gyeongju, Republic of Korea, pp. 30-36, October 2022.*
8. ***Kirti Kumari**, and Sima Das, "Stress Detection System using Natural Language Processing and Machine Learning Techniques", In the nineteenth International Conference on Natural Language Processing (ICON-2022), CEUR Works Proceeding, Vol. 3416, pp. 45-55, December 15-18, 2022.*
9. ***Kirti Kumari**, and Ranjana Kumari, "An Extractive Approach for Automated Summarization of Indian Languages using Clustering Techniques", In 14th annual meeting of the Forum for Information Retrieval Evaluation (FIRE 2022), CEUR Works Proceeding, Vol. 3395, pp. 418-423, December 16-20, 2022.*
10. ***Kirti Kumari**, Shirish Shekhar Jha, Zarikunte Kunal Dayanand, and Praneesh Sharma, "ML&AI IIIT Ranchi@LT-EDI-2023: Hybrid Model for Text Classification aimed at Identifying Different Forms of Depression", In Proceedings of the Third Workshop on Language Technology for Equality, Diversity and Inclusion (LTEDI), In Recent Advances in Natural Language Processing, Association for Computational Linguistics (ACM), September 7-8, 2023.*
11. ***Kirti Kumari,** Shirish Shekhar Jha, Zarikunte Kunal Dayanand, and Praneesh Sharma, "ML&AI_IIIT Ranchi@DravidianLangTech: Leveraging Transfer Learning for the Discernment of Fake News within the Linguistic Domain of Dravidian Language", In Proceedings of the Third Workshop on Speech and Language Technologies for Dravidian Languages, In Recent Advances in NLP, Association for Computational Linguistics (ACM), September 7-8, 2023.*

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MESSAGE

I am immensely happy to know that NIST University's Department of Computer Science and Engineering is organizing the International Conference on Technology Advances for Green Solutions and Sustainable Development (ICT4GS-2024). This event underscores the critical intersection of technological innovation and sustainability, reflecting our collective commitment to addressing the pressing challenges of our time.

The focus on green solutions and sustainable development is not only relevant but imperative in today's context. By fostering discussions and disseminating knowledge on these themes, the ICT4GS-2024 Conference is contributing significantly to the global efforts towards sustainable development goals.

The number of paper submissions from researchers and practitioners and the rigorous peer review process to select the 38 high-quality articles to be published during conference proceedings is commendable. It speaks volumes about the dedication and scholarly contributions of the researchers and practitioners involved.

I am confident that the insights shared and the collaborations forged during this conference will pave the way for innovative solutions that align with our vision for a sustainable future. I encourage all participants to engage actively, share their expertise, and take this opportunity to learn from each other.

I extend my best wishes for the success of the ICT4GS-2024 Conference and look forward to the impactful outcomes it promises to deliver.

Best regards.

T.G. Sitharam

(Prof. T. G. Sitharam)

Dr. Omkar Rai

Executive Chairman, Startup Odisha

I extend my heartfelt congratulations to **NIST University** for organizing the **International Conference on Technology Advances for Green Solutions and Sustainable Development (ICT4GS-2024)**. This event is a testament to your commitment to fostering innovative solutions that address the urgent need to mitigate carbon footprints across various sectors of the economy.

As we strive towards sustainable development, it is crucial to adopt a coordinated approach, ensuring that all sectors function harmoniously to achieve our global and national green targets. I hope this conference becomes an ideal platform to explore and promote such collaboration, driving forward the agenda of sustainability and environmental stewardship.

As leaders and innovators, it is our responsibility to champion these efforts, fostering an ecosystem where green solutions are not just an option but a necessity.

Sd/-

(Dr. Omkar Rai)

Message from the President, NIST University

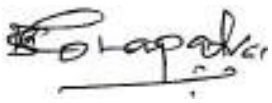
Dr. Sukant K. Mohapatra

It is a great pleasure to learn that the International Conference on "Technology Advances for Green Solutions and Sustainable Development (ICT4GS-2024)" is being organized by the Department of Computer Science and Engineering at NIST University (www.nist.edu), Institute Park, Berhampur, Odisha on 9th-10th August, 2024. This prestigious event brings together leading scholars, scientist, researchers, industry experts, and policy makers to engage in meaningful discussions on sustainable technological advancements. I have the distinct pleasure of welcoming you all to this premier conference at NIST University.

In today's world, where environmental challenges have reached a critical juncture, the necessity for innovative and sustainable solutions is more pressing than ever. This challenge requires systemic and holistic innovations that include a sustainable development of highly efficient and practical technical solutions for the green environmental for the welfare of the mankind. The ICT4GS-2024 conference provides a dynamic platform to address these challenges by fostering collaboration and the exchange of ideas among innovative minds from various disciplines. It is through such collaboration that we can develop and implement cutting-edge technologies that promote environmental sustainability and contribute to a greener and greater future. The theme of this conference aligns perfectly with NIST University's commitment to promoting research and innovation that addresses the global challenges. As a leading University dedicated to academic excellence and societal impact, we are proud to support initiatives that advance green solutions and sustainable development. We at NIST are very pleased to host this high quality forum of scientist and thought leaders to present their latest research results, findings, innovative ideas, trend and challenges on green solution and sustainable development.

I am confident that the insights and solutions shared during this conference will inspire new pathways toward achieving sustainable development goals. My sincere thanks to sponsors, speakers, panelist, presenters and participants for their invaluable time, contribution and interest for success of this conference. The conference is the result of the hard work of contributing authors, speakers, and conference committee members, who deserve big applaud. My heartfelt appreciation to local organizing committee and participating members for the local arrangements and coordination. Together, let us pave the way for a more sustainable and prosperous future.

I sincerely wish all the success for this international national conference on "Technology Advances for Green Solutions and Sustainable Development".



Dr. Sukant K. Mohapatra

Message from the Vice Chancellor

Dear Esteemed Guests, Speakers, and Participants,

It is my great pleasure to welcome you to the International Conference on Technology Advances for Green Solutions and Sustainable Development. In a world that faces unprecedented environmental challenges, the role of technology in fostering sustainable development has never been more critical.

This conference serves as a dynamic platform for researchers, industry experts, policymakers, and innovators to come together and explore cutting-edge technologies and solutions that can drive the global sustainability agenda. Our discussions will span a diverse array of topics, including renewable energy, waste reduction, and the innovative use of digital technologies to monitor and mitigate environmental impacts.

As we gather here, let us be inspired by the potential of technology to transform our world into a more sustainable and equitable place. The solutions we develop today will lay the foundation for a healthier planet and a brighter future for generations to come.

I encourage all of you to engage actively in the discussions, share your insights, and forge collaborations that can lead to impactful change. Together, we can advance the frontier of green solutions and sustainable development.

Thank you for being a part of this important dialogue, and I wish you a fruitful and inspiring conference.

Warm regards,

Dr P. Rajesh Kumar

Vice-Chancellor I/C

NIST University

Message from the Program Chair, ICT4GS-2024

It is my great pleasure and privilege to be part of the *International Conference on Technology Advances for Green Solutions and Sustainable Development (ICT4GS),* a very pertinent topic in the contemporary world. As we face pressing global challenges such as climate change, resource depletion, and environmental degradation, the importance of sustainable development and green solutions has never been more critical. The cross-domain nature of sustainable development challenges researchers from a wide range of specialization to explore new technological solutions to deal with the ever-growing menace. Therefore, this event will serve as a crucial platform for exchanging cutting-edge research, exploring new technological advancements, and fostering interdisciplinary collaboration.

Artificial Intelligence can play a significant role in advancing green solutions and sustainable development across various sectors, be it energy management through smart grids, sustainable agriculture through precision farming & optimized supply chains, environmental monitoring through drones, climate modeling through machine learning, resource management by facilitating reuse & recycling, or developing smart cities to ensure optimized use of urban infrastructure and resources. Thus, by leveraging AI, it is possible to create more efficient, sustainable, and resilient systems that contribute to a healthier planet to live.

Likewise, the integration of sensor technologies and IoT has immense potential to create smarter, more sustainable systems that can enhance resource efficiency, waste management, and improve environmental monitoring to promote a greener and better future.

The conference is geared towards providing a comprehensive overview of the latest research and developments in the field of green solutions and sustainable development. I am sure the participants will have the opportunity to engage with a series of keynote addresses from leading experts and technical sessions that will highlight the research trends and milestones achieved in the recent times.

I strongly believe, this academic event will mark a significant milestone in our collective journey toward fostering a sustainable and environmentally responsible future.

(Prof Manas Ranjan Patra)

Programme Chair, ICT4GS-2024

Message from the Vice Registrar

It gives me immense pleasure to extend my warmest greetings to all the participants of the International Conference on Technology Advances for Green Solutions and Sustainable Development (ICT4GS-2024). As the Registrar IC of NIST University, I am honored to be part of this significant event that brings together brilliant minds from around the globe to address the critical challenges of our time.

In today's world, where environmental sustainability is paramount, the role of technology in driving green solutions and sustainable development cannot be overstated. This conference serves as a vital platform for fostering innovation, collaboration, and knowledge exchange among researchers, industry professionals, policymakers, and academicians.

I am delighted to see the enthusiastic response to our call for papers, with 119 full-length submissions received and 50 high-quality articles accepted for publication. This remarkable achievement is a testament to the dedication and expertise of our contributors and the rigorous peer-review process that ensures the highest standards of academic excellence.

I extend my heartfelt appreciation to the organizing committee, keynote speakers, authors, reviewers, and participants for their invaluable contributions to making ICT4GS-2024 a resounding success. Your collective efforts are paving the way for a sustainable future, where technological advancements harmonize with environmental stewardship.

I encourage all participants to engage actively, share insights, and forge lasting collaborations that will inspire innovative solutions for a greener and more sustainable world. Let us seize this opportunity to make a meaningful impact and drive positive change for generations to come.

Best wishes for a successful and enriching conference.

Dr Bishnukar Nayak

Registrar IC

NIST University

Message from the Convener, ICT4GS-2024

Dear Delegates, Researchers, and Innovators,

Namaskar!

It is with great pleasure that I welcome you to the **International Conference on Technology Advances for Green Solutions and Sustainable Development (ICT4GS - 2024)**. This gathering marks a pivotal moment for researchers, practitioners, and enthusiasts who are passionate about advancing sustainable technologies and fostering a greener future.

In a world that faces unprecedented environmental challenges, our collective efforts towards innovation and sustainable development have never been more crucial. This conference serves as a vital platform for sharing groundbreaking research, exchanging innovative ideas, and fostering collaborations that will shape the future of green solutions.

The themes explored in this conference range from renewable energy technologies and eco-friendly algorithms to sustainable urban planning and green computing. Our distinguished speakers and contributors, representing a diverse spectrum of expertise and backgrounds, have come together to inspire and challenge us to rethink the conventional approaches to technology and sustainability.

I extend my heartfelt gratitude to our esteemed keynote speakers, dedicated presenters, reviewers, organizers, and Springer publication house who have worked tirelessly to bring this event to fruition. Your commitment and passion for sustainable development are the cornerstones of ICT4GS - 2024's success.

As you engage with the conference proceedings, I encourage you to immerse yourself in the wealth of knowledge presented, explore new perspectives, and build meaningful connections that will last beyond this event. Together, let us strive towards a future where technology and sustainability go hand in hand, and where innovation serves as a catalyst for positive change.

Thank you for joining us on this exciting journey. I wish you a productive and inspiring conference experience.

Warm regards,

Dr. Brojo Kishore Mishra

Convener
International Conference on Technology Advances for Green Solutions & Sustainable Development
ICT4GS-2024

Message from the Co-convener, ICT4GS-2024

On behalf of the organizing committee of International Conference on Technology Advances for Green Solutions and Sustainable Development (ICT4GS-2024), I have great pleasure in welcoming all the delegates to the Conference during 9–10 August 2024 at NIST University, Berhampur, Odisha, India.

The main aim of this conference is to share and enhance the knowledge of each participating individual. Thirty-nine technical papers have been accepted for oral presentation in five sessions. Additionally, there are five keynote speakers on Green Energy and Sustainability who are eminent personalities in their fields. This conference will facilitate the exposure and exchange of various novel ideas among participants. The conference aims to bridge the gap between researchers in academia and other professionals through research presentations and keynote addresses on current technological trends. Outside of the conference, you can enjoy some of the many attractions found in and around our beautiful campus.

I personally express my heartfelt thanks to School of Computer Science and Engineering at the NIST University, Berhampur, Odisha, India, all the organizing committee members and my colleagues and staffs for their dedication and hard work, without whose support this ICT4GS-2024 event could not have been organized in a befitting manner.

I cordially invite all the enthusiasts to participate with full heartiness in this celebrated event which can give immense exposure and global opportunities to all.

Warm Regards,
Dr. Sudhakar Das
Co-Convenor, ICT4GS-2024

Message from the Co-convener, ICT4GS-2024

The International Conference on Technology Advances for Green Solutions and Sustainable Development (ICT4GS-2024) is an event organized by the School of Computer Science and Engineering at NIST (University), Berhampur, Odisha, India. The conference aims to explore the synergies between technology advances for green solutions and sustainable development. It provides a platform for sharing creative ideas, cutting-edge research, and practical solutions to pressing sustainability concerns. The conference represents a convergence of visionaries, innovators, and leaders dedicated to forging a sustainable future for our planet. The challenges of our time, such as climate change, resource depletion, and biodiversity loss, demand bold, innovative solutions. The technologies explored and strategies developed will play a crucial role in redefining how we live, work, and interact with our environment. The conference will provide researchers and attendees with prospects for national and international collaboration and networking among universities and institutions from India and abroad for promoting research. The organizers, academics, and attendees are praised for their tireless efforts to make the conference a reality. The conference aims to significantly advance both the environment and society towards sustainability, laying the groundwork for a more sustainable and technologically advanced future.

Thank you for your dedication to this vital cause. Together, let us drive the technological advances that will ensure a greener, more equitable world for future generations. With warm regards and best wishes for a productive conference,

Dr. Manjushree Nayak
Co-Convener, ICT4GS-2024

Message from the Co-convener, ICT4GS-2024

It is with great pleasure that I welcome you to the International Conference on Technology Advances for Green Solutions and Sustainable Development (ICT4GS - 2024). This conference, organized by the Department of Computer Science and Engineering at NIST Berhampur, serves as a significant platform for researchers, academics, industry professionals, and students to engage in fruitful discussions and share innovative ideas that contribute to the development of sustainable technologies.

I extend my heartfelt gratitude to all the authors, reviewers, and session chairs for their invaluable contributions to making this conference a success. A special thanks to our sponsors and partners for their generous support, without which this event would not have been possible.

I would like to express my sincere appreciation to the President, Vice-Chancellor, and Registrar of NIST University for their unwavering support and guidance. Their leadership and commitment to promoting research and innovation have been instrumental in the organization of this conference.

We are confident that the knowledge shared during this event will inspire new approaches and solutions to the pressing environmental challenges we face today. I hope that the interactions and collaborations formed during this conference will lead to meaningful advancements in our collective efforts towards a more sustainable future.

Thank you for joining us at ICT4GS - 2024. I wish you a rewarding and insightful experience.

Dr. Sandipan Mallik
Co-Convener, ICT4GS – 2024

International Conference on Technology Advances for Green Solutions and Sustainable Development (ICT4GS - 2024)

09th - 10th August 2024

Organized by

Department of Computer Science and Engineering
NIST University Berhampur, Odisha – 761008, India

Program Schedule - Day 01 (09th August 2024)		
Timing		**Events**
INAUGURAL CEREMONY	9:45 AM – 10:00 AM	Arrival of the Guests, Tree Pot Gift, Lamp Lightening
	10:00AM – 10:10 AM	*Address by Programme Chair, ICT4GS-2024* **Dr. Manas Ranjan Patra** Professor Department of Computer Science & Engineering NIST University, Berhampur
	10:10AM – 10:20 AM	*Welcome address by* **Dr. P. Rajesh Kumar** Vice Chancellor NIST University, Berhampur
	10:20AM – 10:40 AM	*Address by* **Dr. Sukanta K. Mohapatra** President NIST University, Berhampur
	10:40AM – 11:00 AM	*Address by Guest of Honour* **Dr. Sandeep Poddar** Deputy Vice Chancellor (Research & Innovation) Lincoln University College, Malaysia
	11:00AM – 11:20 AM	*Address by the Chief Guest* **Er. Prasanta Pattanaik** Senior General Manager (Elect) Odisha Power Transmission Corporation Ltd, Bhubaneswar
	11:20AM – 11:25 AM	*Release of Proceedings & Felicitation to the Delegate*
	11:25AM – 11:30 AM	*Vote of Thanks By* **Dr. Bishnukar Nayak** Registrar NIST University, Berhampur
11:30 AM		**High Tea and Refreshment**

Day – 01 (9th August 2024)	
12 Noon – 12:45 PM	*Keynote Talk – 01:* **Dr. Sandeep Poddar** *Deputy Vice Chancellor (Research & Innovation)* *Lincoln University College, Malaysia*
12:45 PM – 1:15 PM	*Google Cloud Gen-AI Study Jam Swags Distribution*
1:15 PM - 2:30PM	**Lunch Break**
2:30 PM-03:15 PM	*Keynote Talk – 03:* **Dr. Kirti Kumari** Asst. Professor, Dept. of CSE Indian Institute of Information Technology (IIIT) , Ranchi, India
03:15 PM-04:30 PM	**Technical Sessions for Paper Presentations (Physical)** Venue Lab 1 : Track 01
04:30 PM	**Evening Tea**
Program Schedule - Day 02 (10th August 2024)	
10:00 AM – 10:45 AM	*Keynote Talk – 04 :* **Dr. Kamalakanta Muduli** *Associate Professor & Head School of Mechanical Engg. Papua New Guinea University of Tech.* *Lae, Morobe Province*
11:00 AM - 11:45 AM	*Keynote Talk – 05:* **Dr. Bedir Tekinerdogan** *Professor & Chair Information Tech* *Professor of Software and Systems Engg., Wageningen University, Netherlands*
12:00 Noon – 12:45 PM	*Keynote Talk – 02 :* **Dr. Minati Sahoo** *Head of the Department, Dept. of Economics Central University of Odisha, Koraput, Odisha*
01:30 PM-02:00 PM	**Lunch**
02:15PM – 03:45 PM	**Parallel Sessions for Paper Presentations (Virtual)** Venue Lab 1 : Track 02 Venue Lab 2 : Track 03 Venue Lab 3 : Track 04 Venue Lab 4 : Track 05
03:45PM – 04:00 PM	**Valedictory Session**

CONTENTS

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Paper Id: 003

A Survey of Applications for Wireless Sensor Networks in Smart Cities

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ABSTRACT

Wireless Sensor Networks (WSNs) are an enabling technology for smart cities, providing the necessary infrastructure for different applications such as traffic management, environmental monitoring, building energy management, and public safety. The integration of WSNs into smart city environments is still a challenge, as it requires dealing with multiple complexities, such as large-scale deployment, limited energy resources and communication capabilities, and the need for real-time data processing and decision-making. With the recent advancements in wireless communication, sensor technology, and IOT, the use of WSNs in smart cities has become increasingly important. However, the development of WSNs for smart cities applications is still in its infancy, and it is important to understand the current state of the art and the challenges that need to be addressed to ensure the successful deployment of WSNs in smart cities. We classify these applications into various categories, and building energy discusses their challenges and opportunities. We also review the existing technologies and standards for WSNs and their suitability for smart city applications. The main contribution of this paper is to provide a clear overview of the current state of the WSNs in smart cities, highlighting the most important trends and challenges for future research. Our survey will be useful for researchers and practitioner's smart cities, as it will help them understand the current state and future research directions in this field.

Keywords*: wireless, sensor, networks, smart cities, energy.*

Paper Id: 013

Exploring IoT Applications in Oceanographic Research for Advancing the Blue Economy

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ABSTRACT

It is the field of oceanographic research with the aim of advancing the blue economy. Generally, it can be used as an ocean research resource for economic growth, and IoT technologies to analyze the data collection, monitoring and sensor networks in oceanography. It consists of some different applications for analyzing data, including LIDAR technologies, sensor networking, autonomous underwater vehicles and data mining to enhance the understanding of an ecosystem improve sustainable development in marine industries and to detect the remote operated vehicle technology for fisheries, rock and salinity. It involves interconnected devices and sensors that can be communicated and share the data through the network. It can store a huge amount of data for an oceanography on fisheries, plants and route mapping technology inside the water and also detect the depth of an ocean. It helps some GIS tools to analyze and visualize the data related to oceanography such as temperature, current and marine habitats. The data can be simulated through the use of IoT data into numerical methods in a real-time environment.

Keywords*: IoT applications, Oceanographic research, blue economy, data analytics, sustainability.*

Paper Id: 027

IoT-Enabled Smart Wheelchair System for Real-Time Fall Detection and Alerting

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ABSTRACT

The National Sample Survey Organization (NSSO) has identified disability as a significant public health challenge in India, with a notable increase in limb loss, visual impairment, and other disabilities arising from factors such as wars, accidents, health issues, and aging. Many visually impaired individuals struggle with motor skills and strength, making traditional power wheelchairs problematic. Furthermore, the high cost of these wheelchairs renders them inaccessible to many. Caregiver workload in nursing and old-age homes is escalating due to a disproportionate ratio of disabled residents to caregivers. This research introduces a prototype for a Smart Wheelchair aimed at reducing accident risks and easing caregiver responsibilities. The wheelchair integrates various hardware and software elements coordinated via an Arduino Uno board. A primary feature is the Ultrasonic sensor, which measures distance and detects falls. In conjunction with this, a mobile application, Blynk, alerts caregivers immediately if the user experiences an accident, ensuring prompt response and increased safety.

Keywords: *Smart Wheelchair, Caregiver Alert System, Internet of Things (IoT), Ultrasonic Sensor*

Paper Id: 031

Brain Tumor Detection using Deep Learning (CNN-Vgg19)

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ABSTRACT

The detection of brain cancer presents a critical healthcare challenge, necessitating precise and efficient diagnostic systems. This paper introduces a comprehensive approach utilizing Convolutional Neural Networks (CNNs) and deep learning techniques for early detection. Leveraging advanced image processing, a meticulously curated dataset, and a Flask API for integration, the system offers real-time processing capabilities. The front-end interface, designed for usability and accessibility, complements the robust backend infrastructure. Through meticulous algorithmic design and optimization, the system demonstrates sensitivity and specificity in identifying brain tumors. This project represents a significant advancement in medical diagnostics, poised to enhance healthcare accessibility and contribute to scientific exploration in brain tumor diagnostics.

Keywords: *Brain Cancer, Convolutional Neural Networks, Deep Learning, Flask API, Medical Diagnostics.*

Paper Id: 033

Investigation of Machine Learning Blockchain Approaches for Privacy Preservation

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ABSTRACT

In the era of decentralized networks and big data, the confluence of Blockchain and Machine Learning (ML) technologies has emerged as a promising solution for ensuring robust, transparent, and private transactions. While the individual merits of Blockchain in ensuring data integrity and ML in deriving insights are well-established, their synergistic effects particularly in the realm of privacy preservation are yet to be fully explored. This fusion has the potential to revolutionize sectors like healthcare, finance, and supply chain by offering unprecedented levels of data privacy without compromising on system performance. This paper presents a comprehensive review of existing models that employ machine learning techniques for privacy preservation operations within blockchain frameworks. Utilizing a set of predetermined metrics delay, throughput, energy efficiency, privacy levels, deployment cost, and scalability the paper compares these models to provide a nuanced understanding of their capabilities and limitations. Our in-depth comparison elucidates the trade-offs involved in selecting specific blockchain-ML models for diverse applications. For instance, while some models may offer higher throughput, they could compromise on privacy levels. Conversely, models excelling in privacy preservation might incur higher energy costs or delays. This multi-faceted evaluation not only serves as a guide for stakeholders to choose the most efficient model based on individual or multiple metrics but also uncovers avenues for future research. By correlating these metrics with real-world use cases in healthcare, finance, and supply chain, among others, the paper adds a layer of practical applicability. This aids in the formulation of best practices for the deployment of these cutting-edge technologies to maximize both performance and privacy. The paper contributes to the academic discourse by laying down a foundational framework for understanding and selecting the most appropriate blockchain-ML models for privacy preservation. The insights derived from this work are instrumental in steering the future development and deployment of secure, efficient, and privacy-preserving solutions across various industry verticals & scenarios.

Keywords: *Blockchain, Machine Learning, Privacy Preservation, Data Integrity.*

Paper Id: 040

Optimizing SEO with AI: Achieving Success through Responsible Innovation

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ABSTRACT

The integration of Artificial Intelligence (AI) into Search Engine Optimization (SEO) practices has ushered in a new era of digital marketing, characterized by transformative innovations and ethical considerations. This paper delves into the profound impact of AI on SEO, elucidating its multifaceted role in revolutionizing traditional approaches to optimizing online visibility and user engagement. Through advanced algorithms and machine learning techniques, AI-powered SEO tools offer unparalleled capabilities, including enhanced efficiency in keyword research, content optimization, and trend analysis. Moreover, AI enables personalized content creation tailored to individual user preferences, driving increased traffic and conversion rates. However, amidst these advancements lie challenges and ethical concerns, such as algorithmic biases, over-reliance on AI, and data privacy issues. Striking a delicate balance between innovation and ethical practices is imperative for businesses seeking to harness the full potential of AI in SEO while upholding transparency, fairness, and user privacy. This paper navigates the intricate landscape of AI-driven SEO, providing insights into its transformative power and guiding principles for ethical AI implementation in the digital realm.

Keywords: *AI-driven SEO, Artificial Intelligence, Search Engine Optimization, Transformative Impact, Ethical Considerations, Advanced Analytics, Personalized Content, Predictive Strategies.*

Paper Id: 042

Second-Hand Drive: A Comprehensive Study of Influencing Factors on Buying Decisions of Used Cars in India

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ABSTRACT

There have been many significant studies done on the Indian automobile sector, primarily on new cars but, not many research studies have been done on used cars, revealing a potential research gap. Consumer preferences have changed after COVID-19 and there is more interest in a balanced lifestyle of work and play. A by-product of this change is an increasing purchase of cars mostly used for long-distance travel and weekend getaways. Also, with the advent of Vehicle Scrappage Policy 2021, limiting the use of vehicles to 10-15 years and a shift towards electric vehicles, there is a change in the usage life of Internal Combustion Engine (ICE) vehicles by the Indian populace which leads to sustainability. In addition, this has created an increase in the quantity of used cars in the market in good working conditions. This research paper aims to analyze the usage patterns, buying behavior, and problems faced while purchasing used cars in India. Also, this study aims to document the major players in the Indian used car market.

Keywords: *used cars, consumer behaviour, automobile, buying behaviour, sustainability*

Paper Id: 047

Role of Corporate Social Responsibility of Banks in Emerging Markets in India

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ABSTRACT

In this paper, we have used the Analytical **choice experiment** method to determine marginal rate of energy consumption and energy Intensity As the energy is closely inter linked with poverty, and it directly effect on the social development and economic growth and development, it needs to be mapped in a concrete manner by focusing on dignity of life. There is urgent need to address sustainable strategy catering to human centric activities like socio - economic activity, employment, social justice and welfare, social protection, decent work culture and environment etc. We are used the relevant annual reports, authentic information published by the various government and responsible organizations to propose **choice experiment** method.

Keywords: *Sustainable Development, energy, SDG, UN, Solar Energy. Per-Capita Energy Consumption and Energy Intensity, Energy Indicators, Carbon emissions*

Paper Id: 055

Gig Economy Potential for Generating Employment in India

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ABSTRACT

This paper outlines the projected growth of the gig economy in India and its potential to create lakhs of jobs, highlighting its effect across sectors like retail, transportation, and education. By mapping the current trajectory and future prospects, the paper suggests constructive policy interventions to harness this enormous dividend potential in India. The text scrutinizes potential roadblocks such as lack of job security, irregularity of incomes, and restricted access to benefits and proposes an action plan to overcome these hurdles for a resilient job market in India. This paper investigates the gig economy's potential for unemployment reduction and emphasizes how it can offer abundant job opportunities, eventually creating a better job market in India.

Keywords: *Gig Economy, Policy, Platform Economy, E-Commerce, and India*

Paper Id: 059

Robust Identification and Meta Agnostic Visualization of Pest, Weed, and Disease in Tomato Plant Using Deep Convolutional Neural Network

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ABSTRACT

India, a prominent global producer of tomatoes, plays a vital role in meeting the worldwide demand and supporting the livelihoods of farmers. Tomatoes are rich in essential vitamins and antioxidants, contributing to food security. Tomato production has been negatively affected by climate change, poor water management, and excessive pesticide use, resulting in reduced yields. To tackle these issues, we suggest the implementation of an advanced deep convolutional neural network with tailored machine learning techniques to identify and categorize weeds, pests, and diseases that impact tomato plants. Through the training and assessment of this model using holdout validation on an extensive dataset of tomato leaves, our goal is to achieve higher validation accuracy and enhance current methodologies in the analysis of tomato plants.

Keywords: *Deep convolutional neural networks, tomato plant disease.*

Paper Id: 060

Unregulated Intensification and Key Challenges in Sustainable Aquaculture Production in some selected regions of Ganjam District of Odisha

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ABSTRACT

Aquaculture sector is growing at amazing pace to provide nutrient rich food to the fast growing population of the developing world. Our present study encompasses aquaculture enterprises developed by female aquaculture entrepreneurs of Ganjam districts of Odisha. Semi-intensive culture ponds A and B and Intensive culture ponds P and Q was taken in Aska ans Surada blocks for observation for fish production over three years 2021-2023. Four women SHGs with 12 members each involved in aquaculture enterprise was interviewed. The mean value of the production as per ANOVA was at par. But, Initial productivity in high input intensive culture pond was high and found to be 1.915 tonnes and 1.898 tonnes /acre reduced to 1.461 tonnes and 1.458 tonnes/acre between 2021to 2023. In Semi-intensive ponds the production increased from 1.58 tonnes to 1.64 tonnes/acre and 1.59 tonnes to 1.625 tonnes/acre respectively in the same time period. Similarly net profit (mean) per annum was found to be high in semi- intensive system over three years as compared to intensive system which. Water quality parameter such as DO,pH, dissolved carbon dioxide is found to beyond safe limit in intensive culture ponds as compared to semi-intensive ponds. Due to lack of proper knowledge about intensive aquaculture female stake holders facing problem for optimum output from intensive aquaculture which can be optimized with proper regulation of feeding and maintenance of water quality parameters by acquisition of proper technical knowledge.

Keywords: *Unregulated, intensification, Key challenges, Sustainable aquaculture.*

Paper Id: 064

Smart Cities and Urban Sustainability: A Comprehensive Analysis

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ABSTRACT

Urbanization is accelerating at an unprecedented rate, posing significant challenges for sustainable development. It examines key components, technologies, and strategies that drive smart city initiatives, focusing on their potential to enhance environmental, economic, and social sustainability. The study also addresses the challenges and future directions in the implementation of smart cities, providing a holistic view of their impact on urban living

Keywords: *Smart cities, urban sustainability, technology, data-driven approaches*

Paper Id: 065

Selection of Electrical Vehicle: An m-polar Fuzzy TOPSIS Approach

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ABSTRACT

The intensity of global warming is increasing at an alarming rate, posing an increasingly serious threat to the world. Life on Earth will be jeopardized due to the effects of global warming unless swift and coordinated action is taken to reduce greenhouse gas emanations. The launch of electric vehicles (EVs) is significant development popular reducing the impact of global warming. Many nations are moving toward the use of electric vehicles, which encourages sustainable development. Even though EVs are becoming more and more popular globally, choosing the best option among the many available models can be challenging. In order to opt and grade the finest substitute for an electric vehicle, this study presents an integrated strategy that combines the m-polar fuzzy set (mFs) and Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) technique as a multi-criterion decision-making tool (MCDM). The data of the decision matrix is used as m-polar fuzzy input for the decision making. The weight coefficients of the criterion are obtained exercising the AHP methodology, and the TOPSIS method is used to assess the choice of EVs alternative. A sample of six workable options has been taken into consideration for the investigation. The combined m-polar fuzzy TOPSIS strategy, which hasn't been used in this field before, is what makes this work original. This study contributes by evaluating the best option among the electric vehicles which is KONA ELECTRIC vehicle helps the customer to purchase the electric vehicle. This study also explains the application of the mFs TOPSIS technique to resolve the MCDM glitch.

Keywords: *MCDM, MCGDM, EV.*

Paper Id: 066

Predictive Analysis of Medicinal Plants for Central Nervous System Diseases Using Machine Learning

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ABSTRACT

Central nervous system (CNS) diseases have witnessed an alarming rise globally, affecting millions of individuals and imposing significant healthcare expenses. Throughout history, indigenous medicinal plants have played a vi-tal role in addressing various ailments, including CNS disorders. In this re-search, we propose a cutting-edge machine learning approach to accurately predict the effectiveness of medicinal plants in treating CNS diseases. Lever-aging the VNPlant200 dataset comprising plant images and associated metadata, we train a convolutional neural network (CNN) to extract profound features. To amplify the discriminative power of these features, we employ matrix-based discriminant analysis, thereby augmenting our model's predictive capabilities. Furthermore, we integrate an ensemble technique that com-bines multiple classifiers, resulting in improved accuracy with a remarkable rate of 100%. Additionally, we have developed a user-friendly mobile appli-cation empowering individuals to identify and classify medicinal plants based on their potential for treating CNS diseases. This innovative work holds great promise in efficiently and cost-effectively identifying and harnessing the ability of conventionally used medicinal herbs to treat CNS disorders.

Keywords: *Medicinal plants, central nervous system diseases, machine learning, convolutional neural networks, discriminant analysis, ensemble learning, mobile application*

Paper Id: 073

A Real Time Application for Crime Trends Prediction using ML Algorithms

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ABSTRACT

Now day's crimes are increasing rapidly and there is no region or city without crimes. So we require an automation for crime detection and prevention. System should stop crimes before it starts. As crimes are increasing, precautionary measures to be taken to stop crimes. Finding frequent crimes and related correlations is a tedious and high effort task in the current crime sector. This issues needs to be addressed. Current real-time system isn't supports automation for crime prediction in real time. Machine learning or AI is the emerging technology to solve this issue. Efficient Unsupervised learning algorithms used to process crime training datasets and frequent crimes and their relationships are identified. Proposed system build to reduce crimes and applicable to crime sector. We are building a real time application where it is useful for crime sectors to reduce the crimes. Currently no one of the crime sector applications does this and we use efficient data science algorithms to predict crimes with better results.

Keywords: *Data Science, Machine Learning, Apriori Algorithm, Apriori TID Algorithm, Crime Types, Patterns*

Paper Id: 076

Analysis and Optimization of Co-Channel Interference using Genetic Algorithm

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ABSTRACT

Cellular networks are designed to accommodate a large number of users while efficiently utilizing limited radio spectrum resources. Co-channel interference poses significant challenges for cellular network operators and can have widespread negative impacts on network performance, user experience, and operational costs. Effective interference management strategies and technologies are essential to mitigate these effects and ensure optimal performance of cellular networks. Optimization techniques in cellular networks aim to improve network performance, enhance user experience, and maximize resource utilization. Co-channel interference minimization techniques are methods employed in cellular networks to reduce the interference that occurs between cells operating on the same frequency channels. Potential solutions can be obtained by using genetic algorithm for co-channel interference optimization.

Keywords: *Cellular Network, Co-Channel, Interference, Genetic Algorithm.*

Paper Id: 079

An Enumerative Choice Experiment Method of the Sustainable Energy

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ABSTRACT

In this paper, we have used the Enumerative **choice experiment** method to determine the marginal rate of energy consumption and energy Intensity As energy is closely interlinked with poverty, and it directly affects social development and economic growth and development, it needs to be mapped concretely by focusing on dignity of life. There is an urgent need to address sustainable strategy catering to human-centric activities like socio-economic activity, employment, social justice and welfare, social protection, decent work culture and environment etc. We used the relevant annual reports, and authentic information published by the various government and responsible organizations to propose **the choice experiment** method.

Keywords: *Sustainable Development, energy, SDG, UN, Solar Energy.*

Paper Id: 080

Blockchain-Enabled Defi Solutions for Achieving Sustainable Supply Chain Goals

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ABSTRACT

Decentralized Finance (DeFi) has brought about radical change in supply chain management. It minimizes the role of middlemen, and central institutions, and fosters peer-to-peer transactions through Blockchain Technology (BCT). Traditional mode supply chain uses paper-based and structured data systems. As against this, blockchain technology develops a unified view of data to identify the current locations and status of the product and services and enables the smooth function of the supply chain process. Blockchain-enabled Defi Solutions are transforming the world of the supply chain by leveraging financial activities and making financial solutions more efficient, accessible, and secure. This paper focuses on blockchain-enabled Defi Solutions to achieve sustainable Supply Chain Goals.

Keywords: *Decentralized Finance, Blockchain Technology, Supply chain, Tokenisation, Distributed Ledger.*

Paper Id: 081

Supply Chain Management for Coconut Farmers to Formulate New Marketing Strategies

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ABSTRACT

The coconut industry represents one of the most significant economic sectors, but farmers and marketers in this industry face an array of challenges. In this paper we are focused to evaluate one of the possible solutions to this problem with effective supply chain management. In particular, this paper examines the Supply Chain Management Practices of Coconut Farming in the state of Kerala. To attain this, a sample of 150 coconut growers who cultivate coconuts was collected using a convenient sampling method. The findings obtained from the study will be useful for coconut farmers to formulate new marketing strategies or modify existing strategies based on consumers' preferences.

Keywords: *Coconut Farming, Supply Chain Management, Marketing strategies*

Paper Id: 082

Importance, Need and A Role of Indigenous Technical Knowledge for Sustainable Agriculture Developments

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ABSTRACT

In this paper we are focused to study the Importance of technological advancements and need to promote about agricultural sustainability in a Analytical way. Also, introducing to study the Role of Indigenous Technical Knowledge for the Developments in Sustainable Agriculture.

Keywords: *Agricultural sustainability, human development, Need and importance etc.*

Paper Id: 083

A Fuel Cell Fed Multi Level Zeta Converter System with Fuzzy Logic Controller

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ABSTRACT

This paper presents a multilevel zeta converter (MZC) for fuel cells, using a 1260W proton exchange membrane fuel cell (PEMFC) and a fuzzy logic controller (FLC) with voltage feedback. The converter is planned and built utilizing MATLAB SIMULINK and a topological circuit, with an FLC controller configured to increase output voltage transient responsiveness. The results show enhanced performance of the MZC with FLC Controller, allowing for control of the time-varying non-linear nature of power converters. The converter's performance is verified through MATLAB simulations, demonstrating fast transient response, excellent steady-state response, and less sensitivity to load fluctuations.

Keywords: *Fuel cell, Fuzzy logic controller, multilevel converter, zeta converter.*

Paper Id: 088

Promoting Electric Vehicle Accessibility: Integrative Strategies and Innovations

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ABSTRACT

In recent times, electric vehicles, specifically electric cars have gained a lot of attention due to their increasingly positive impact on the environment. They help with tackling a wide array of challenges that our world faces, like pollution control, excessive draining of renewable resources and regression in health because of the emission of harmful pollutants. A shift towards electric vehicles can help reduce the emission of harmful pollutants into the atmosphere and reduce the usage of renewable resources, which could result in an immense positive impact on our environment. Apart from this, it can also help with keeping the Air Quality Index at safer levels and have a positive impact on the health of all life on Earth. Electric vehicles are a stepping stone in the positive direction, to make the world clogged with less pollutants and a safer and a healthier place to be in. In this proposal, we try to analyze and understand what factors affect the performance and accessibility of electric vehicles using a dataset pertaining to certain metropolitan cities in Europe, which can help us pinpoint the reason as to why they are not as widely used. We utilize these data-driven factors to help with correlating the EV scene in India and also think of ways to increase their usage, apart from addressing the intricate nature of how electric vehicles function.

Keywords: *Electric Vehicle, Metropolitan Cities, Air Quality Index*

Paper Id: 089

Food Price Index Prediction using Time Series Models: A Study of Cereals, Millets and Pulses

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ABSTRACT

The household food price index prediction has always been a significant challenge for the food industry, especially in developing countries like India, where most of the population depends on agriculture for their livelihoods. In this project, we aim to develop a food price index prediction system for household food items like cereals, millets, and pulses using three popular time-series forecasting models: SARIMA, ETS, and FB Prophet. We use historical price index data to build and evaluate the forecasting models. The performance of each method is assessed using evaluation metrics such as MAE and RMSE. The results show that all three methods can accurately predict the demand for food items. However, FB Prophet performs better than the other two methods regarding forecasting accuracy and computation time. This project presents a food prediction model that can be used by grocery stores and households to plan and manage their food inventory effectively. The study highlights the effectiveness of time series forecasting techniques such as SARIMA, ETS, and FB Prophet in predicting the demand for household food items, which can aid in reducing food wastage and improving food supply chain management The developed forecasting model can help retailers and suppliers to manage their inventory and plan their production based on the predicted demand for household food items. Additionally, this study provides valuable insights into applying time series forecasting methods in the food industry.

Keywords: *Historical, Inventory, SARIMA, ETS, FB PROPHET, MAE, RMSE, Supply chain management, Retailers*

Paper Id: 090

Efficient Mechanism of Text Identification and Retrieval

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ABSTRACT

Text recognition and extraction from videos suffers out of several issues. We introduce a hybrid method for edge detection in this study. We use the product of sobel and canny which proves to be effective when compared to the other edge detection mechanisms. Sobel, Canny Product(SCP) intensify the text pixels and helps in better understanding of the text in video. Once after detecting edges text classification is made that which eliminates the unwanted non text from the frame. This classification is made effective with the help of connected component method. Thus true text pixels are formed out of this classification technique. The resulting frame is then intersected with the Laplacian to obtain the text candidates. Bounding Box formation is the next stage in which text traversal is made . This method flip through the frame from top to bottom and forms a fringe over the text present in the frame. False positive elimination is the final stage, which aids in getting the true text pixels. According to the experimental results, the suggested system performs more stimulatingly than the current approaches.

Keywords: *Sobel Canny Product (SCP), Connected Component, Text Traversing, Text Candidates.*

Paper Id: 091

Enhancing Security through Dual Layer Techniques for Encrypting Text Messages within Images using LSB Image Steganography and AES Encryption Algorithms

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ABSTRACT

Ensuring data security has become a serious concern as it has evolved into a multifaceted problem. Over the past few decades, many security measures have been developed to address this issue. However, cryptography and steganography are the most commonly used tools to ensure the security of sensitive data. Cryptography involves encoding secret messages, while steganography involves hiding messages within digital media and images. While both methods have their advantages, cryptography is more suited for secure communication, while steganography is better for hiding sensitive information.

In our paper, we propose a two-tier encryption approach to ensure data security. We use the AES algorithm to generate a top-secret message in the first layer, and the LSB image steganography method to encrypt the information in the second layer. By combining these two encryption methods, we ensure the confidentiality, integrity, and availability of the data. We perform comprehensive testing and analysis on our proposed methodology to validate its efficiency, effectiveness, and reliability.

***Keywords**: Cryptography, Steganography, Cover-Image, Stego-Image, Plain-Text, Cipher Text, AES, LSB*

Paper Id: 092

Application based System to Calculate Nutrients for Hydroponics Farming

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ABSTRACT

Although hydroponic farming is an effective and sustainable kind of agriculture, it is mostly dependent on careful nutrient control. The design and development of a mobile application to make the process of calculating nutrient solutions specific to hydroponic systems easier is presented in this study. The programme aims to improve accuracy, streamline the fertilizer formulation process, and encourage the best possible plant development in hydroponic systems. With the help of user-friendly interfaces, calculation algorithms, and nutrient databases, this smart phone app is an invaluable resource for hydroponic practitioners of all skill levels. Thus, hydroponic production is an essential component of the aqua-agricultural system of aquaponics, together with the Recalculating Aquaculture System (RAS).

Paper Id: 093

RUL Prediction of Electric battery with Error Indices using Machine Learning Techniques

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ABSTRACT

Remaining Use Life (RUL) prediction is becoming more and more popular as a way to allay worries about security and dependability of lithium-ion batteries in electric cars. Even though battery operational characteristics are thoroughly recorded, the current prediction methodologies for evaluating battery performance are inadequate. To address the issues of inadequate local feature learning and insufficient capacity to handle large datasets, a data-driven prediction method of machine learning algorithms is proposed. The intention of this paper is to use specific machine learning techniques to improve prediction resilience and accuracy. Selected machine learning techniques are evaluated for accuracy prediction using real life battery cycle data set from the Hawaii National Energy Institute (HNEI). For each of the ML methods, performance error indices are computed, including Mean Square Error (MSE), Root Mean Square Error (RMSE), Mean Absolute Error (MAE) and R-Squared. Relevant inferences are then exhibited, highlighting the prospective of battery RUL prediction near most accurate values. The findings demonstrate that, in comparison to other approaches, the random forest method is more resilient and considerably increases RUL prediction accuracy while reducing prediction error.

***Key words:** RUL prediction, Lithium-ion battery, Machine learning algorithms, Performance error indices.*

Paper Id: 094

Optimising Academic Performance: Leveraging Custom GPT and Prompt Engineering for Effective Study Companionship

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ABSTRACT

In today's digital age, the integration of artificial intelligence (AI) technologies into educational settings has become increasingly prevalent. This study explores the utilisation of custom Generative Pre-trained Transformers (GPT) and prompt engineering techniques to enhance the role of ChatGPT as a study companion. Through a combination of qualitative and quantitative analysis, this study investigates the reliability and efficiency of personalised GPT models tailored to educational texts and preferences of each student and the strategic use of prompts to guide learning interactions. By harnessing these innovative approaches, students can potentially improve study efficiency and comprehension enhancing the whole studying experience. The findings shed light on the benefits and challenges of integrating AI-driven study companions into educational practices and provide insights into future directions for leveraging AI technologies in learning environments.

Keywords: *GPT, ChatGPT, AI, Prompt Engineering, Custom GPT, LLM*

Paper Id: 095

Improving the Accuracy and Comprehensibility of XAI Explanations

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ABSTRACT

The paper titled "Improving the Accuracy and Comprehensibility of XAI Explanations" delves into the intricacies and challenges of explainable artificial intelligence (XAI). As artificial intelligence (AI) becomes increasingly integrated into various sectors, the need for transparent and understandable AI systems has become paramount. This paper addresses the "black box" problem, which refers to the opacity of AI models that impedes trust, accountability, and ethical use.

The primary objective of this research is to enhance the transparency and comprehensibility of AI systems through XAI. The authors provide a detailed examination of current XAI techniques, including Local Interpretable Model-Agnostic Explanations (LIME), Partial Dependency Plots (PDP), and decision trees. They explore the limitations of each of these methods and propose potential improvements to address their shortcomings. One of the key findings is that while these methods significantly contribute to model interpretability, they often fall short in terms of accuracy and user comprehension.

The study suggests hybrid approaches that combine multiple XAI techniques to overcome these gaps. For instance, integrating feature interaction analysis with dynamic feature importance methods can provide more nuanced insights into how features influence each other and the model's decisions. Additionally, the research proposes the use of advanced counterfactual generation techniques based on causal inference methods to improve the generation of relevant counterfactuals that are close to the original data points.

The paper highlights the critical role of XAI in enhancing the trustworthiness of AI, particularly in sensitive applications like healthcare, where understanding the rationale behind predictions can aid in informed

decision-making. The paper underscores a comparison of the input and output parameters of the algorithms, each of which is easily explained through an example.

Furthermore, the study outlines future research directions to address the existing challenges in XAI. By addressing the limitations of current XAI methods and proposing improvements, the paper aims to promote responsible AI development and unlock the full potential of AI for societal benefit.

In conclusion, this research provides a comprehensive analysis of the current state of XAI, identifies its limitations, and proposes innovative solutions to enhance the accuracy and comprehensibility of AI explanations. It highlights the importance of transparency and interpretability in AI systems to build trust and accountability, and paves the way for future advancements in the field. The findings and recommendations presented in this paper are crucial for advancing the development of explainable AI and ensuring its ethical and responsible use in various domains.

Keywords: *Explainable machine learning, classification, PDP, LIME, Decision tree, XAI, Dimensionality reduction*

Paper Id: 097

Design of PID Controller for Speed Control of Hybrid Electric Vehicle

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ABSTRACT

The enormous growth and demand for hybrid electric vehicle (HEV) technology leverage modern, efficient control methods in the on-demand HEV system. This work introduces a novel approach to controlling the speed of the HEV by implementing a PID controller with a distinct metaheuristic technique. The PID controller parameters are tuned using metaheuristic algorithms. Moreover, to optimize the parameters of the controller, the Honey Badger Algorithm (HBA) technique using PID controller is developed for regulating the speed of a HEV. Various objective functions such as IAE, ISE, ITAE, and ITSE are used to minimize the controller error. The efficacy of the proposed methods is measured in terms of the transient and steady-state analysis of the system, which is evaluated based on its performance index. The proposed controller gives optimum speed control of the HEV system using tuned values for the better result.

Keywords: *PID Controller, IAE, ISE, ITAE, ITSE, HBA Algorithm*

Paper Id: 100

Comparative Study of Thyroid Classification using Deep Learning Tools

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ABSTRACT

Nowadays thyroid disease has become very common but it is important to check it at the right time otherwise it can turn into some serious disease. It is easy to do a blood test to check thyroid. But it can also contain some errors like noisy data. Therefore, to find out the exact disease related to thyroid, deep learning algorithm should be used. In today's modern era, special contribution of deep learning algorithms is made to process vast data. There are some deep learning tools that can process large datasets accurately and efficiently. Some such attempts are made to optimize classification models by using deep learning tools with small datasets. In this paper thyroid dataset from kaggle is executed on data mining tool WEKA and deep learning tool TensorFlow, Keras. WEKA gives an accuracy of 94.77% and TensorFlow 92.70%. Our objective is to experiment with both the tools and find a better tool for future research.

Keywords: *Keras, PyTorch, MXNet, WEKA, TensorFlow*

Paper Id: 101

Role of Emerging Technologies for Sustainable Smart Cities

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ABSTRACT

Smart city is one of the topics most discussed by the researchers. As the world is becoming a global village and more people are moving towards cities it is essential to know the requirements of the cities and upgrade the facilities to make life comfortable. Various technologies like IoT, AI, Blockchain, and Big Data have helped to improve smart city environments. The municipal corporations should provide facilities for residents to make living comfortable. Besides this, the cities should be protected from the impact of increasing environmental pollution, climate change, and global warming. Recent technologies can ensure better living conditions in smart cities through real-time monitoring. The current cities can be converted into smart cities by incorporating the latest infrastructural development and adopting sustainable practices. This paper will study the importance and role of a few emerging technologies in converting existing cities into sustainable smart cities. It will be helpful to learn about how the technologies are being used currently and how they can be applied to make smart cities more sustainable.

Keywords: *Smart City, IoT, AI, Blockchain, Sustainability*

Paper Id: 102

Designing & Developing Bio-Lattice Structures using 3D Printing with ABS Carbon Fiber Inspired by Foxtail Palm Seed Fiber

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ABSTRACT

The goal of this article is to design and develop bio-lattice structures utilizing 3D printing technology with ABS carbon fiber and nTopology software, which are inspired by the fibrous pattern of foxtail palm seed fiber. The aim is to replicate the complex structure of foxtail palm seeds while maximizing biocompatibility and mechanical robustness. This work combines bio-inspired design with cutting-edge materials and testing methods to advance bio-mimetic structures in biomechanics and sustainable materials development. The analytical examination of lattice structures, namely Iso-Truss and Fluorite lattice structures entailed assessing crucial characteristics such as displacement, tension, and strain. The results showed that the Iso-Truss lattice structure had a maximum displacement of 1.45e-04 and a maximum stress of 7.49e+06, whereas the Fluorite lattice structure had a maximum displacement of 1.54e-04 and a maximum stress of 4.83e+06. These findings offer useful knowledge about the mechanical behavior and performance of the lattice structures, emphasizing their strengths and peculiarities when subjected to various loading circumstances.

Keywords: *Bio-lattice structures, Foxtail palm seeds, Structural Analysis, nTopology, 3D printing*

Paper Id: 103

Performance Analysis of Simulation Techniques used in Internet of Things

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ABSTRACT

Now a day, the Internet of things are become a most essential component of the human life. This important role to extensive growth of world. To become a smart, update and give the less human interaction for doing task which save our time. IoT is everywhere, Internet of Things changing the way of human living because is a portable, wearable, implantable, making a worldwide and linked universe, and converting physical things that surround us into an environment to the information. This research paper presents a comparative analysis of various IoT simulator, their working behavior. The paper goal is to study of the existing simulation technique to make enhancement in the IoT device system performance, enhance security, testing of theories, their modeling methods. This comparative analysis gives a help to researchers/author/reader to select the appropriate tools for their application with employment of the IoT platforms. This paper also demonstrations the architecture of IoT and their domains, IoT devices, categories of communications and IoT environment challenges with existing prospective and scenario.

Keywords: *-Internet of Things (IoT), Architecture of IoT, IoT Simulators, IoT Challenges Communication, IoT domain.*

Paper Id: 104

Reliable Broadcast and Multi-Channel Access in Hybrid Traffic Scenario

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ABSTRACT

Advancements in self-driving technology, facilitated by artificial intelligence and smart transportation systems, have significantly enhanced safety and efficiency in autonomous vehicles, particularly through the concept of platooning. Recent studies highlight the potential of vehicular adhoc networks (VANETs) in optimizing the performance of self-driving cars when they travel closely together. Nevertheless, these studies often neglect the coexistence of self-driving and human-driven vehicles on the road. Addressing this, Wireless Access in the Vehicular Environment (WAVE) emerges as a crucial technology for communication in such mixed traffic scenarios. WAVE has provided one control channel (CCH) and six service channels (SCHs). To ensure robust and efficient communication, the proposed work focuses on a platoon-centric multi-channel access strategy centered around reliable broadcasting. This reliable broadcast method incorporates an improved RTS/CTS mechanism specifically designed for multicast communications. This paper provides an extensive throughput performance evaluation of both Simple broadcast and Platoon-centric broadcast mechanisms.

Keywords: *MAC, WAVE, multi-channel, platoon, contention window.*

Paper Id: 105

A Comparative Analysis of Tesseract OCR and Amazon Textract for Handwritten Documents

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ABSTRACT

Handwritten character recognition is a process of recognizing text from a handwritten image. This process is getting more and more attentive due to its wide range of applications. There are numerous Optical Character Recognition (OCR) instruments that identify and extract writing from pictures. These tools are utilized within the introductory steps of the investigation of scanned pictures for recognizing and naturally preparing the data that the images contain. There are many OCR tools that are used for various purposes. Some of them are Google OCR, Azure OCR, Amazon Textract, and an open-source tool called Tesseract OCR. In this paper, our attempt is to compare Amazon Textract and Tesseract OCR with handwritten images as input, and we analyze the performance, accuracy, and execution time of various handwritten image datasets.

Paper Id: 110

Development of a Restricted Access and Energy-Efficient IoT-Based Greenhouse System for Tropical Climates

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ABSTRACT

Agriculture as a cornerstone of global food production, faces sustainability and environmental impact issues. Conventional greenhouses while aiding crop production, often contribute to high energy consumption and substantial greenhouse gas (GHG) emissions. They are also vulnerable to the introduction of diseases due to uncontrolled access. Theoretical frameworks highlight the greenhouse effect and the impact of climate change on traditional agricultural methods, emphasizing the urgency of alternative sustainable practices. This paper introduces and implements a Radio Frequency Identification (RFID) and Internet of Things (IoT)-based energy-efficient greenhouse system for tropical climates applications. The system employs a solar energy source, an Arduino microcontroller, and various units for soil moisture, temperature monitoring, and RFID-based access control. The Arduino system enhances security by managing a list of approved RFID card (UIDs), granting access only to authorized users, and activating a buzzer for unauthorized access attempts. Performance tests of the prototype demonstrated superior results in temperature and soil resistance management compared to open-field farming, thus highlighting its potential for increased yield, resource efficiency, and enhanced farm security. This eco-friendly system is particularly suitable for deployment in energy-deprived tropical regions, offering improved farm yield and robust protection for greenhouse operations.

Key Words: *IoT, Radio Frequency Identifier, Energy, Agriculture, Greenhouse*

Paper Id: 111

Smart Air Quality Monitoring and Conditioning System (SAQMCS)

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ABSTRACT

Air pollution poses significant health risks globally, especially with increasing urbanization and industrialization. The Smart Air Quality Monitoring and Conditioning System (SAQMCS) addresses this challenge by integrating real-time monitoring with active air conditioning to ensure cleaner and healthier indoor environments. Unlike traditional systems that merely report air quality, SAQMCS actively controls it through a combination of sensors and actuators. Key components include the ESP32 microcontroller, MQ-135 air quality sensor, BMP280 pressure sensor, and DHT11 temperature and humidity sensor, all managed via Arduino IDE developed code. The system dynamically adjusts inlet and outlet fans and a humidifier based on sensor data, ensuring optimal air quality and comfort. Data is visualized on an OLED display and transmitted to ThingSpeak for remote monitoring and analysis. The user-friendly design, affordability, and scalability makes SAQMCS accessible for residential and small-scale commercial use. Extensive testing demonstrated its effectiveness and reliability. Future advancements will focus on integrating advanced air purification technologies, enhancing data analytics through machine learning, and improving compatibility with smart home ecosystems, furthering its capabilities in autonomous air quality management.

Keywords: *Air quality monitoring, IoT, ESP32, ThingSpeak, Humidity control, Indoor air conditioning.*

Paper Id: 113

Toxicity and Efficacy of ITK based Chili-neem Biopesticide on Sucking Pests in Vegetable Crops

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ABSTRACT

This research paper explores the efficacy of an innovative ITK (Indigenous Technology Knowledge) based chili-neem biopesticide in targeting common sucking pests infesting vegetable crops. The biopesticide's strategic focus on sucking pests necessitates a targeted approach to pest management, utilizing potent ingredients such as green chili extract, red chili extract, neem leaf extract, molasses, garlic, and cow urine to enhance efficacy. The effect was evaluation firstly by brine shrimp lethality assays to assess the lethal dose. The most effective lethal dose of 7-10% were further evaluated through laboratory trials on pests such as aphids, mealy bugs, and hadda beetles demonstrates the concentration-dependent effectiveness of biopesticides in controlling pest populations. Overall, ITK-based chili-neem biopesticide is a novel innovative Agro product promising a sustainable alternative for managing pest infestations in vegetable crops, aligning with the principles of eco-friendly and healthy agriculture

Keywords: *Chili, Neem, Biopesticide*

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