8th International Conference on Soft Computing : Theories and Applications December 24-26, 2023 URL: http://www.socta.in/

SOUVENIR CUM BOOK OF ABSTRACTS



Indian Institute of Information Technology Una, Himachal Pradesh University, BHARAT भारतीय सूचना प्रौद्योगिकी संस्थान ऊना, हिमाचल प्रदेश, भारत

Editors Prof. Ajit K. Verma Prof. Rajesh Kumar Dr. Tarun K. Sharma Dr. Om Prakash Verma Dr. Tanu Wadhera

78935980734

An Event of

Proceedings in







Soft Computing: Theories and Applications (SoCTA2023)

December 21 – 23, 2023

Indian Institute of Information Technology (IIIT) Una, Himachal Pradesh, India

Editors:

Prof. Ajit Kumar Verma
Western Norway University of Applied Sciences, Norway
Prof. Rajesh Kumar
Malaviya National Institute of Technology Jaipur (MNIT), Jaipur
Dr. Om Prakash Verma
Dr. B R Ambedkar National Institute of Technology, Jalandhar
Dr. Tarun K. Sharma
Shobhit Deemed University, Meerut
Dr. Tanu Wadhera
Indian Institute of Information Technology (IIIT) Una



9789359807348

First Edition 2023

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Published by: Self Published

E-Publication Website: http://socta.in





Prof. Abhay Karandikar





सचिव भारत सरकार विज्ञान एवं प्रौद्योगिकी मंत्रालय विज्ञान एवं प्रौद्योगिकी विभाग Secretary Government of India Ministry of Science and Technology Department of Science and Technology

01st December, 2023



MESSAGE

It gives me immense pleasure to write this message on the day of the 8th International Conference on Soft Computing: Theories and Applications (SoCTA 2023), which is set to take place from December 24 to December 26, 2023.

I am delighted that this 8th International conference is being hosted by the School of Electronics at the Indian Institute of Information Technology Una, Himachal Pradesh, with technical support of Dr. B. R. Ambedkar National Institute of Technology Jalandhar.

SoCTA-2023 is a seven years' young prominent conference which stands as the foremost and definitive gathering centered on interdisciplinary areas of soft computing, and the next generation of intelligent systems. In keeping with the growing technological demands of our country, the SoCTA-2023 seeks to showcase the latest advancements, addressing challenges, and presenting research outcomes that is crucial in aligning with the evolving technological needs of the nation.

May SoCTA-2023 indeed leave an enduring mark on each participant, fostering new insights, collaborations, and inspirations. It is remarkable to witness such enthusiasm and dedication towards advancing knowledge in the field of soft computing.

My sincere congratulations to the organizers of this conference and my best wishes to all the participants of this conference.

(Abhay Karandikar)



प्रो. टी. जी. सीताराम अध्यक्ष Prof. T. G. Sitharam Chairman

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अखिल भारतीय तकनीकी शिक्षा परिषद् (भारत सरकार का एक सांविधिक निकाय) (शिक्षा मंत्रालय, भारत सरकार) नेल्सन मंढेला मार्ग, वसंत कुंज, नई दिल्ली–110070 दूरभाष : 011–26131498 ई—मेल : chairman@aicte-india.org



ALL INDIA COUNCIL FOR TECHNICAL EDUCATION (A STATUTORY BODY OF THE GOVT. OF INDIA) (Ministry of Education, Govt. of India) Nelson Mandela Marg, Vasant Kunj, New Delhi-110070 Phone : 011-26131498 E-mail : chairman@aicte-india.org

MESSAGE

I am extremely happy to know that this year Indian Institute of Information Technology (IIIT) Una, Himachal Pradesh is orgainizing the 8th International Conference on Soft Computing: Theories and Applications (SoCTA 2023).

SoCTA is an excellent platform for researchers, academicians, scientists and industrialists working in the area of soft computing to share and exchange their views and ideas on the theory and application of soft computing techniques in multi-disciplinary areas.

I am glad to know that more than 200 participants across the globe will be joining this conference and present their research work. SoCTA gives an opportunity to budding researchers to participate in the conference and gets connected with various stakeholders to present their ideas and research work before renowned scientists and experts of the same domain.

Conferences like SoCTA give an exposure to the young generation to learn, experience and gain some valuable feedback and confidence from renowned scientists and experts. I congratulate IIIT Una for holding this grand responsibility of organizing the conference on Soft Computing.

I extend my best wishes to IIIT Una, the organisers of this conference and to all the participants who will come under one roof from across the globe to gather practical information in the field of soft computing. I also wish success for the Souvenir publication of IIIT Una.

V.G. SThomy

(Prof. T.G. Sitharam)

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY UNA HIMACHA PRADESH



An Institute of National Importance under MoE

Saloh, Una – 177 209

Website: <u>www.iiitu.ac.in</u>

Email : <u>chairperson@iiitu.ac.in</u>

RAVI SHARMA Chairperson, Board of Governors

09, Dec.'23



Massage

It is both an honor and a privilege to welcome you to the Soft Computing Theories and Applications Conference hosted by IIIT Una. I extend my warmest greetings to all attendees, and I am delighted to witness the convergence of brilliant minds in this dynamic field.

This conference is not just an academic gathering; it is a testament to our commitment to advancing the frontiers of knowledge and fostering innovation. Over the past year, the global landscape has undergone unprecedented changes, underscoring the critical role of technologies like soft computing in addressing complex challenges and driving progress.

As we embark on this intellectual journey over the next few days, I encourage each of you to fully immerse yourselves in the discussions, presentations, and interactions. The theme of this conference, "Soft Computing Theories and Applications," encapsulates the dual nature of our pursuit—the theoretical foundations that provide the intellectual scaffolding for our field and the practical applications that transform theories into solutions.

In academia, a significant weakness lies in the lack of collaboration among faculty and researchers from various institutions, as well as the limited engagement between academia and industry. I encourage each of you to take the necessary steps to bridge this gap. I firmly believe that by working together, we can substantially reduce this divide.

I wish you all a stimulating and fruitful conference. May the ideas exchanged here serve as catalysts for future breakthroughs, and may the connections forged during these days' foster collaborations that transcend boundaries and disciplines.

Thank you for being part of this significant gathering, and I look forward to witnessing the impactful contributions that will undoubtedly emerge from our collective efforts.

Ravi sharma

RAVI SHARMA

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY UNA HIMACHAL PRADESH An Institute of National Importance under MoE

Saloh, Una - 177 209



Website: www.iiitu.ac.in

Email address: <u>director@iiitu .ac.in</u> ssk@nitt.edu

Prof. S. SELVAKUMAR DIRECTOR



Message

I am pleased to note that the 8th International Conference on Soft Computing: Theories and Applications (SoCTA2023) is being organized at IIIT Una, Himachal Pradesh during 24 - 26 December, 2023 in association with STEM Research Society, India. It is with great pleasure and enthusiasm that I extend my heartfelt welcome to each of you for the SoCTA conference. This gathering marks not only a momentous occasion for the academic community but also a celebration of the collaborative efforts that have fueled advancements in the field of soft computing over the past years.

IIIT Una takes immense pride in hosting this conference, providing a platform for the exchange of ideas, insights, and innovations that have the potential to reshape the landscape of soft computing theories and applications. The journey our institute embarks upon today is a testament to the relentless pursuit of knowledge, the spirit of inquiry, and the transformative power of collective intelligence.

Over the course of the past year, the world has witnessed unprecedented challenges that have underscored the importance of leveraging cutting-edge technologies to address complex issues. In this context, the role of soft computing becomes increasingly pivotal. Its ability to emulate human-like thinking processes, adapt to dynamic environments, and provide solutions in the face of uncertainty and positions it as a cornerstone of modern computational approaches.

I congratulate the organizing committee, sponsors, and partners who have worked tirelessly to bring this conference to fruition. The dedication and passion of these members have laid the foundation for an event that promises to be both enriching and inspiring.

May the next few days be filled with stimulating discussions, collaborative breakthroughs, and the forging of lasting connections. I wish the take away of this conference is not only a deeper understanding of soft computing techniques but also a renewed sense of purpose and a commitment to advance the research in frontiers of knowledge.

Thank you, and I wish you all a fruitful and memorable conference experience.

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Message





I am looking forward to an interesting and successful conference which brings together people from all over the world to exchange and discuss ideas in the field of soft computing. This is the eighth edition of the conference "International Conferences on Soft Computing: Theories and Applications (SoCTA 2023)" to be held in hybrid mode during 24 – 26December 2023 and it is a delight to see the event growing every year.

It is a challenging time for everyone and an exceptional situation for conference organizers due to post-pandemic situation around the world. This unique situation has opened lots of new avenues for organizers, like organization of the conference in hybrid mode, and inclusion of more participants and speakers from across the globe by breaking the barriers of time zone.

The Conference is the perfect forum for researchers to network, collaborate and meet world renowned experts to learn, share and solve problems through discussion. I expect several high-quality deliberations from specialists which will help students and young researchers to learn.

I convey my warm greetings to all the participants and congratulate organizing members for grand success of the event.

All the best,

Aninda Bose Executive Editor – InterdisciplinaryApplied Sciences Research Publishing – Books

Springer Nature Group The Campus, 4 Crinan Street, London N1 9XW www.springernature.com



Jagdish Chand Bansal

South Asian University Delhi, India & Liverpool Hope University UK (Visiting)



It is my real honor and privilege to be the keynote speaker during one of the most reputed conferences on soft computing, SoCTA 2023. It gives me immense pleasure that the conference is being organized by the Indian Institute of Information Technology (IIIT) Una, BHARAT.

The quest for knowledge has been from the beginning of time, but knowledge only becomes valuable when disseminated and applied to benefit humankind. It is hoped that SoCTA 2023 will be a platform to gather and disseminate the latest knowledge in soft computing. Academicians, Scientists, Researchers, and Practitioners of soft computing and allied areas will be able to share and discuss new findings and applications. It is envisaged that the intellectual discourse will result in future collaborations among the participants. In particular, it is expected that focus will be given to research issues, ultimately benefitinghumankind.

I am thankful to the organizers for considering me to be part of this conference. My best wishes for successful and fruitful learning during the conference.

Jagdish Chand Bansal



Dear Participants and Researchers,

Welcome to the book of abstracts for SoCTA2023! In this compilation, we embark on a journey through the diverse realms of soft computing, exploring its profound importance in addressing real-life challenges.

Soft computing, with its foundation in fuzzy logic, neural networks, genetic algorithms, and evolutionary computation, emerges as a powerful paradigm capable of navigating the intricacies of uncertainty and imprecision. Within these abstracts lie glimpses of groundbreaking research that not only advances theoretical frameworks but, more importantly, holds the key to transforming our daily lives.

From enhancing medical diagnostics through intelligent decision support systems to optimizing complex industrial processes, soft computing stands as a beacon of innovation. The fusion of fuzzy sets, neural networks, and evolutionary algorithms opens new avenues in machine learning, enabling systems to adapt, learn, and evolve, mirroring the dynamic nature of the real world.

As you peruse these abstracts, envision the tangible impact of soft computing on finance, image processing, robotics, and beyond. Witness how these computational techniques transcend mere theory, actively contributing to solutions for societal challenges.

We extend our deepest appreciation to the contributors whose research showcased here represents a collective effort to bridge the gap between theoretical brilliance and practical application. Together, we forge a path towards a future where soft computing plays an integral role in shaping a smarter, more adaptive world.

Thank you for being a part of this journey.

Best Regards,

Conference Organizing Committee





SoCTA (Soft Computing: Theories and Applications) is now Seven years young International conference.

The **objective of SoCTA** is to provide a common platform to researchers, academicians, scientists and industrialists working in the area of soft computing to share and exchange their views and ideas on the theory and application of soft computing techniques in multi disciplinary areas.

The **aim of the conference** is to highlight the latest advances, problems and challenges and to present the latest research results in the field of soft computing with a link to scientific research and its practical implementation. SoCTA especially encourages the young researchers at the beginning of their career to participate in this conference and invite them to present their work on this platform.

Previous SoCTA conference was successfully organized at the following venues:

SoCTA2016:	Amity University Rajasthan, Jaipur, India.	(December 28-30, 2016)
SoCTA2017:	Bundelkhand University Jhansi, Uttar Pradesh, India.	(December 22-24, 2017)
SoCTA2018:	Dr B R Ambedkar NIT, Jalandhar, Punjab, India.	(December 21-23, 2018)
SoCTA2019:	National Institute of Technology, Patna, Bihar, India.	(December 27-29, 2019)
SoCTA2020	In Virtual Mode (due to pandemic COVID-19).	(December 25-27, 2020)
SoCTA2021:	Indian Institute of Information Technology Kota, India.	(December 17-19, 2021)
SoCTA2022	Himachal Pradesh University Summerhill, Shimla, India.	(December 16-18, 2022)

8th in the series, SoCTA2023 held at IIIT, Una, Himachal Pradesh INDIA in hybrid mode during December 21 – 23, 2023.

SoCTA2023 is organized in technical collaboration with Dr B R Ambedkar NIT, Jalandhar, Punjab, India; Shobhit Deemed University Meerut and Science, Technology, Engineering and Management (STEM) – Research Society.

The conference had 5 keynote lectures presented by eminent academicians and practitioners from different parts of the world. Totally, 99 technical papers under 12 different themes of the conference were presented during the conference in 18 oral presentation sessions. We are thankful to Springer Plc., for giving us opportunity to publish the proceedings in Lecture Notes in Networks and Systems (LNNS). All papers submitted to SoCTA2023 had undergone a peer-review process and subsequently revised before being finally accepted.

The credit of the success of the SoCTA Series, goes to our Mentors, Keynote & Invited Speakers, Chief Guests, Guest of Honor(s), Members of the advisory board (National & International), Program Committee members, Springer Team as a publishing partner (in particular Mr. Aninda Bose, Executive Editor – Interdisciplinary Applied Sciences; Research Publishing – Books), all the Author(s), participants and the reviewer's board. We sincerely appreciate your continued support, encouragement and trust in us. We look forward to have this wonderful support in the coming SoCTA Series as well.

We are glad to inform you that the next in the SoCTA Series i.e. SoCTA 2024 is scheduled at MNIT Jaipur Rajasthan, India.

Looking forward to have your significant contribution in SoCTA Series...





Message from the Conveners

It is our great pleasure to welcome you to the 8th International Conference on Soft Computing: Theories and Applications (SoCTA2023) at IIIT Una, Himachal Pradesh, INDIA. Soft Computing methods are increasingly applied to solve problems in diverse domains. Hence SoCTA is appropriately conceived to offer a forum to bring all such applied researchers together under one umbrella.

There is no SoCTA Series without the quality contributions made by the authors. In addition SoCTA2023 is very fortunate to have so many top quality panel, keynote speakers and workshop organizers. We sincerely thank them all.

We are particularly looking forward to the invited talks. We are delighted to have such a strong and varied series of plenary talks at the conference. The underlying philosophy motivating this conference, which has become a flagship forum in the area of Mathematics and Computer Science in general and in the area of Soft Computing in particular, has been to bring together researchers who apply, besides conventional traditional computing techniques, soft and other novel computing paradigms to problems and situations that have hitherto been intractable, complex, highly nonlinear and difficult to solve. Soft Computing is a cutting edge field of research in which one of the main inspirations for problem solving is based on, for example, natural or biological systems that tend to be decentralized, are adaptive and are known to be environmentally aware, and as a result they have survivability, scalability and flexibility properties. In addition to work on traditional serial computers, these researchers also exploit methods of efficiency with parallel computing techniques and tools to achieve high performance computing capabilities in their work.

There are two further key features of this conference series that make this a unique event – i.e. these events are "go-green" environmentally friendly conferences where emphasis is on the quality of academic endeavor rather than spin and gloss; and these events see participation from large number of young researchers and particularly women scientists which is an important aspect if we are to increase female participation in STEM (Science, Technology, Engineering, and Mathematics) areas. Conferences like these are only possible thanks to the hard work of a great many people and the successful organization of SoCTA2023 has required the talents, dedication and time of many volunteers and strong support from program committee.

Chairs of each event contributed exceptionally by attracting contributions, getting them reviewed, making accept and reject recommendations, developing the programs and so on. We also thank the National and International advisory committee. Publication of SoCTA2023 proceedings is not a simple task. Committee has contributed immensely. We are as ever grateful to the SpringerNature and Mr. Aninda Bose, Executive Editor for their dedication and professionalism in helping us produce what is an excellent and high-quality proceedings.

We also give our sincere thanks to the competent authorities of IIIT Una, Himachal Pradesh and all our colleagues on the Organizing Committee for their sincere work and support throughout the year. It only remains for us to thank all of you for participating in the conference and helping to make it a success.

We hope that all of you will benefit from the extensive technical program and establish long lasting interactions with fellow delegates at SoCTA2023.

Dr. Tarun K. Sharma and Dr. Om Prakash Verma



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Snvited Talks



Prof. Leo Joskowicz Head, Computer-Assisted Surgery and Medical Image Processing Laboratory School of Computer Science and Engineering and The Edmond and Lily Safra Center for Brain Sciences (ELSC) The Hebrew University of Jerusalem, Israel President, MICCAI Society; Fellow, ASME, IEEE, MICCAI Societies

Prof. Joskowicz is a Professor at the School of Computer Science and Engineering at the Hebrew University of Jerusalem, Israel. He is the founder and director of the Computer-Aided Surgery and Medical Image Processing Laboratory (CASMIP Lab). Prof. Joskowicz is a Fellow of the IEEE (Institute of Electrical and Electronic Engineers), ASME (American Society of Mechanical Engineers) and MICCAI (Medical Image Processing and Computer Aided Intervention) Societies. He is the recipient of the 2010 Maurice E. Muller Award for Excellence in Computer Assisted Surgery by the International Society of Computer Aided Orthopaedic Surgery and the 2007 Kaye Innovation Award. He has published over 250 technical works including conference and journal papers, book chapters, and editorials. He is a member of the Board of Directors of the MICCAI and CAOS International Societies and has served on numerous related program committees. He is on the Editorial Boards of six journals, including Medical Image Analysis, Int. J. of Computer Aided Surgery, Computer Aided Surgery, and Nature Scientific Reports. He is the Co-Chair of the MICCAI 2020 conference in Lima, Peru.



Prof. Swagatam Das Head Electronics and Communication Sciences Unit ISI Kolkata, India

Prof. Das has received the B. E. Tel. E., M. E. Tel. E (Control Engineering specialization) and Ph. D. degrees, all from Jadavpur University, India, in 2003, 2005, and 2009 respectively. Swagatam Das is currently serving as an associate professor and Head of the Electronics and Communication Sciences Unit of the Indian Statistical Institute, Kolkata, India. His research interests include evolutionary computing and machine learning. Dr. Das has published more than 300 research articles in peer-reviewed journals and international conferences. He is the founding co-editor-in-chief of Swarm and Evolutionary Computation, an international journal from Elsevier. He has also served as or is serving as the associate editors of the



SoCTA2023



IEEE Transactions on Cybernetics, Pattern Recognition (Elsevier), Neurocomputing (Elsevier), Information Sciences (Elsevier), IEEE Trans. on Systems, Man, and Cybernetics: Systems, and so on. He is an editorial board member of Information Fusion (Elsevier), Progress in Artificial Intelligence (Springer), Applied Soft Computing (Elsevier), Engineering Applications of Artificial Intelligence (Elsevier), and Artificial Intelligence Review (Springer). Dr. Das has 24,500+ Google Scholar citations and an H-index of 73 till date. He has been associated with the international program committees and organizing committees of several reputed international conferences including NeurIPS, AAAI, AISTATS, ACM Multimedia, BMVC, IEEE CEC, GECCO, etc. He has acted as guest editors for special issues in journals like IEEE Transactions on Evolutionary Computation and IEEE Transactions on SMC, Part C. He is the recipient of the 2012 Young Engineer Award from the Indian National Academy of Engineering (INAE). He is also the recipient of the 2015 Thomson Reuters Research Excellence India Citation Award as the highest cited researcher from India in Engineering and Computer Science category between 2010 to 2014.



Prof. Rajesh Kumar Department of Electrical Engineering Robotics and Machine Analytics (RAMAN) Lab Malaviya National Institute of Technology, Jaipur

Prof. Rajesh Kumar received the Bachelor of Technology in Engineering degree with honors in Electrical Engineering from the Department of Electrical Engineering, National Institute of Technology, Kurukshetra, India in 1994, Master of Engineering with honors in Power Engineering from the Department of Electrical Engineering, Malaviya National Institute of Technology, Jaipur, India in 1997 and Ph.D. degree in Intelligent Systems from Department of Electrical Engineering, Malaviya National Institute of Technology (MREC, University of Rajasthan), India in 2005. He is currently Professor at Department of Electrical Engineering; Adjunct Professor at Centre of Energy and Environment at Malaviya national Institute of Technology, Jaipur, India.

He has been Research Fellow (A) at the Department of Electrical and Computer Engineering at National University of Singapore from 2009-2011. He has been Reader from 2005-2009, Senior Lecturer from 2000-2005 and Lecturer from 1995-2000 at Department of Electrical Engineering, Malaviya National Institute of Technology. He is the Founder of ZINE student innovative group. His background is in the fields of Computational Intelligence, Artificial Intelligence, Intelligent Systems, Power and Energy management, Robotics, Bioinformatics, Smart Grid and Computer Vision.



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Mr. Aninda Bose Executive Editor Springer Nature Group New Delhi

Mr. Aninda Bose is presently working as Executive Editor with Springer Nature. Mr. Bose is part of the Global Acquisition Team at Springer Nature and responsible for acquisition of scientific content across the globe. He is responsible for acquisition of content in Interdisciplinary Applied Sciences. He has more than 26 years of industrial experience in marketing and different fields of publishing. Mr. Bose has completed Masters in Organic Chemistry from Delhi University and Masters in Marketing Research from Symbiosis Institute of Management Studies, Pune. Mr. Bose has delivered more than 160 invited talks on Scientific Writing and Publishing Ethics in reputed Universities, International Conferences and Author Workshops. He has published books for secondary level in Chemistry and is a member of American Chemical Society, USA.



Dr. Steven L. Fernandes Creighton University California Plaza, Omaha, United States

Dr. Fernandes began his postdoctoral research at The University of Alabama at Birmingham. There, he worked on NIH-funded projects. He also conducted postdoctoral research at the University of Central Florida. This research included working on DARPA, NSF, and RBC funded projects. His publications include research articles in highly selective artificial intelligence venues. Dr. Fernandes is Senior IEEE membership and AWS educator. His current area of research is focused on developing artificial intelligence techniques to extract useful patterns from big data. This includes robust computer vision applications using deep learning and computer-aided diagnosis using medical image processing.







Department of Telecommunication networks and Head of SDN Laboratory St. Petersburg State University of Telecommunications St Petersburg, 193232

Dr. Ammar Muthanna is an Associate Professor at the Department of Telecommunication networks and Head of SDN Laboratory. He received his B.Sc. (2009), M.Sc. (2011) and as well as Ph.D. (2016) degrees from Saint – Petersburg State University of Telecommunications. 2017-2019 he worked as Postdoctoral Researcher at RUDN University. In 2012 and 2013, he took part in the Erasmus student Program with the Faculty of electrical engineering, University of Ljubljana and in 2014 he was visitor researcher at Tampere University, Finland. His area of research includes, wireless communications, 5G/6G cellular systems, IoT applications, Edge computing and software defined networking.





Samvad: Ethics in Artificial Intelligence

Ethics in artificial intelligence (AI) is a critical and evolving topic that addresses the moral and societal implications of developing and deploying AI technologies. Here are some key aspects of ethics in AI:

Bias and Fairness:

Al systems can inherit and perpetuate biases present in their training data. Ensuring fairness and addressing bias in Al algorithms is essential to prevent discrimination based on race, gender, ethnicity, or other factors.





Transparency:

The "black-box" nature of some AI models can be a concern. Ethical AI requires transparency, meaning that the decisions made by AI systems should be understandable and interpretable by humans.

Privacy:

Al often involves processing large amounts of personal data. It's crucial to establish robust privacy protections to safeguard individuals' information and prevent misuse.

Accountability:

Determining responsibility when AI systems make errors or have unintended consequences is a challenge. Establishing clear lines of accountability is essential for ethical AI development.

Explainability:

Al systems should be designed to provide explanations for their decisions. This is particularly important in critical applications such as healthcare or finance, where understanding the rationale behind decisions is crucial.

Security:

Ethical AI involves securing AI systems against malicious attacks and ensuring that they cannot be manipulated to cause harm.

Informed Consent:

Users and individuals impacted by AI systems should be informed about how their data will be used and should have the ability to provide informed consent.

Social Impact:

Ethical considerations extend to the broader societal impact of AI. This includes addressing issues such as job displacement, economic inequality, and the digital divide.

Environmental Impact:

The computational requirements of some AI models can have a significant environmental impact. Ethical AI involves considering and mitigating these environmental consequences.

International Collaboration:

Given the global nature of AI development and deployment, ethical considerations should involve international collaboration to establish common standards and principles.

Human-Centered AI:

Prioritizing human well-being and ensuring that AI systems are designed to augment human capabilities rather than replace or harm humans is a fundamental ethical principle.

Ongoing Evaluation and Improvement:

Ethical AI requires continuous monitoring, evaluation, and improvement. Developers should be open to feedback and ready to update their systems to address emerging ethical concerns.

Many organizations, researchers, and policymakers are actively working on guidelines and frameworks to promote ethical AI. Staying informed about these developments and actively participating in discussions around AI ethics is crucial for ensuring responsible and beneficial AI development.

Organizing discussions over ethics in AI is crucial for several reasons:

✓ Addressing Moral Dilemmas:

Al technologies often involve making decisions that have moral implications. Discussing ethics in Al allows individuals to grapple with moral dilemmas and consider the societal impact of these technologies.

✓ Promoting Accountability:





Ethical discussions help establish accountability frameworks. Determining who is responsible for the consequences of AI decisions is essential for ensuring transparency and trust.

✓ Ensuring Fairness and Avoiding Bias:

Al algorithms can inadvertently perpetuate biases present in training data. Ethical discussions help identify and address issues of fairness, ensuring that Al systems treat individuals and groups equitably.

✓ Building Trust:

Public trust in AI is crucial for widespread adoption. Open and transparent discussions about the ethical considerations in AI contribute to building trust among users, stakeholders, and the general public.

✓ Guiding Policy and Regulation:

Ethical discussions provide insights that can inform the development of policies and regulations surrounding AI. Establishing ethical guidelines can help guide responsible AI development and deployment.

✓ Protecting Privacy:

Al often involves the processing of personal data. Ethical considerations help establish guidelines for protecting individuals' privacy rights and ensuring that AI systems handle sensitive information appropriately.

✓ Minimizing Unintended Consequences:

Ethical discussions help identify potential unintended consequences of AI technologies. By considering ethical implications, developers can work to minimize negative impacts on individuals and society.

✓ Encouraging Responsible Innovation:

Ethical discussions promote responsible innovation by encouraging developers to consider the ethical implications of their work from the early stages of AI system design.

✓ Fostering Collaboration:

Ethical discussions create a platform for collaboration between researchers, policymakers, industry experts, and ethicists. This interdisciplinary collaboration is essential for addressing the multifaceted challenges posed by AI technologies.

✓ Educating Stakeholders:

Many stakeholders, including developers, business leaders, and the general public, may not be fully aware of the ethical considerations in AI. Discussions provide an opportunity to educate stakeholders about these issues.

✓ Preparing for Future Challenges:

Al is a rapidly evolving field, and ethical considerations must evolve alongside technological advancements. Ongoing discussions help prepare for future challenges and ensure that ethical guidelines remain relevant. Human-Centered Development:

Discussions on ethics in AI emphasize the importance of human-centered development. It reinforces the idea that AI should be designed to benefit humanity and respect human values.

Overall, organizing discussions over ethics in AI is a proactive and responsible approach to ensure that AI technologies align with human values, contribute positively to society, and are developed and deployed in a manner that respects ethical principles.





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			243006, India and National Institute of Technology, Kurukshetra, Haryana-136119, India



Machine Learning Approaches







13 A Mathematical Approach to Prevent and Control COVID-19 Outbreaks: The Improved M-E Model

Shanmuk Srinivas Amiripalli and S V Siva Rama Raju Abu Dhabi Polytechnic and GITAM University shivram2006@yahoo.co.in

The COVID-19 virus, the eighth in the family of Corona viridae, will spread swiftly among people, birds, and other animals. This virus spreads mostly via human infections and primarily affects the respiratory and nervous systems. There were more patients reported to hospitals in Wuhan, China, in the month of December 2019. They recognized it as a brand-new Corona virus known as COVID-19. The uncontrolled virus presents humans with two significant problems. Inadequate medical resources are a result of the anomalous development of COVID-19 cases. Lockdowns and other emergency procedures are used as a precaution. We provide a preliminary mathematical model for COVID-19 control and prevention that is based on evolutionary graph theory in our first paper. The well-known social distance approach is used in the proposed model in a variety of ways. In present research an updated model was generated and named as an Improved M-E(Mathematical-Based Epidemic Model) to Prevent and Control COVID-19 through random clustering. Lockdown in many nations causes a drop in GDP and an increase in mental health issues among the population. The distribution of anti-virus has done based on clustering the total population into small groups based on location, relation, culture etc. In the next process identify the random person among the clusters and inject the anti-virus, so that the proposed model will generate quick recovery then the previous model.

22 Implementation of Agricultural produce segregation using image processing Algorithm Kevin Abishek S, Ezhil Subbia K, Nikhil G, Sriharipriya K C Vellore Institute of Technology, Vellore sriharipriya.kc@vit.ac.in

Sorting of produce is an integral part in farming, agricultural and distribution sectors. Most farmers resort to hand picking to remove the contaminants which are mostly fruits or vege-tables infested with some type of fungus, worms or insects. Hand picking the produce leads to too much wastage of time. It is also not perfect due to human error which results in end consumer receiving products with subpar quality leading to damage of brand name. This results in market loss resulting in reduction of profit. The proposed system aims to target this activity by sorting the produce based on its appearance. This is done by processing the image of the fruit or vegetable and classifying it as whether it is fresh or rotten. Capturing the image of the produce and processing it is done with Espressif ESP32 Cam Module. The dataset containing all the different class is processed and stored as a pre-defined dataset in online servers. This dataset is accessed by the microcontroller to classify the image of pro-duce. Retinanet algorithm is used to classify the image based on their appearance. Since the produce needs to be classified individually, a conveyor system is necessary. The ESP32 Cam Module is mounted on top of the conveyor setup. A lever is placed at the end of the conveyor to segregate the produce. The ESP32 cam module controls the lever based on the result from processing the





image. Overall, the proposed system will drastically reduce the time consumed to segregate the produce while increasing the efficiency of sorting.

35 Detection of Duplicate Question Pairs by Applying Proposed BoW, TF-IDF & USE Approach Manish Raj, Juginder Pal Singh, Akhilesh Kumar Singh, Avick Kumar Dey, Pradeep Kumar Singh, Surabhi Kesarwani Associate Professor, Bennett University, Greater Noida, UP Assistant Professor, GLA University, Mathura, UP, India Assistant Professor, Sharda University, Greater Noida, UP, India Assistant Professor, Department of Computer Applications, DSMS College, Durgapur Associate Professor, Sharda University, Greater Noida, UP, India akhilesh.singh1@sharda.ac.in

Plenty of social media sites where users can put up questions on topics has been coming up in recent times. Quora is one such social networking website where user questions are posed and answered by experts who provide insights about quality. The role of identifying duplicate texts involves profound semantic level comprehension in natural language processing. A duplicate text is nothing but a re-statement of an article, statement, etc. In identifying the sentence similarity, Traditional NLP techniques have less accuracy.

58 The Hand Glove Enabling Voice and Text Communication

Dr N Krishna Chaitanya, V.Suneel Reddy, K.Sreelakshmi, T.Abhinaya Keerthi, R.Poojitha, G.Rajeswari Ramireddy Subbarami Reddy Engineering College nosinakc@gmail.com

This work aims to address the daily challenges faced by individuals with disabilities, including those who are unable to speak, hear, and are visually impaired. It also seeks to assist elderly individuals who experience difficulties in speech. Through the development of a wearable smart glove, this innovation enables seamless communication for disabled individuals and patients. By simply tapping specific points on the glove using their thumb, users can activate twelve different commands that are both visible and audible on any Android smartphone through a dedicated application. The glove utilizes Bluetooth technology to establish data communication with the target device, allowing it to speak out and display the transmitted information. Furthermore, this technology has the potential to be employed in automating everyday tasks such as controlling home appliances and other similar applications.

59 Advancing Rheumatoid Arthritis Care: Exploring Technological Breakthroughs and Future Directions A. Ezhil Grace, Dr.R. Thandiah Prabu Saveetha School of Engineering

ezhilgracea9072.sse@saveetha.com

Rheumatoid Arthritis (RA) is a persistent inflammatory disorder primarily impacting the joints., posing a significant health burden among autoimmune diseases. The management of RA is multifaceted, encompassing factors such as pain, fatigue, medication side effects, functional impairment, cardiovascular



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risks, and reduced lifespan. The integration of technology has the potential to revolutionize the management of RA across the spectrum, including prevention, diagnosis, treatment, rehabilitation, disease monitoring, and symptom control. This systematic review examines the existing landscape and future prospects of technological solutions for RA care. Emphasizing the importance of interdisciplinary collaboration, the review underscores the challenges faced in effectively managing RA and illuminates the potential of technology-driven therapy to raise the standard of living for RA patients. The paper calls for the development of novel treatment approaches and interventions that leverage technology to optimize RA management. It concludes that further research in this field is crucial to advance the care and well-being of millions of individuals worldwide living with RA.

64 HMHDTML: Human Mental Health Detection using Text and Machine Learning Model Vanita G. Kshirsagar, Dr. Sunil Yadav, Dr. Nikhil Karande

1 Amity University, Jaipur, India, Dr. D. Y. Patil Institute of Technology, Pimpri, Pune, India2 Amity University, Jaipur, Rajasthan, India 3 SISA Information Security Pvt. Ltd. Bangalore, India vanita.kshirsagar@gmail.com

Human Mental Health (HMH) is a serious chronic condition that affects how a person thinks, feels, and behaves negatively. It is a common but serious mood disorder. About 20% of women will experience at least one episode of depression across their lifetime. Scientists examining many potential causes for and contributing factors to women's increased risk for depression. To diagnose depression the symptoms must be present at least two weeks. A research study has been conducted by detection of depression using sentiment analysis on Twitter, Face book, Insta-gram, etc. to understand their behavioral symptoms like depressed mood, loss of interest, change in sleeping, difficulty in thinking and /or concentrating, taking decisions. This paper describes the features and the implementation of the depression using Twitter and sarcastic text with the help of Machine learning algorithm to improve the overall results.

65 Analysing the growth profile of Brain tumor with Caputo fractional operator via Sumudu transform

Amit Prakash, Lalit Mohan Department of Mathematics, National Institute of Technology, Kurukshetra lalit_62000037@nitkkr.ac.in

In this paper, we analyse the growth profile of Brain tumor with Caputo fractional operator. The Sumudu adomian decomposition technique (SADT) is applied for getting the numerical solution. It is a perfect combination of the Sumudu transform and the Adomian decomposition technique. The maximum absolute error of the proposed technique is also analysed. The efficiency of the SADT is shown by solving three distinct examples and comparing the results with the collocation method and the superiority of the proposed technique is established.





70 Security in Mobile Ad hoc Networks: Impact of Attacks and Counter-Measure Approaches Tanay Jaiswal and N.R. Kidwai INTEGRAL UNIVERSITY, LUCKNOW, INDIA mr.tanayjaiswal@gmail.com

Compared to wired networks, MANETs are more prone to attacks due to their lack of a defined infrastructure and the autonomy of their self-contained nodes. Ensuring security is crucial for applications that handle sensitive data, as it guarantees the quality of service, confidentiality, integrity, availability, authen-tication, and non-repudiation. Although attempts have been made to identify se-curity risks and their solutions in MANETs, the existing studies are incomplete or scarce. This article aims to bridge this gap by comprehensively discussing at-tacks and viable solutions. To illustrate the impact of attacks, the article evaluates the AODV routing protocol's performance in the presence of several well-defined attacks in MANETs. Based on the assessments and evaluations, the article suggests some counter measures.

72 Optimization of vibrational frequencies for orthotropic parallelogram plates with circular variations in tapering at simply supported boundary

Neeraj Lather, Pravesh Kumar, Amit Sharma Amity University Haryana, Rajkiya Engineering College dba.amitsharma@gmail.com

In this paper, authors investigated the vibrational characteristics of an orthotropic and non-homogeneous parallelogram plate. The plate exhibits circular thickness variation in two dimensions and linear density variation in one dimension at simply supported boundary. Additionally, a two-dimensional linear temperature distribution is assumed across the plate. To solve the governing equation and determine the vibrational modes, the Rayleigh-Ritz technique is employed. Comparative analysis is conducted to validate the accuracy and reliability of the obtained frequency modes for orthotropic parallelogram plates. The study aims to provide numerical data that demonstrate how circular variation in tapering parameters of plate can effectively control and optimized vibrational frequencies, ultimately improving the performance of orthotropic parallelogram plates for specific applications.

73 Drowsiness Detection Using Adaboost Method and Haar Cascade Classifier to Improve Safety of Drivers

S. Niranjan1 T. Jemima Jebaseeli, Samson Arun Raj; , S. Marshal Karunya Institute of Technology and Sciences, Coimbatore,

Drivers who need a nap are to blame for one-fourth of all major highway accidents, suggesting that tiredness is a bigger factor in crashes than drunk driving. Drowsiness detection systems operate in realtime, continuously monitoring the individual's state and providing timely alerts when drowsiness is detected. This allows for proactive intervention before drowsiness leads to accidents or errors. The primary objective of this research endeavor is to develop a non-intrusive system capable of detecting human fatigue and providing an immediate warning. The proposed solution employs the employment of a camera to track the driver's vision to recognize signs of driver fatigue enough in time to prevent the driver from sleeping. This



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will be important for anticipating driver fatigue and presenting caution information in the manner of alerts and popups. In addition, instead of being deleted by itself, the notification will be deleted manually. If the driver is fatigued, they may react improperly to the conversation. If all three input parameters display an increased risk of fatigue at the same moment, a time domain graph is produced. The warning message is delivered through text message. This directly indicates sleepiness or exhaustion, which is then utilized as a record of driving performance.

74 Early detection of colorectal cancer from polyps images using deep learning Ravi Kumar, Amritpal Singh, Aditya Khamparia Department of Computer Science Engineering, Lovely Professional University, Punjab, India. e-mail: Ravi.42100244@lpu.in@gmail.com, Department of Computer Science Engineering, Lovely Professional University, Punjab, India. e-mail: apsaggu@live.com, 3Assistant Professor, Department of Computer Science, Babasaheb Bhimrao Ambedkar University, Amethi, India. e-mail: aditya.khamparia88@gmail.com Ravi.42100244@lpu.in

Detecting colorectal cancer in early stages and predicting associated risk is very important as it has the highest mortality rate after lung cancer. The polyps present in the colon and rectum are one of the main causes of colorectal cancer..In this study, we propose different deep learning methods to classify images as normal or containing polyps. The performance of these models was evaluated via implementation on public and private datasets. On WCE dataset, the OEM model implemented with transfer learning achieved a classification accuracy of 99.5%, 96.37%, and 96% on training, validation and test set respectively. On Kvasir dataset, the OEM model obtained a classification accuracy of 97.80%, 96.40%, and 96.03% on training, validation and test set respectively. On SCPolyps dataset, the OEM model achieved a classification accuracy of 93.80%.Hence, the utilization of deep learning techniques can be viewed as an efficient approach to creating tools for assisting in the diagnosis of CRC.

75 Motion control of underactuated cart-double-pendulum system via fractional order sliding mode controller

Naveen Kumar, Km Shelly Chaudhary

National Institute of Technology Kurukshetra Haryana, Mahatma Jyotiba Phule Rohilkhand University Bareilly, Bareilly 243006, Uttar Pradesh, Meerut college, Meerut-250002, Uttar Pradesh,India shellymath23@gmail.com

In this paper, the motion control problem of an underactuated cart-double-pendulum system is addressed. These systems are very complicated nonlinear and underactuated systems with 3-degrees of freedom and two control inputs. By analyzing the dynamic properties of the system, a fractional-order sliding surface is presented. Based on presented sliding surface, a fractional order sliding mode motion control approach is presented to handle the dynamic system in a robust manner. The non-linearities of the dynamic system are approximated using a radial basis function neural network. Using an adaptive compensator, the neural network reconstruction error and upper limits on disturbances are compensated. The stability of the presented approach is assessed using Barbalat's lemma and the Lyapunov stability criteria. As a result of





the proposed controller, an asymptotic error convergence is achieved, and the efficiency of the controller is enhanced. Furthermore, numerical simulation studies are used to validate the efficiency of the designed control approach."

77 A Comparative Study of Pedestrian Detection Techniques over the Last Decade Nader Salam, T Jemima Jebaseeli Karunya Institute of Technology and Sciences, Coimbatore.

Abstract. Pedestrian detection has made significant strides in the recent decade because of breakthroughs in the fields of deep learning. Computer vision-based applications, from object detection and tracking to surveillance footage and, most frequently, driverless cars, rely on pedestrian identification. Human detection in streets and pathways is an important aspect of various highly important jobs. There are numerous approaches to this problem, including the use of digital cameras, infrared or heat-detecting devices, Time of-flight sensors, and so on. All of them function by gathering data about the environment and then predicting or estimating where a person is concerning the sensor. In the assessment, the efficiency of detection and tracking is evaluated using several image sources such as RGB, thermal, and multispectral formats. The proposed research delves into RCNN, Fast RCNN, Single Shot detector, and Scale Aware Fast R-CNN approaches. These methods assess the works by utilizing datasets from KITTI, Caltech, and INRIA. These results are compared to over 20 other earlier research conducted utilizing the same datasets. With the KITTI, Caltech, and INRIA datasets, Faster RCNN gets the greatest average precision of all pedestrian identification models tested.

81 Approximation properties of Modified-Bernstein operators having Szasz weight functions Smita Sonker, Priyanka National Institute of Technology Kurukshetra, Haryana, India smitafma@nitkkr.ac.in

The present work introduces a modification of the modified Bernstein operator using SzÂ'asz weight function. We discuss the rate of convergence of proposed operators via continuity modulus and Peetre's K-functional for HÂ"older's class of functions. Further, we establish a Vornovskaya type asymptotic formula. Also, we give numerical examples illustrating the error functions and the approximation of the proposed operators.

86 Fourier-Laguerre expansion of signals by composite summable technique Smita Sonker and Neeraj Devi National Institute of Technology Kurukshetra, Haryana 136119, India and National Institute of Technology Kurukshetra, Haryana 136119, India smitafma@nitkkr.ac.in

Finding approximate Fourier-Laguerre series signals has been interest to a lot of researchers. Numerous studies investigated the Fourier-Laguerre signal's approximation employing individual means. Additionally, some researchers sought to approximate Fourier-Laguerre series signals using double product summability.



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In the present work, we proposed the error estimation of functon belonging to $L[0,\infty)$ - class by(H,1)(E,\theta)(E,\theta) composite means using its Fourier-Laguerre series at point y=0. We also introduced the approximation theorem using composite summability along-with some graphical interpretations.

87 A Multiple Linear Regression Model to Estimate Global, Direct and Diffuse Irradiance in Gurugram, India using Python

Subhayan Das, Subhra Das School of Computer Engineering, Kalinga Institute of Industrial Technology, Bhubaneswar, Odisha, India and Amity School of Engineering & Technology, Amity University Haryana, India sdas@ggn.amity.edu

Estimating solar radiation is important for designing a solar photovoltaic or thermal system. In the present work, multiple linear regression model is used to estimate global horizontal irradiance, direct normal irradiance and diffuse horizontal irradiance using the solar resource assessment data collected from National Institute of Solar Energy located in Gurugram (28.42oN, 77.15oE) which records direct, diffuse, global radiation at an interval of 1 minute along with humidity, wind speed, wind direction, temperature, and precipitation. Principal component analysis is used to select the dominating variables and then fit a multiple regression model to estimate the components of solar radiation. The model performance is tested by computing the coefficient of determination, root mean square error, mean bias error, mean absolute error, and model efficiency for each of the models. A model efficiency of 0. 93, 0.88 and 0.93 is obtained for the multiple regression model for estimating global, direct and diffuse irradiance respectively which suggests that the model fits well with the observed data.

88 Supervised Machine Learning Approaches for Customer Reviews Payal Garg, Suyash Tyagi, Aditya Joshi, Abhijaat Pandey and Deepak Panwar

Sentiment analysis, also known as opinion mining, is a natural language processing (NLP) method to extract subjectivity and polarity from a body of text i.e. identify whether the data is positive, negative, or neutral. In this paper, I have presented vectorization techniques like Bag of Words, TF-IDF, and HashingVectorizer along with the following text classification algorithms: K-Nearest Neighbour, Multinomial Naïve Bayes, Random Forest Classifier, Decision Tree and SVM. A comparative analysis is performed on the performance of different algorithms and vectorization technique combinations by computing statistical parameters like accuracy, specificity, sensitivity, false positive rate, false negative rate, negative predictive rate, false discovery rate, precision, recall, and f1-score.

94 Transparent Price Forecasting for Basic Food commodities in a Developing Economy Reagan Waliggo Bbale, David Ssembatya, Muhammad Kasasa, Santos Isadru, Ggaliwango Marvin Makerere University ggaliwango.marvin@mak.ac.ug



SoCTA2023 [ABSTRACTS]



Price fluctuations have been on a rise especially for the basic food commodities in developing economies like Uganda and are attributed to many causes. The use of machine learning algorithms was used to forecast the future prices in order to address the issue of price fluctuation. Several machine learning models were employed to implement the price forecasting model, including linear regression, KNN regression, support vector machine, XGBoost, light GBM, Random Forest regressor, and CatBoost regressor. The accuracy of each model was evaluated to determine the most precise and reliable one, which would be utilized for predictions. The models were further fine tuned to improve their accuracy and using hyper parameter tuning such as grid search. To enhance the explainability and interpretability of the models, Explainable Artificial Intelligence (XAI) techniques were employed. Specifically, LIME and SHAP were utilized to explain the decision-making process of the black box machine learning algorithms. Furthermore, the models were evaluated using evaluation metrics such as mean absolute error, mean squared error, root mean squared error and r-squared score upon which we selected the best price food forecasting model. According to the results, the XGboost outperformed all the other models in terms of performance and was selected to be deployed into the web application

95 Paddy Leaf disease Prediction using Parallel Deep-CNN Dr.G. Gangadevi, Dr.S. Rajaratna,Dr.J.jospinjey, Mrs. M.Priya SRM INSTITUTE OF SCIENCE AND TECHNOLOGY,RAMAPURAM ,DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, VELAMMAL ENGINEERING COLLEGE gangadeg@srmist.edu.in

Agriculture is one of the major sources for gross regional product among the developing nations. The nature and amount of crop cultivated along with its yield in each region varies with soil and climate. Additionally, the crop yield is affected due to the event of disease. Paddy is one of the chief food crops cultivated in numerous parts and it succumbs to several diseases. The framers often find it hard to predict the nature of disease over the paddy crop. For supporting the farmer, a novel Parallel Deep Convolution Aggregation Neural Network (P-DCNN) classifier is proposed to predict and localize the disease in paddy crop using raw images. The novel parallel classifier which has hybrid tanh and sigmoid function is developed for the proposed work. The input images are considered for processing is given into equally divided and sent to two smaller networks works independent to each other simultaneously and then outcome is merged into a final output layer. Parallelization reduces the computational time for processing the images through the network. The performance of the proposed framework is evaluated on various performance metrics.

104 Convolutional-LSTM Network for Emotion Recognition using EEG data in Valence-Arousal dimension

Divya Garg, Gyanendra Kumar Verma, Awadhesh Kumar Singh 1,3 Department of Computer Engineering, NIT Kurukshetra, Harayana, INDIA; 2 Department of Information Technology, NIT Raipur, Chhattisgarh, INDIA divya29garg@gmail.com

The detection of emotions using automatic electroencephalogram (EEG) analysis is a significant challenge within human-computer interaction. This study aims to present a hybrid model that considers the frequency and time characteristics of multimodal EEG data to facilitate emotion recognition. Most conventional



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methods for identifying emotions rely on analyzing the frequency characteristics of EEG data. Spatial qualities are advantageous as they encompass data about a person's affective state. This study analyzes EEG signals and utilizes deep neural networks for feature learning and end-to-end categorization. To begin with, the initial step involves converting one-dimensional raw EEG signals into a Scalogram using Continuous Wavelet Transform (CWT). The Scalogram is an input for the Convolutional-LSTM framework, which extracts features and classifies affective states. This framework operates on multiple-channel EEG data, considering temporal and spectral information. To evaluate the effectiveness of our proposed model, we conducted experiments using the DEAP dataset, a well-established benchmark dataset for emotion recognition. The experimental results demonstrated that the suggested model attained classification accuracies of 57.47% and 60.17% for valence and arousal, respectively. The proposed methodology suggests that the Scalogram technique efficiently determines an individual's emotional states based on EEG signals.

108 Analysis of Multiply Accumulate (MAC) Unit Using Convolution Neural Networks (CNN) Mihiraamsh B S, Anita J P Department of Electronics and Communication Engineering,

Amrita School of Engineering, Coimbatore, Amrita Vishwa Vidyapeetham, India. jp_anita@cb.amrita.edu

In Digital Signal Processing (DSP) applications, the multiplicative accumulator (MAC) process serves as the primary cognitive kernel. The MAC unit, which is constantly on the critical route, determines the overall system speed. A high-speed MAC is a crucial step for real-time DSP applications. A system that requires the least amount of electricity will almost probably dominate the worldwide market because of the ongoing need for small, portable devices. As a result, the development of a MAC unit with low power consumption is essential. Scientists have made several attempts to develop MAC architecture with great computation efficiency and minimal power utilization. Convolutional neural networks (CNNs) are highly effective for image, voice, and video processing but they require a lot of processing power and memory bandwidth. To solve this, hardware accelerators with plenty of multiply-accumulate (MAC) units have been proposed. However, these units increase integrated circuit (IC) gate count and power consumption due to their large multipliers. Weight-sharing accelerators com- press trained CNN weight values into bins, reducing gate count and power consumption. The parallel accumulator with hybrid adder structure presented in the model is modified to use an alternative technique that involves changing the MAC units to add up each weightâ€[™]s frequency and grouping the results into bins. The actual value accumulation takes place during the working multiplication phase, which considerably reduces the CNN's gate count and power consumption. The proposed approach leverages the advantages of Wallace tree-based arithmetic units and hybridizes them with other efficient hardware structures, resulting in a highly optimized architecture for CNN layers. By carefully balancing resource utilization and performance, this approach enables the acceleration of CNN layer computations while efficiently utilizing FPGA resources. Experimental results demonstrate that the Hybrid Wallace Tree Approach achieves significant improvements in speed and resource efficiency compared to traditional FPGA-based CNN implementations, making it a promising solution for the deployment of CNNs in resource-constrained environments, such as edge devices and embedded systems.

110 Implementing reinforcement learning for tackling smart grid pricing problem





Anshul Agarwal (VNIT Nagpur)*

In the smart grid system, dynamic pricing can be an effective instrument for the service provider. In practice, however, the paucity of information regarding customers' time-varying load demand and energy consumption patterns, as well as the volatility of wholesale electricity prices, make the implementation of dynamic pricing extremely difficult. In this paper, we examine a dynamic pricing problem in the smart grid system where the retail electricity price is determined by the service provider. To surmount the obstacles associated with implementing dynamic pricing, we devise an algorithm for reinforcement learning. The main challenge tackled by this paper is obtaining a pragmatic solution for satisfying the conflicting criteria -- high profit of power utilities and low energy cost for consumers. Results from numerical simulations indicate that the proposed reinforcement learning algorithm can function effectively without prior knowledge of the system dynamics. During peak hours, the service provider profit was as high as approximately 6297 units -- which is an impressive gain.

111 Water Management of Canal Command Area of Upper Ganga Canal using Teaching Learning Based Optimization Algorithm

Devaki Nandan Sharma (GB Pant University of Agriculture & Technology, Pantnagar)*; Vinod - Tare (IIT Kanpur); Vishal Kapoor (IIT Kanpur); Rajeev Suman (GB Pant University of Agriculture & Technology, Pantnagar)

One of the oldest irrigation canal systems in India commissioned as far back as 1854-55 on mighty Ganga River is Upper Ganga Canal (UGC). The command area spreads into the districts of Uttar Pradesh and Uttarakhand and irrigates nearly 9,000 km² of fertile agricultural land. The existing cropping pattern may not utilize the available resources due to poor economic efficiency that result in less water discharge in main stream of river Ganga. Therefore, an attempt has been made to optimize the net benefits under existing land and water resources using an evolutionary algorithm Teaching Learning Based Optimization (TLBO) method. It was revealed through the results that under the optimal cropping pattern, 1.2 % increment is obtained in net profit with 7.3 % reduction in water consumption.

112 Deep Learning Based Algorithmic Trading Based on News and Events Strategies Kayathri V¹, P.Prabakaran²,

Department of Computer Applications, School of Computing Sciences, Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai 600 117

Successful stock market investors should consider these trends. This article defines price effect, optimal execution, and placement through the lens of algorithmic trading and strategies based on news and events. By using feed-backs controlled to include consideration of a stop-loss order, algorithmic trading allows traders and investors at large to liquidate or construct big secu-rities positions in a fully automated manner, thus generalising the existing stock trading results. Trading decisions made by the AI agent could affect the asset price. We see this as a marketplace where people are bartering and swapping goods. Creating a new market is the driving force behind our re-search into generative models. This news sentiment does a good job of de-scribing stocks, and AI systems that read the news and quantify them react to factors that affect prices far more quickly than humans do. All three of the stock market's underpinnings – price, volume, and volatility – respond strong-ly to news events. Sentiment analysis is a method for gauging the overall tone of a news piece and classifying it as optimistic, pessimistic, or neutral. The simulation is conducted in python to test the effectiveness of the model in trading in an automated manner for stocks. The results show that the pro-posed sentimental analysis for stock trading achieves higher rate of accuracy and precision than the other methods.




117 Pothole detection and prediction using deep learning with Convnet and YOLOv8 Dinesh Swami and Dr. Mahesh Jangid Manipal University Jaipur

Potholes cause great danger in driving and to the lives of passengers. Therefore, it is essential for the accurate prediction and detection of potholes and it also saves the lives of many people. Pothole objects are difficult to accurately detect due to their regular shape in challenging, and dynamic road environments. This research study aims to improve the accuracy of detecting and predicting potholes using deep learning methods (such as Convnet and YOLO). The deep learning method is verified as effective and efficient in object detection. The results ratify that the proposed models have the feasibility to detect pothole occurrence.

119 Window Function Dependency on Male and Female Speech Signals for Pitch Extraction at Low SNRs

Md. Saifur Rahman, Miss. Nargis Parvin, Moinur Rahman Department of Information and Communication Technology, Comilla University, Bangladesh.; Department of CSE, Bangladesh Army International University of Science and Technology, Cumilla Cantonment, Bangladesh.; Department of Information and Communication Technology, Comilla University, Bangladesh. saifurice@cou.ac.bd

This research suggests an efficient idea that is better suited for speech processing applications for retrieving the accurate pitch from speech signals in noisy conditions. Almost every pitch detection method has windowing as a significant part of segmentation. This research considers using Hanning, Hamming, and Rectangular window function on male and female speech signals separately for pitch extraction. Also, analyze the windowing effect on the speech signal analytically to understand which window function is more suitable and effective for male and female speech signals specifically. For the validation of our idea, we have utilized the conventional autocorrelation function, cepstrum method and state of-the-art method BaNa. This study puts out a potent idea that will work better for speech processing applications in noisy speech. From experimental results, the proposed idea represents which window function is more appropriate for male and female speech signals in noisy context of speech.

122 Improvised Optical Flow Techniques to Track Vehicle Movements in a Drone Video â€" Hybrid Approach combining Lucas-Kanade and Horn-Schunck Methods

Vishal Nagpal, Manoj Devare Amity University, Mumbai vishal.nagpal@gmail.com

This paper focuses on the crucial task of accurately tracking vehicle movements in drone videos for applications such as traffic monitoring and surveillance. Optical flow techniques have shown promise in





estimating motion between consecutive frames. In this study, a hybrid approach is adapted that combines the strengths of the Lucas-Kanade method and the Horn-Schunck method to achieve precise tracking of short vehicle movements in drone video frames. Proposed approach aims to improve the precision and efficiency of vehicle motion estimation, thereby contributing to the advancement of computer vision-based vehicle speed estimation in aerial videos. To achieve this, Lucas-Kanade algorithm is being used in two iterations for sparse key points. In between these iterations, Horn-Schunck technique is being employed for intense optical flow estimation. By leverag-ing modified optical flow technique in proposed novel sandwiched arrangement, the challenges in accurately capturing small vehicle movements is being addressed which is vital for robust vehicle speed estimation, providing improvised results. A detailed analysis showcases the effectiveness of this approach in achieving more reliable mo-tion estimation and precise vehicle speed calculations. This research offers valuable insights into the integration of optical flow techniques for optimizing vehicle motion estimation in drone videos, opening new possibilities for applications in Traffic mon-itoring and aerial surveillance.

124 Generation of Negative and Positive Association Rules Using Modified Algorithm Sanat Jain, Garima Jain, Ajay Kumar Phulre, Jitendra Pratap Singh Mathur, Harshlata Vishwakarma, Vijendra Singh Bramhe

VIT Bhopal University sanatjain@vitbhopal.ac.in

The primary objective of this work is the optimization of association rules by modified genetic algorithm for better rule prediction. The proposed algorithm is an extension to genetic algorithm which provides modified genetic algorithm based optimizer. Modified genetic algorithm is applied to find out optimal rules that use common genetic algorithm operators to find a population of solutions, based on the fitness function value. The Modified genetic algorithm based optimizer selects the most useful set of rules with comparatively less number of iteration required for standard genetic algorithm. This improved technique efficiently discovers all correct association rules, removing a major bottleneck from earlier mining approaches. These optimized rules produce effective results in making any decision in support system. This work also introduces the basics of rule generation in data mining.

126 A Cutting Edge Algorithm for Interval-Valued Intuitionistic Fuzzy Decision Making Based on Mean, Variance of Alternative Score Matrices and A New Score Function Sandeep Kumar, Reshu Tyagi Ch. Charan Singh University, Campus, Meerut, Uttar Pradesh (India) reshutyagi2219@gmail.com

The interval-valued intuitionistic fuzzy (IVIF) set (IVIFS) is a powerful and valuable medium for expressing decision makers (DMs) thoughts and handling imprecise information. The present research is mainly partitioned into two portions in order to create a better decision making pattern. Initially, a generalised score





function(GSF) for IVIF values(IVIFVs) is created and its quality features are covered. This GSF is not only easy to apply but also conquers the weakness of the past score functions. Thereafter, in the IVIF context, the solution steps for a new algorithm have been built up for the multiple attribute decision making (MADM) problems. In it, the attribute weights and values, given by the DM are conveyed in the form of IVIFVs. On the basis of mean and variance of each alternative, a standard value is calculated for the final ranking of alternatives. The best alternative comes out corresponding to a larger standard value. Various numerical examples and comparisons with existing methods are also given to show the validity, applicability and superiority of the present research.

132 Apple Scab Detection using Transfer Learning and Deep Convolutional Network Anupam Singh, Arjav Jain, Arvan Batra

1 Department of Computer Science and Engineering, Graphic Era Hill University, Dehradun, Uttarakhand, India. 2,3 Informatics Cluster, School of Computer Science, University of Petroleum & Energy Stud-ies, Dehradun- 248007. Uttarakhand, India anupam2007@gmail.com

Every year, diseases and pests inflict enormous economic losses on the apple industry. One of the significant challenges faced by the farmers is the identification of the various diseases, as the signs and symptoms of several illnesses could be very similar and be present simultaneously. Through this proposed work, We make an effort to offer accurate and timely detection of one such apple disease, i.e. apple scab, a fungal disease. The main reason for choosing apple scab and apple leaves scab detection as our work is due to the lack of research on the topic, and we wanted to take this opportunity to do something meaningful and help the agriculture industry in India. The first part of the work was data preprocessing and labeling. The datasets containing photographs of patch-affected apples and leaves of an apple tree are collected, however, there are hardly any public datasets that contain enough images for us to use and train our models with be-cause the acquisition of these images is extremely time-consuming and has a component of probability; therefore we decided that Transfer Learning (TF) would be an a suitable training approach. Training deep neural networks from scratch on a small dataset can take a long time and may not converge to a good solution due to overfitting. Transfer learning allowed us to start with a pre-trained model and fine-tune it on your specific task. This significantly reduced the train-ing time and resource requirements. The Convolutional Neural Network (CNN) on the collected dataset is the model used to categorize apples. End-to-end learning algorithms known as CNN automatically extract characteristics from raw photos and learn complex features from them. To avoid our model overfitting, we would use data augmentation techniques like rotation, translation, and scaling. An experimental result demonstrates that using the proposed structure of CNN and transfer learning, the results are comparatively better than the pre-trained deep learning models.

134 Cloud Eye: A Tool to Secure Text, Images and Audios using Steganography

Vijay Prakash, Venu Aggarwal, Rajesh Yadav, Lalit Garg, Pardeep Singh

1 School of Computer Science, University of Petroleum and Energy Studies, Dehradun, India [vijaysoni200, venu.agarwal102, rajeshkyadav995]@gmail.com 2 Department of Computer Information Systems, University of Malta, Msida, Malta (lalit.garg@um.edu.mt) 3 Department of Computer Science & Engineering, Graphic Era Hill University, Dehradun, India (pardeep.maan@gmail.com) vijaysoni200@gmail.com





With the increasing need for secure communication and storage of sensitive data in various formats like text, audio, and images, there is a growing concern for protecting this information from unauthorized access or data breaches. Although encryption techniques are widely used for secure data transmission, they may not be sufficient for hiding data in plain sight. The proposed approach addresses the challenge of securing sensitive data in text, audio, and image formats by implementing robust steganography and encryption techniques while ensuring seam-less data storage and data monitoring in cloud storage platforms like Amazon S3. The proposed approach utilizes the Least Significant Bit (LSB) steganography method, where the least significant bit of each pixel or sample in the media is re-placed with a bit of the personal data, ensuring minimal visual or audible changes. The proposed approach will be designed to embed secret messages into carrier data using steganography algorithms and encrypt the resulting data using a symmetric key. The encrypted data will be stored in an Amazon S3 bucket for secure storage, and the entire bucket will be monitored using Dynatrace for performance and security analysis. The proposed approach could reduce the response time from 5 seconds to 2 seconds and increase the throughput from 100 requests per second to 500 requests per second.

137 A Green Inventory Model for New and Revamped Decaying Products with Partially Backlogged and Stock Dependent Demand

Varuna Bhardwaj , Sunil Kumar and Vipin Kumar Tyagi SBAS, Shobhit Institute of Engineering and Technology (Deemed to-be University), Meerut, U.P., India, Department of Mathematics, Chandigarh University, Mohali, Punjab India ,SBAS, Shobhit Institute of Engineering and Technology (Deemed to-be University), Meerut, U.P., India, varuna.01983@gmail.com

In response to increasing awareness of the need to maintain a healthy environment, supply chain sustainability has become a major topic of discussion in recent years. It focuses on green practices in order to minimize environmental degradation and increase its economic and operational performance. Its primary goal is to integrate environmental issues such as carbon emissions. For a single item that degrades naturally, this study suggests a three-tier green supply model of inventory, including demand based on stock, shortages (permitted at the retailer's end), and carbon emissions. Integrated cost minimization and critical time optimization are achieved with this work. New items are delivered by the producer and moved to the retailer. Remanufacturing a product is a green practice. Defective items are returned once again to the producer by retailers for remanufacturing. For the purpose of analyzing how inventory parameters affect decision-making, a sensitivity analysis is presented. The model's validity is confirmed by using numerical illustrations, and convexity is shown graphically.

138 A Machine Learning based approach to Assess and Predict Drought Events: A case of Rajasthan, India

Tuba Firdaus, Satheesh Abimannan, S. Sangita Mishra, Preeti Gupta 1,2,3 Amity School of Engineering and Technology, Amity University Maharashtra, Mumbai4 School of Technology Management and Engineering, Narsee Monjee Institute of Man-agement Studies, Navi Mumbai tubafirdaus@gmail.com





The work focuses on understanding and analyzing drought events in the re-gion of Rajasthan, India, using drought indices and machine learning mod-els. The Standard Precipitation Index (SPI) and Standardized Precipitation and Evapotranspiration Index (SPEI) are calculated to assess drought severi-ty, duration, and intensity. The study area includes two stations, Jodhpur and Banswara, with different climatic characteristics. Various hydro-climatic factors such as precipitation, temperature, humidity, and solar radiation are considered to analyze their correlation with drought indices. The machine learning models, Long Short Term Memory (LSTM) networks, and Random Forest (RF), are employed for drought prediction. The results indicate that LSTM performs better than RF in short-term predictions, with lower Root Mean Square Error (RMSE) values. The study provides valuable insights into drought monitoring, characteristics, and prediction, contributing to effective drought mitigation strategies in the region.

145 Ensemble Models for Vulnerability Prediction using Code Metrics Purushottam Tiwari, Zope Sumedh Murlidhar, Amrita Chaturvedi, Shashank Kumar Singh Department of Computer Science and Engineering, Indian Institute of Technology BHU, Varanasi amrita.cse@iitbhu.ac.in

Software vulnerabilities are glitches or flaws that can be exploited by attackers to gain unauthorized control over systems. As such attacks can cause disastrous incidents related to information security, it becomes important to detect these vulnerabilities in code as early as possible. There have been multiple efforts towards building Vulnerability Prediction Models (VPMs) using static string analysis and text mining in early 2000s. Those analysis tools were mostly some glorified forms of the famous regex tool, grep. In this paper we present a novel ensemble-based classification architecture that uses a stacking of advanced probabilistic machine learning classifiers to predict software vulnerabilities at project level granularity. We have used static software metrics as features along with feature selection and have achieved a much higher accuracy and precision scores than existing State-of-the-Art works that use ensemble models for vulnerability prediction. Unfortunately, there was no suitable large scale code metrics dataset present for C/C++ to the best of our knowledge. So, as part of this study, we have also created a large software metric dataset from projects and vulnerability testcases available on Software Assurance Reference Dataset (SARD) and made it publicly available for further research.

146 Echo State Networks for Cryptography: A Novel Framework for Key Generation and Secure Communication

Aviral Srivastava, Priyansh Sanghavi, Viral Parmar, Kartik khurana Pennsylvania State University, Pandit Deendayal Petroleum University, Pennsylvania State University, Pandit Deendayal Petroleum University aks7873@psu.edu

This study presents a pioneering, theoretical approach to cryptography, introducing Echo State Networks (ESNs) into cryptographic processes. The paper delves into the potential application of ESNs' non-linear dynamic behavior in key generation, encryption, and decryption. We emphasize the inherent high-dimensional nonlinear mapping and long-term memory attributes of ESNs, underscoring their aptness for cryptographic applications. The development of this novel cryptographic framework capitalizes on the



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randomized and non-linear nature of ESNs, promising robust resistance to crypto-analytical attacks. Proposing a transformative shift in cryptographic techniques, this conceptual exploration has far-reaching implications for the evolution of theoretical cryptography and practical security within the expanding cyberspace.

147 Exploration of Coarse-Graining and Threshold Selection of Lempel-Ziv Complexity on Vibroarthrographic Signals

Rameesa Mol J, Jessy John Department of Electronics and Biomedical Engineering, Govt. Model Engineering College, Kochi, APJ Abdul Kalam Technological University, Thiruvananthapuram rameesazulu@gmail.com

Lempel-Ziv Complexity (LZC) is extensively used for measuring the non-stationary nature of bio signals like Electrocardiogram (ECG), Electroen-cephalogram (EEG), Electromyogram (EMG) etc. But LZC is not yet used for analyzing Vibroarthrography (VAG) signals. We study the perfor-mance of LZC as compared to other nonstationary measures used in lit-erature like Fractal Dimension, Approximate entropy and observed that LZC offer superior performance. The separability among the classes of-fered by LZC depends on the selection of threshold used in coarse-graining technique. There are no clear guidelines regarding the selection of threshold for coarse-graining in VAG signals. We compare the ampli-tude-based and gradient-based coarse-graining techniques and mean and median thresholds in amplitude-based coarse-graining in terms of the abil-ity of LZC measure to distinguish normal and abnormal VAG signals. We also study the effect of the selection of threshold in amplitude-based coarse-graining. We observed that mean-based coarsegraining techniques offer Bhattacharya distance = 0.1609, Relative Entropy = 1.6835 and p-value = .0027 using Wilcoxon rank-sum test between the normal and ab-normal VAG signals. Mean-based coarse-graining techniques provide slightly higher class separability as compared to median-based coarse-graining. The distance measures and p-values indicate that gradient-based coarse-graining is not suitable for the screening of VAG signals.

148 Image Super Resolution using Extensive Residual Net-work (ERN) for Orange fruit disease detection

P.V.Yeswanth, Srikanth KMNV, Chegrik Cherian B Marak, Kunal Vijay Thool, S.Deivalakshmi National Institute of Technology Tiruchirappalli pvy100@gmail.com

Oranges hold global significance in trade and consumption. Diseases like citrus greening threaten orange crops. Timely disease identification ensures crop health and productivity. Fast and accurate results aid farmers in controlling diseases and ensuring healthy crops. This paper proposes the Extensive Residual Network (ERN) model for generating high-resolution images and identifying diseases from low-resolution orange fruit images. The ERN model achieves significant results on the orange fruit greening disease dataset, obtaining high PSNR values 31.98, 32.785, and 34.853, SSIM values 0.8164, 0.9057, and 0.9164, and classification accuracies 99.24%, 98.71%, and 97.46% for super resolution factors of 2, 4, and 6 respectively.





150 A Powerful High-Order B-Spline Galerkin Technique for Numerical Solutions of Advection-Diffusion aigbal@pmu.edu.sa

The present paper proposes a novel numerical approach for solving the advection-diffusion equation using Quintic B-spline functions combined with the Galerkin finite element method. The advection-diffusion equation is a fundamental partial differential equation that is used in a variety of scientific and engineering domains, including fluid dynamics, heat transfer, and environmental modeling. The finite difference scheme is applied for time derivative and Crank-Nicolson scheme is used for space parameters. The proposed approach, which is found to be accurate and effective, is validated with two numerical problems. The numerical results indicate that the present scheme performs well and correctly with the higher order Bspline functions. To see the performance of the method, the error norms Lâ^ž and L2 are measured."

151 Some Explicit Formulas for Changhee–Genocchi Polynomials and Numbers wkhan1@pmu.edu.sa

In this work, we consider the Changhee-Genocchi polynomials utilizing the exponential function and logarithm function. Then, we analyze some summation and addition formulas for these polynomials. In addition, we de-rive some correlations with Stirling numbers of both kinds and Euler-Genocchi polynomials. Furthermore, we provide diverse relations for Changhee-Genocchi polynomials.

152 Numerical Simulations of Third-Order Singularly Perturbed Boundary Value Problems
 Azhar Iqbal, Tayyaba Akram ,Waseem Ahmad Khan, Ajmal Ali

 1Mathematics and Natural Sciences, Prince Mohammad Bin Fahd University, 31952 Al Khobar, Kingdom of Saudi Arabia.
 2Department of Mathematics, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia. 3Department of Mathematics, Virtual University of Pakistan, Lahore 54000, Pakistan

 aiqbal@pmu.edu.sa

This paper introduces a quartic trigonometric B-spline (QTBS) for the purpose of producing numerical solutions for a third-order singularly perturbed boundary value problem (SpBvp) characterized by the presence of a minuscule parameter multiplying the highest-order derivative. The QTBS basis function, denoted as Ti(x), is applied at various nodal points. This approach is employed subsequent to the modification of the problem at the singularity point through the utilization of the Lâ \in ^MHospital rule. Resulting system of equations is solved by Mathematica to get the solution. These present numerical results are compared with the numerical results that exist in the literature like the method presented by H. K. Mishra [20]. This demonstrates that the approximate solutions produced by the numerical algorithm developed using the QTBS are better than the regular quartic B-spline (QBS).





153 A Study On -Analogue Type of Degenerate Daehee Polynomials and Numbers wkhan1@pmu.edu.sa

In this paper, we construct the -analogue type of degenerate Daehee numbers and polynomials and establish some properties of these polynomials and also we dene -analogue type of higher-order degenerate Daehee numbers and polynomials and investigate some properties of these numbers and polynomials. Also, we give some new identities and relations between the degenerate Dae-hee polynomials, degenerate Bernoulli polynomials, and the degenerate Stirling numbers of the rst and second kinds.

155 Water Quality Prediction using Machine Learning Chitkara University, UPES, Graphics Era errajeev.tiwari@gmail.com

Over 70% of the ground surface is below water, which is one of the ultimate detracting possessions for claiming existence. Increasing industrialization and urbanization have led to a disturbing rate of water character depravity that has resulted in bad ailments. Traditional procedures for judging water status involved valuable and behind mathematical and workshop tests, making the plan of real-opportunity listening trivial contemporary. There must be an active, more practical resolution by way of the urgent belongings of distressing water quality. In order to estimate the water status, this research investigates any of directed machine intelligence methods. This study investigates the performance of machine intelligence algorithms to determine the kind of water. The algorithms used to do so involve of Logistic Regression, Decision Tree, Random Forest, KNN, SVM, Adaboost, BAGGING, and Perceptron. To evolve these algorithms different types of kernels and transfers were captured in the report. The effect of the model was accompanying SVM showing the capital veracity accompanying veracity score of 0.7012 trailed by the Perceptron and BAGGING accompanying veracity score of 0.6753 and 0.6595 individually. The slightest acting showed by LOGISTIC REGRESSION treasure accompanying veracity score of 0.6051. In order to prove the being of its request in evident-occasion water character discovery systems, the submitted method achieves acceptable veracity accompanying a limited number of limits.

157 Single Smart Card for Identity and Authentication UsingData Analytics

Sachin Sawant, Siddhant Ghodke, Dnyaneshwari Ghuge, Kanishka Ghodake, Aditya Ghuge, Darshan Ghuge Vishwakarma Institute of Technology, Pune, Maharashtra, India shivam.ghodake22@vit.edu

Efficient and secure authentication, where time is of the essence, is crucially important for the modern world. The increasing number of cards in various domains has led to inconvenience and clutter to users. This research paper presents a promising solution for the same that reimagines the way these cards are managed with the introduction of the concept of ""Authentified Smart Card"", which consolidates multiple cards into a single card using QR codes. This eliminates the need for carrying multiple cards and comes up with unparalleled convenience, a carry-with-ease element, an accessibility factor, and a reduction in cognitive burden. The system here leverages data analytics to make informed decisions in a targeted manner. This strategic approach minimizes disruptions, optimizes operational efficiency, and also enhances the overall user experience through targeted innovation. By adopting a password-protected website, it emphasizes preventing unauthorized access and safeguarding user privacy. Potential benefits, challenges,





and use cases are discussed, providing strategies to address compatibility issues and ensure the user experience. Authentified smart cards offer a streamlined and organized card management solution that sets a new benchmark for hassle-free authentication in diverse domains, allowing continuous improvement and ensuring that the system remains efficient, relevant, and adaptable to changing user needs and technological advancements.

158 Strategic Utilization of ChatGPT in Teaching and Learning Nakayiza Hellen, Ggaliwango Marvin, Joseph Kibombo Balikuddembe, and Fiona P. Tulinayo Muni University, Makerere University ggaliwango.marvin@mak.ac.ug

ChatGPT is an advanced language model developed by OpenAI with great promise in revolutionizing education, teaching, and learning processes. Its capabilities as a virtual tutor and teaching assistant fosters personalized and inclusive learning environments. By leveraging the power of NLP, ChatGPT can transform skills training in a more accessible and effective way for learners. This chapter provides an in-depth understanding of ChatGPT's ar-chitecture, workings, and its specific applications in the education sector. It particularly provides insight into proper utilization of ChatGPT for teaching and learning, its risks, opportunities and challenges. It provides a research and practical strategic direction on applications of ChatGPT for teaching and learning most especially for developing economies like Uganda.

164 Particle Based Swarm Fuzzy Optimization Approach in Vague Measurement of the Distance in Transportation Problems

Tarun Kumar, M.K. Sharma Chaudhary Charan Singh University, Meerut tkvats3@gmail.com

This paper addresses the vague measure of distance for transportation problems to improve both time and cost factors. By minimizing the distance between the source and destination points, overall efficiency can significantly be enhanced. This study aims to achieve distance reduction through the utilization of particle swarm fuzzy optimization (FPSO) with the combinations of fuzzy logic techniques. The paper examines the different scenarios to demonstrate the effectiveness of PSO and fuzzy PSO. First, PSO is used to reduce the distance between the source and the conveyances with constant distance. Second, when the conveyance is in motion, PSO is utilized to find the most efficient route and minimize the overall distance travelled. Lastly, in situations involving uncertainty, fuzzy PSO is applied to handle unpredictable variables and optimize the transportation vague distances accordingly. To illustrate the proposed methodology, the study implements the effectiveness of the fuzzy PSO-based approach in minimizing transportation distances and improving overall transportation efficiency. The discussions in this paper provide valuable in-sights into the application of PSO and fuzzy logic in transportation optimization.

165 Design and Implementation of Network Coverage Area in WSN Using Swarm Optimization Technique

S.Kannadhasan, P.Palaniyammal, N.Kavitha, Duddukuru China Ramanamma, G.Priya





Study World College of Engineering, Hindusthan College of Engineering and Technology kannadhasan.ece@gmail.com

In this paper, the concept of wireless sensor network optimisation methodologies is covered. A wireless sensor network consists of several sensor nodes, each of which collects data from the environment it is sensing and sends it to the base station. Wireless sensor networks use optimisation techniques to lower overall energy consumption and deal with routing difficulties. A Wireless Sensor Network (WSN) is made up of a number of small embedded devices called sensors and uses wireless ad hoc communication to exchange data. By carefully choosing their location within a physical medium and interacting with it, they may monitor environmental physical properties and transmit sensed data. Recent advancements in sensing, processing, and communication technology, as well as the need to continuously monitor physical occurrences, led to the development of Wireless Sensor Networks (WSNs). To extend the life of networks and reduce energy use, several optimisation strategies have been proposed. The article gives a general overview of the types of swarm intelligence (SI)-based algorithms that have been most successful in addressing energy-based lifespan optimisation issues."

168 Divergence Models in Fuzzy Environment and Their Solicitations for the Development of Fuzzy Information Improvement Models

Vikramjeet Singh, Om Parkash, Butta Singh, Manjit Singh

1Department of Mathematics, I. K. Gujral Punjab Technical University, Amritsar Campus, India. vikram31782@gmail.com 2Department of Mathematics, Graphic Era Deemed to be University, Dehradun, Uttrakhand, India. omparkash777@yahoo.co.in 3,4Department of Engineering and Technology, Guru Nanak Dev University, Regional Campus Jalandhar, India bsl.khanna@gmail.com

The literature of information theory is self-possessed with various information theoretic models including entropy, directed divergence, inaccuracy and information improvement models in probabilistic as well as fuzzy environment. Each of these models is incredibly imperative from application point of view and participate a vital accountability towards optimization problems in possibility as well as fuzzy spaces. Here, we have advocated a new-fangled discrete divergence model and certain original information improvement models in fuzzy environments and studied their wide-ranging possessions for ascertaining their acceptability.

169 ViT-ALZ: Vision Transformer with Deep Neural Network for Alzheimer's Disease Detection Hemant Kumar, Rashi Agarwal(1) Department of Information Technology, School of Engineering and Technology, Chhatrapati Shahu Ji Maharaj University; (2) Department of Computer Science and engineering, Harcourt Butler Technical University, Kanpur hemantime@gmail.com

This study introduces the ViT-ALZ framework, which combines Vision Transformer (ViT) and deep neural networks (DNN) to accurately detect Alzheimerâ€[™]s disease (AD) using MRI scans. Our approach involves resizing images and applying augmentation techniques for dataset enhancement. The ViT-ALZ model integrates a ViT-based architecture that captures planar features from axial slices and utilizes weighted





fusions to emphasize important visual token characteristics. DNN further enhance feature processing, leading to precise AD classification. Experimental results showcase significant performance metrics: accuracy, sensitivity, specificity, precision, F1-score, and Kappa values are 97.65%, 97.85%, 97.92%, 96.86%, 97.65%, and 95.19%, respectively, on the Kaggle AD dataset. This research underscores the value of deep learning and MRI images in effectively classifying AD, highlighting their potential for early diagnosis and care.

172 Edge-ward computational offloading for Smart Waste Management System Rajani Singh (GL Bajaj Institute of Technology Greater Noida)*; Deepti Mehrotra (Amity University Noida); Dev Raj Mishra (ICAR-IIPR, Kanpur)

Rapid urbanization and population growth have escalated waste generation concerns, impacting health and the environment. Advanced technologies are crucial for automated waste collection, fostering cleaner, sustainable environments and well-being. Initially, based on the cloud, the waste management system connected smart bins via an intermediary proxy, with action triggered by alerts or waste thresholds. However, network congestion caused delays and high bandwidth use.To overcome this, "Edge-word computational offloading" was introduced, integrating Fog/Edge computation devices into the system. Urban areas were divided into wards, each with Wi-Fi Fog servers connecting to smart bins and linked to the cloud through a proxy. To validate the effectiveness of this approach, simulations, and experiments were carried out using the iFogSim simulator.

173 AMPpred-CNN: Prediction of antimicrobial peptide by using 1D convolution neural network and Composition/Transition/Distribution (CTD) encoding Uddalak Mitra, Amit Kumar Singh

uddalakmitra@gmail.com

Antimicrobial resistance has become a global health crisis due to antibiotic misuse. Antimicrobial peptides (AMPs) show promise with broad pathogenic activity. However, experimental AMP discovery is expensive, and computational methods face challenges with data availability and resistance patterns. We introduce a method AmpPred-CNN based on 1D convolutional neural network and peptide encoding for their computational identification. Validated on a diverse dataset of 3268 AMPs and 1,66,791 non-AMPs, our model achieved impressive accuracy of 96%. Comparative evaluations confirmed its superiority. Notably, even with just the top 10 features, an accuracy of 94% is obtained. Additionally, AMP's antimicrobial activities were found independent of sequence length. These findings underscore the significant improvement in AMP prediction accuracy through effective peptide encoding techniques and diverse training datasets, offering hope in combating antimicrobial resistance.

174 A hybrid system for detection of Stress using human emotions through voice Vikas Mittal (Chandigarh University)*

The art of detecting human emotions through voice has been here for quite some time now, but the last decade has shown a tremendous rise in different kinds of computer-based, automated assessment techniques. This paper describes non-invasive, robust, and simple emotion detection and classification architecture based on machine learning techniques. The work present in this paper investigates the use of three types of machine learning model. The authors have been described an approach for emotion classification to detect stress. In the described approach, the emotion dataset has been classified with two





different classifiers based on acoustic features. To improve performance of classifying algorithms Principal Component Analysis (PCA) has been used. PCA was used for features selection. We used two different classifiers including the k-NN (nearest neighbour, kNN) and Support vector machine (SVM) for the classification. The described methodology could be used for human emotion classification. As the first classifier, we have used the support vector machine classifier (SVM). The classification accuracy of 86.7% has been attained with complete dataset using SVM classifier. The average accuracy achieved 88.6 % for classification with combination of first approach and SVM classifier has been obtained. The average accuracy has been achieved 89.2 % with second approach and SVM classifier with PCA. The second classifier, we have used the k-NN classifier and has been obtained 85 % classification. The average accuracy has achieved 90.1 % for classification with first approach and k-NN classifier with PCA. The authors second strategy, which combines k-NN and PCA to classify stressed voice, has been recommended the best accuracy at 90.7%.

181 Quasi-opposition based whale optimization applied to Multilevel Image thresholding Falguni Chakraborty , Tushnik Sarkar, Provas Kumar Roy, Debasis Guha Dr. B. C Roy Engineering College, Durgapur, West Bengal, India,Kalyani Government Engineering College, Kalyani, West Bengal, India falguni.durgapur@gmail.com

Due to the incorrect proportions between the exploitation & exploration phases, the Whale Optimization Algorithm (WOA) gets stuck into the local optima, which causes premature convergence. To address this issue, Quasi-oppositional-based learning is imposed with a whale optimization algorithm called Oppositional WOA (OWOA) to improve the local search ability. Also, it enhances the possibility of producing excellent individuals in the random search stage of the algorithm. To verify the performance of this IWOA, $Otsuâ \in Ms \& Kapurâ \in Ms \& results$ entropy were used as the objective function to segment the different regions of images using multilevel threshold values on some grayscale images. The simulation and analysis results of different quality metrics validate the superiority and robustness of the proposed algorithm over the basic WOA algorithm.

183 Enhanced Georeferencing by adapting improvised Lens Distortion Correction in Stationary Drone Video Frames

Manoj Devare Amity University, Mumbai, Maharashtra, India devare.manoj@gmail.com

Accurate lens distortion correction is crucial for maintaining geometric precision in various imaging applications. This abstract presents a novel approach to radial lens distortion correction that aims to enhance image analysis accuracy. This paper intro-duces an advanced distortion model that incorporates higher-order coefficients (k3 and beyond), surpassing the limitations of traditional models. Proposed method is integrated into a homography-based georeferencing framework, effectively rectifying distorted images captured by stationary drones. Through a meticulous calibration process involving known coordinates and a centroid point, it determines distortion coefficients with heightened accuracy. The proposed model not only



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rectifies distortion but also improves the precision of speed calculation for stationary drone video frames. Computational efficiency remains a focus, accommodating wide-angle lenses and complex distortion patterns. In contrast to traditional models, this approach captures intricate distortion behaviours, enabling precise geometric measurements crucial for photogrammetry and computer vision applications. This substantiates the effective-ness of proposed model through comparative analyses, highlighting its superior distortion correction and enhanced accuracy in speed calculations for stationary drone imagery. The technique significantly improves the measurement of vehicle speed by accounting for subtle horizontal or vertical movements, offering valuable insights for transportation analysis and related applications.

190 Feature Selection and Classification to detect Fetal Abnormalities

Dr. Sheeba Joice C, Mr. Srinivasan C and Mr. Sridhar P Department of ECE, Saveetha Engineering College, Kancheepuram-602105, Department of ECE, Saveetha Engineering College, Kancheepuram-602105 and Assistant Professor, Department of ECE Sri Ramakrishna Engineering College, Coimbatore csrinivasan1983@yahoo.co.in

The process of feature selection involves selecting a specific group of features necessary for image analysis. This process is a part of medical image processing, which includes pre-processing, segmentation, feature extraction, and feature selection. Medical imaging has advanced significantly in the recent past, which has aided physicians in diagnosing diseases using various medical modalities. Fetal biometrics, such as Amniotic Fluid Volume, Parietal Diameter, Head and Abdominal Girth, Femur Length, and Gestational Age, are identified and extracted using feature extraction. We can obtain a subset of features that enhance accuracy and computation time by using feature extraction and selection. This paper presents feature selection and classification methods that improve the accuracy of detecting fetal abnormalities in ultrasound images. We have used SVM-based LDA and PNN-based MLE methods for classification and compared the performance of both methods The PNN-based MLE technique outperforms the SVM-based LDA method, with an accuracy of 95.10% compared to 90.45%.

191 Adoption of Blockchain Technologies into Forensic Accounting Practices

Mohammad Mosttafa Shazzad Hasan, Ahmed Razman Abdul Latiff, Zubaidah Zainl Abidin, andMd. Motahar Hossain

1Putra Business School (PBS), Universiti Putra, Malaysia, E-mail: shazzad.fca.cpa@gmail.com2Putra Business School (PBS), Universiti Putra, Malaysia, E-mail: razman@putrabs.edu.my3Accounting, Shariah Audit & Governance, Universiti Sains Islam, MalaysiaE-mail: drzubaidah@usim.edu.my 4*University School of Business, Chandigarh University, Punjab, Indiahmmotahar2006@gmail.com; shazzad.fca.cpa@gmail.com

Forensic Accounting, Blockchain Technologies

194 Path Tracking Control of Mobile Manipulator with Skidding and Slipping Naveen Kumar and Soni Department of Applied Mathematics, Mahatma Jyotiba Phule Rohilkhand University Bareilly, Uttar Pradesh-243006, India and National Institute of Technology, Kurukshetra, Haryana-136119, India





soni_61900126@nitkkr.ac.in

In this paper a path tracking backstepping-based control method for the mobile manipulator in the presence of slippage effects has been proposed. The target wheel velocities of the mobile base are determined using a kinematic control law that incorporates an adaptive term to reduce the effects of wheel skidding and slipping. This scheme combines neural network-based technique with the positive characteristics of conventional backstepping control methods. In order to provide robustness and to counteract the uncertainties caused by network reconstruction, external disturbances, etc., an adaptive bound term is utilised as well in the control scheme.The overall analysis of the stability of the system is shown using the Lyapunov theory and the Barbalat lemma.

199 Predicting Stock Market Prices Using a Hybrid of High-Order Neural Networks and Barnacle Mating Optimization

Sudersan Behera, A V S Pavan Kumar, Sarat Chandra Nayak Department of Computer Science and Engineering, GIET University, Gunupur, Odisha, India, Department of Computer Science and Engineering, GITAM, Hyderabad Campus, India

Predicting stock market movements presents a formidable challenge due to the inherent non-linearity and ever-changing nature of financial markets. In this research endeavor, we employ an innovative approach, harnessing the power of an evolutionary algorithm called Barnacle Mating Optimization (BMO), to fine-tune the optimal parameters of a sophisticated neural network known as the Pi-Sigma Neural Network (PSNN). This intricate optimization process results in the development of a hybrid model, aptly named BMO-PSNN. We put BMO-PSNN to the test by utilizing it for predicting the closing prices of five widely tracked stock indices. In order to provide a comprehensive comparison, we also implement the traditional Gradient Descent (GD) optimization technique to train the PSNN network for the same predictive task. The performance evaluation is carried out using the average percentage error (APE) metric. Remarkably, the results conclusively demonstrate that BMO-PSNN outshines GD-PSNN in its ability to make more accurate predictions, underscoring the effectiveness of the evolutionary BMO algorithm in tackling the complexities of stock market forecasting.

208 Stock Price Prediction Using LSTM & SVM

Jyoti Nil Parashar (Dr.Akhilesh Das Gupta Institute of Technology & Management, Delhi); Virendra Singh Kushwah (VIT Bhopal University, Sehore)*; Pinki Nayak (ADGITM); Anju Shukla (JUET)

The purpose of this article is to compare the effectiveness of support vector ma-chine (SVM) and long shortterm memory (LSTM) models in predicting stock prices to make profitable investment decisions. The proposed system combines mathematical functions, machine learning techniques, and external factors to improve prediction accuracy. There are mainly two types of stock market trading. intraday (day trading) and intraday (long-term holding period). LSTM models, a type of neural network, are ideal for this task because they can store important historical information to predict future stock prices. Predicting exact prices is difficult, but the goal is to develop models that can predict whether prices will rise or fall. It is important to recognize that predicting stock prices is a complex task due to the inherent volatility and complexity of the stock market. Predictions should be seen as a guide, not a final answer. It is important to consider the risks and limitations associated with predictive models and to conduct further research be-fore making any





investment decisions. This article aims to compare the performance of SVM and LSTM models to gain insight into their respective capabilities and stock price prediction potential.

209 Automated Plant disease detection: CNN for corn maize, tomato and potato

Aruneshwaran S (SRM Institute of Science and Technology, Ramapuram)*; Angeline R (SRM Institute of Science and Technology, Ramapuram)

Plant ailments pose present a significant challenge to the worldwide food security and the agricultural sector. Swift and precise detection of these diseases is pivotal for effectively managing them and preventing crop yield reductions. Lately, advanced deep learning techniques, specifically Convolutional Neural Networks (CNNs), have exhibited encouraging outcomes across various tasks involving image recognition. This undertaking strives to create and execute a model founded on CNNs to prognosticate plant diseases through leaf images. The proposed strategy encompasses three main phases: compiling and preparing the data, developing the model architecture, and assessing performance. Initially, an extensive dataset of plant leaf images, encompassing leaves afflicted by diverse diseases, is assembled. The images undergo preprocessing to heighten quality and eliminate disturbances, ensuring a dependable model training process. Subsequently, a CNN structure is devised and trained employing the dataset. The chosen CNN model adheres to a sequential design, where each layer possesses precisely one input and output. These layers are arranged sequentially to construct the entire network and incorporate multiple convolutional layers such as Conv2D, MaxPooling2D, Flatten, and Dense, enabling the learning of features from the input images. The findings underscore that the CNN-centered model for forecasting plant diseases attains remarkable training precision of 99.65%, accompanied by a testing precision of 99.44% and a validation precision of 98.61%, proficiently identifying prevalent ailments like common rust disease in corn plants, bacterial spot infection in tomato crops, and the early blight ailment in potato plants. In conclusion, the proposed CNN-driven prognostic model for plant diseases manifests encouraging outcomes in precisely recognizing these diseases from leaf images.

213 Survey of Deep Learning Models for Image-Based Disease Detection in Plants Abhishek Mathur (Samrat Ashok Technological Institute Vidisha)*

Crop diseases pose a severe risk to global food supplies, but accurate and timely diagnosis is hampered by a lack of resources in many regions. As the number of people with access to smartphones continues to rise throughout the world, and as recent advancements in computer vision allowed by deep learning pave the way, we may soon be able to use them to aid in the detection of diseases. Acquiring pictures, preprocessing, segmenting, and extracting features are all part of the image processing pipeline for disease detection in plants. In this review study, we take a look back at some of the most popular methods for classifying plant diseases: "Convolutional neural network (CNN)", "Support Vector Machine (SVM)", "K-Nearest Neighbors", and "Artificial Neural Network (ANN)". The results of the study show that the Convolutional Neural Network method outperforms the more conventional techniques in terms of accuracy. This review study discusses the use of DL models to depict different plant diseases and gives a detailed description of their operation.





Furthermore, several research gaps are noted from which better clarity may be obtained in regards to early detection of plant diseases.

214 A Comprehensive Review on Technological Advance-ments in Object Detection Deep Learning Models

Monika Vyas (Indian Institute of Information Technology Kota)*; Monika Vyas (Indian Institue of Information Technology , Kota)

With the advancement of technologies object detection has attracted the massive interest in the field of computer vision in recent years. Different models have been proposed in last two decades still some issues remains lacking. In order to understand the developments in the field of deep learning a comprehensive survey has been designed which comprises of the existing object detector models and several benchmark data-sets. Now-a-days, the integration of modern technologies has boosted the object detection activities due to high potentialities to anticipate assistance to consumers in different fields. The impulse towards the technological advancement in object detection has revived the state-of-the-art methods with high adoption has started in several applications such as agriculture, robotics and autonomous system, medical, transportation, surveillance, defence, and in daily life has also detailed in the literature. Additionally, the paper shown the current trends, challenges, and future research direction in the field of deep learning as well as in-deep analysis of their technical challenges.

216 Automated Detection of Covid-19 from X-Rays using Deep Learning Shivani Tiwari (Institute of Engineering and Technology Lucknow)*

The COVID-19 pandemic has had a significant global impact, highlighting the need for accurate and efficient diagnostic methods. One such method that has gained attention is the use of X-ray imaging for the detection of COVID-19. This research paper provides a comprehensive review of the various approaches and techniques employed in the detection of COVID-19 using X-rays. It explores the strengths and limitations of X-ray imaging, discusses the challenges associated with COVID-19 diagnosis, and presents recent advancements in this field. The objective is to provide a thorough understanding of the current state of research, identify key trends, and suggest potential areas for future development. Numerous individuals in numerous nations have been impacted by the 2019 new coronavirus (COVID-19), which had its origins in China, and spread quickly over the world. By the end of January, COVID-19 had affected over 104 million people, killing over 2 million people, according to the World Health Organisation (WHO). Due to the increase in routine cases, COVID-19 test kits are less readily available in hospitals. In order to stop the spread of COVID-19 among the populace, it is essential to implement an automated detection system as a guick and alternative diagnostic method. In order to achieve this goal, a thorough investigation has proposed three distinct BiT models-DenseNet, InceptionV3, and Inception-ResNetV4-to identify patients with coronavirus pneumonia using X-ray chest radiographs. Receiver Operating Characteristic (ROC) studies and a 5-fold cross-validation assessment of the uncertainty matrices have both been performed on these models. Simulations have shown that the pre-trained DenseNet model has the highest classification efficiency, outperforming the other two models (83.47\% for InceptionV3 and 85.57\% for Inception-ResNetV4) and obtaining an accuracy of 92\%.

219 Identification and Classification of PV Array Faults Using Artificial Neural Network Anshul Shekhar, M Senthil Kumar National Institute of Technology Patna





Photovoltaic fault detection and classification are important for an efficient and reliable power supply. The nature of electrical parameters helps in the detection and classification of faults in PV arrays. This research presents an artificial neural network (ANN)-dependent fault detection methodology for detecting line-ground (LGF), hot spot (HSF), and short circuit (SCF) faults in PV arrays. The proposed technique uses the Neural Network Pattern Recognition methodology to classify the SCF, HSF, LGF, and standard state of operation. A 3.2 kW PV array model is developed on the MATLAB-Simulink platform to verify the proposed work. To validate the suggested methodology, several fault conditions are simulated by varying irradiance, temperature, and fault resistance. A large enough number of training patterns are produced through simulation, which are then used to train the ANN model. Additionally, performance errors during training help determine the optimum quantity of hidden neurons. Further, the confusion matrix analysis is employed to evaluate the accuracy of the proposed method's performance. The proposed approach offers a promising accuracy of 99.7% in overall cases.

225. Chest X-Ray Based Covid-19 Detection Using Preprocessing Techniques and Deep Learning Algorithms

Thanu Kurian (Amrita School of Engineering,Bengaluru, Amrita Vishwa Vidyapeetham,India)*; Thangam S (Amrita School of Computing); Lokeswar Reddy Kamatham (Amrita Vishwa Vidhyapeetham)

COVID-19 is a transmissible infection identified in Wuhan, China, in December 2019. More than million people were killed with Covid-19. When the contamination enters body, it contacts the mucous film that lies in your mouth,eyes and nose.

The virus entering a cell makes new disease parts making use of the cell and spreads infections by attacking nearest cells. Signs could begin one to fourteen days subsequent

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to presenting to the infection. Majority of them suffer with pneumonia, while a few suffer with extreme side effects like shortness of breath, headache, and fast heartbeat. Medical practitioners can see indications of respiratory infections on a chest X-ray. So, to detect if a person is suffering with Covid-19 the chest images play a vital part in the early analysis and the treatment of the patient. This study utilizes multiple datasets containing images of Chest X-ray and makes use of pre-processing techniques like image augmentation, resizing, Contrast Limited Adaptive Histogram Equalization (CLAHE)

shr/>and trained using Deep learning algorithms like CNN, VGG-16, RESENT-50, AlexNet, MOBILE NET. CNN model with a maximum pooling layer and a flatten layer outperformed other algorithms when trained on image augmentation and normalization images and achieved accuracy of 0.94. Finally, Integrating the best suitable model with Web applications like Flask helps to reduce the burden on doctors and minimize the

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229 Threat or gift to academic: A case study on ChatGPT

Vibha Jain (Manipal University Jaipur)*; Santosh Kumar Vishwakarma (Manipal University Jaipur); Arun Shanbhag (Manipal University Jaipur)

OpenAI developed tool \textit{\enquote{ChatGPT}} is transforming the current generation with its advance artificial intelligent model and wide varieties of applications in distinct domains. As an advanced AI chatbot, it leverages natural language processing and machine learning to enable users to engage in natural, humanlike conversations with a virtual assistant that can understand and respond to complex requests. Despite facing criticism and bans in some communities and regions, it is widely acknowledged that ChatGPT will continue to expand its usage and innovate to serve an even broader range of applications. This article explores the impact of ChatGPT on the academic community, as perceived by students and faculty. Through an online survey, we gathered feedback from different stakeholders to understand their initial reactions to



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this advanced chatbot. As conclusion, we provide recommendations on how to utilize this technology responsibly to enhance the overall teaching and learning experience.

234 Breaking Barriers: Sign Language to Text Transformation in the Digital Era Upasana Pandey, Vanshika kumar, Shanu Kaushik, Abha Sharma ABES IT College of Engineering, Ghaziabad

This paper investigates the evolving field of Sign Language to Text Conversion (SLTC), exploring the remarkable technological strides, challenges, and profound impact on communication accessibility on behalf of the community of Deaf and Hard of Hearing (DHH). The paper also addresses the user experience
sapects of SLTC systems, discussing their user-friendly design, interface considerations, and the incorporation of feedback mechanisms for continuous improvement. Furthermore, it presents findings from user testing, demonstrating the reliability and practicality of SLTC in various communication scenarios. The accuracy of SLTC systems can range from around 70% to 90% or more, depending on factors such as the quality and size of the dataset used for training, the complexity of the sign language, the effectiveness of recognition algorithms, and the robustness of translation models.

241 Sarcasm Detection and Classification using Deep Learning Model

B Rajani; Sameer Saxena; B.Suresh Kumar, GeetikaNarang AMITY Institute of Information Technology Amity University Rajasthan Jaipur,India School of Computer Science and Engineering Sanjay Ghodawat University Kolhapur, India Trinity College of Engineering and Research, Puna Maharashtra, India

The Twitter and Facebook kind of web platformshave gained significant traction as prominent mediums for individuals to document and articulate their emotions, viewpoints, and evaluations. The use of appropriate extraction methodologies, such as sentiment analysis, renders this data valuable across several domains. Sarcasm detection is a methodology used to examine individuals cognitive and affectivestates, with the aim of classifying. There are several methods bywhich individuals might articulate their sentiments. These attitudes are occasionally attended with sarcasm, particularly when expressing strong emotions. Sarcasm has often understoodas a kind of communication in which a good statement is made with an underlying negative purpose. The majority of existing research endeavors see these responsibilities as separate entities. Until far, the majority of methods for sentiment and sarcasm classification have been focused on treating them as separate and independent text categorization tasks. Nowadays, there hasbeen notable growth in the field of study using deep learning methods, resulting in substantial improvements in the performance of standalone classifiers. One of the primary challenges encountered by these methodologies is their inability to accurately categorize sarcastic statements as negative. Given this consideration, we assert that possessing the ability to identify sarcasm will contribute to the enhancement of sentiment classification, and conversely, proficiency insentiment classification will aid in the recognition of sarcasm. Our research has shown a positive correlation between these twoactivities. This study presents a system that employs a deep neural network and multitask learning to effectively predict the connection between different tasks. with the goal of attractive the overall concert of sentiment analysis. The approach presented in this study demonstrates superior performance compared to the pre- 2 vious methods, with a notable margin of 3% improvement, as shown by its F1- score of 97%



human activities—often categorized as suspicious actions—such as leaping, climbing, and crawling. This analysis involves the segmentation of live video into frames to scrutinize human behavior. Detecting humans within video data has long been challenging due to the non-rigid, unpredictable nature of the human body, exacerbated by factors like poor lighting and varied stances. Timely alert generation systems are imperative for notifying system users when suspicious activity is identified. The review delves into state-of-the-art models, with YOLO (You Only Look Once) emerging as a popular choice. YOLO offers a realistic and versatile framework with multiple versions suitable for diverse applications. These models process video input by splitting it into frames, conducting object detection based on their training data. Additionally, transfer learning is explored as a method to enhance model performance by training on custom datasets, facilitating real-time detection of normal and suspicious human activities. Lastly, the review discusses practical means of alerting system users, with a focus on the efficiency of Gmail notifications in promptly notifying relevant personnel about potential security or safety concerns.

243 Hybrid Deep Learning Technique for Leaf Disease Detection System Priyanka Gupta ABES IT College of Engineering, Ghaziabad

Human activity detection, a vital computational method for video analysis, aims to discern ongoing events

within video material. Specifically, this review paper focuses on the process of identifying inappropriate

Plants play a crucial part in providing food in all comprehensive. Diverse common components cause plant sickness, coming about in noteworthy era incidents. In any case, manual discovery of plant illnesses can be a difficult and expensive method. It can be a hazardous methodology for recognizing and foreseeing the spread of plant maladies. Grasping progressed developments such as Machine Learning (ML) and Deep Learning (DL) can offer assistance to overcome these challenges by empowering early location of plant maladies. The afterward progressions within the utilization of ML and DL strategies for the recognizable confirmation of plant ailments are explored in this paper. The examination centers on distributions between 2016 and 2023, and the tests examined in this article illustrate the practicality of utilizing these strategies in moving forward the accuracy and capability of plant infection disclosure. This thought moreover addresses the challenges and restrictions related with utilizing ML and DL for plant infection location confirmation, such as issues with data availability, imaging quality, and recognizing between healthy and unhealthy plants. The investigate gives beneficial encounters for plant illness area investigators, experts, and industry specialists by promoting arrangements to these challenges and limitations, giving a comprehensive understanding of the current state of investigate in this field, highlighting the benefits and confinements of these procedures, and proposing potential arrangements to overcome the challenges of actualizing them.
str/>Keywords: Plant diseases, Machine Learning, Deep Learning, imaging quality.

244 A Comprehensive Review of Predicting Lifestyle based disease specifically PCOS among Women Using Data Mining and Machine Learning Approaches VAISHALI GUPTA, PV Suresh

School of Computer and Information Sciences, Indira Gandhi National Open University, Maidangarhi, New Delhi

Urbanization and industrialization are increasing risk factors associated with lifestyle choices, contributing to the upsurge in lifestyle-related diseases. This primarily results from habits that encourage a sedentary lifestyle, leading to various health issues and ultimately culminating in chronic non-communicable diseases (NCDs). Numerous lifestyle-based diseases affecting women globally include cardiovascular disease, breast cancer, PCOS, type-2 diabetes, thyroid disorders, and more. PCOS, or polycystic ovary syndrome, stands out







as a prevalent health concern affecting a significant proportion of women worldwide. The timely identification and accurate prediction of PCOS are crucial. Numerous researchers have dedicated their efforts to predicting PCOS using data mining and machine learning approaches. This Comprehensive Review (CR) seeks to thoroughly examine and summarize various disease prediction models proposed in current research for predicting PCOS. It employs extensive searches, diverse methodologies, and healthcare variables. The paper scrutinizes technical aspects such as data collection selection, feature engineering applications, data pre-processing, characteristics of data mining and machine learning techniques, methodology, and evaluation matrices. However, none of the selected studies conducted external validation. The paper also delves into the limitations and outlines the scope for future research perspectives in predicting PCOS, presenting opportunities for scholars interested in exploring additional methods to anticipate early-stage risks associated with PCOS.



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Ignorance of terms and conditions is not an acceptable excuse for violation. STEM -RS Members are expected to know and abide by these terms and conditions as well.

- 1. Every member shall work in the positive direction and upliftment of the Society/Foundation
- 2. Payment made through any other mode will not be accepted.
- 3. The Memberships will be activated on verification of receipt of Membership Fee from Bank Statement.
- 4. Membership Registrations are to be done individually. i.e. there is no Group / Multiple Registration
- 5. The fee once paid will not be refunded on any account nor would this fee be held in reserve for future.
- 6. In case of any participant found to have paid more fee than prescribed, due to technical reason and on receiving the communication from the said applicant, the said extra payment, if found, shall be refunded to the same origin from which the payment is received.
- 7. The Executive Committee (EC) holds the rights to accept or reject the membership application of any individual. Also the decision of the EC shall be final and cannot be objected/questioned.





Account Details

S.No	Details	
1	Beneficiary Name	STEM Research Society/ Foundation, Charitable Trust
2	Bank Name	AXIS Bank Ltd.
3	Branch Name	AXIS BANK LIMITED, Ambala Road Saharanpur
4	Branch Code	004186
5	IFS Code	UTIB0004186
6	Swift Code	AXISINBB420
7	MICR Code	247211003
8	Account No	920020065907453
9	Bank Branch	Ground Floor No. 14/25/25/1/2, Ambala Road, Saharanpur, U.P., PIN: 247001
10	Type of Account	Current

Eligibility and Benefits to Join STEMRS

Eligibility

- 1. A person should attain minimum age of 18 Years (on the date of Joining).
- 2. Membership is linked to the possession of at least a graduate degree (in any domain).
- 3. Membership is free (for one year) to all the registered authors (with full fee) of SoCTA2021 and CAMSE2021.

Benefits

- 1. Members receive substantial discounts to affiliated association events such as Seminars, Conferences, Workshops and a like.
- 2. Provides the latest news, a wide range of publications and resources to keep you informed.
- 3. To provide the updates on Special Issues in Indexed Journals/ Books.
- 4. To provide face to face networking opportunities for members.
- 5. To assist in organizing events such as FDP's, Seminars, Workshops and Conferences.
- 6. Student Author Travel Grant

Levels of Membership and Application Forms

The Society offers a range of individual membership levels to best fit the stage of your career. The information below contains details fee along with duration (in years).

S.No	Category	Membership Fee (Non-refundable)
1	Life Member	₹5000 (For Indian) / \$100 (For Others)
2	Member	₹1000 (For Indian) / \$25 (For Others) for One Year
3	Student Member	₹500 (For Indian) / \$15 (For Others) for One Year
4	Platinum Member	₹12000 (For Indian) / \$200 (For Others) for Ever



and the second	SoCT	Tentative Scl A2023 (24-26 D	hedule ecember 2023)	
	DE	ECEMBER 24, 20	023 (DAY-1)	
10:00 AM – 12:00PM		INAUGUI	RATION	
12:00 AM – 12:30 PM		HOIH	-TEA	
12:30 PM – 01:30 PM		PLENARY Dr. Jagdish Cł South Asian Unive	TALK – I nand Bansal ersity New Delhi	
01:30 PM – 02:00 PM		LUNCH-	BREAK	
02:00 PM – 04:00 PM		PLENARY Mr. Anino Executive Editor - Interdisc Research Publishing - Books S	TALK – II da Bose ciplinary Applied Sciences Springer Nature Group London	
04:00 PM – 04:45 PM		SAMVAD: Ethics in A	rtificial Intelligence	
04:45 PM – 05:45PM	TRACK-1 (Online) Soft Computing Applications (5)	TRACK-2(Online) Machine Learning (6)	TRACK-3 (Offline) Metaheuristic Algorithms (4)	TRACK-4 (Online) Artificial Neural Networks (3)
	72, 119, 137, 172, 213	59, 62, 66, 89, 132, 190	65, 111, 165, 181	146, 209, 219
07:30 PM Onwards		GALA-D	INNER	

		DECEMBER25, 202	23 (DAY-2)	
09:30 AM - 10:30 AM		PLENARY 1	ralk – III	
10:30 AM – 11:00 AM		Bre	ak	
11:00 AM – 01:00 PM		STEM RESEAL AWARD CE VENUE: SEM	RCH SOCIETY REMNONY INAR HALL	
01:00 PM- 02:00 PM		-HUNCH-	BREAK	
02:00 PM – 03:00 PM	Track-5 (Online) Hybrid Intelligent Systems (3)	Track-6(Online) Machine Learning (6)	Track-7 (Offline) Soft Computing Applications (4)	Track-8(Offline) Machine Learning (3)
	108, 164, 199, 234, 242	22, 64, 88, 145, 169, 173	13,70, 122, 183, 234	35, 155,208, 242, 243
03:00 PM – 04:00PM	Track-9(Offline) Artificial Neural Networks (4)	Track-10(Offline) Soft Computing Applications (5)	Track-11(Offline) Machine Learning (3)	Track-12(Offline) Fuzzy Logic (5)
	74, 104, 117, 194	150, 151, 152, 153, 158	87, 110, 138, 73, 77	75, 81, 86, 126, 168
04:00 PM – 04:30 PM		Bre	ak	
04:30 PM – 05:30 PM	Track-13 (Offline) Artificial Neural Networks (5)	Track-14 (Offline) Hybrid Intelligent Systems (4)	Track-15 (0) Soft Computing A (4)	ffline) pplications
	94, 95, 148, 214, 216	58, 157, 174, 191	124, 134, 14	7, 229

DECEMBER 26, 2023 (DAY-3)	PLENARY TALK – IV	Break	VALEDICTORY & PRIZE DISTRIBUTION	ons: inks for all online/virtualsessions, Plenary Talk and Valedictory & Prize Distribution will be updated time to time hatsApp and Website.	e participants and session chairs are requested to login 15 minutes before the scheduled time.
	09:30 AM - 10:30 AM	10:30 AM - 10:45 AM	10:45 PM - Onwards	Instructic The Ii<br viaWh	✓ All the

- (Time for each presentation is 10 minutes including Suggestions)
- All session chairs are requested to fill the evaluation sheet and send back to socta2016@gmail.com
- Inauguration, Plenary Talk, Valedictory and Prize Distribution Session will be live on the respective time mentioned above. You all are requested to login 15 minutes before the scheduled time.
- \checkmark In case of any discrepancies please inform us immediately.


Malaviya National Institute of Technology Jaipur (MNIT), Jaipur Rajasthan, BHARAT (Scheduled)

> SoCTA2023 December 24 - 26, 2023 Indian Institute of Information Technology Una

SoCTA2022 December 16 - 18, 2022 UIT - Himachal Pradesh University, Shimla

SoCTA2021 December 17 - 19, 2021 Indian Institute of Information Technology, Kota

SoCTA2020 December 25 - 27, 2020 Virtual Format

SoCTA2019 December 27 - 29, 2019 National Institute of Technology Patna

SoCTA2018 December 21 - 23, 2018 Dr B R Ambedkar National Institute of Technology Jalandhar

> SoCTA2017 December 22 - 24, 2017 Bundelkhand University Jhansi

SoCTA2016 December 28 - 30, 2016 Amity University Rajasthan, Jaipur

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URL: http://www.socta.in/