INDIRA GANDHI DELHI TECHNICAL UNIVERSITY FOR WOMEN

4TH RESEARCH EXCELLENCE AWARDS

A COMPENDIUM OF ABSTRACTS OF PUBLISHED PAPERS

JANUARY 2024 - DECEMBER 2024

This Compendium of Abstracts of published Papers for Research Awards is compiled and edited by Prof. Ranu Gadi, Dean (R&D), Dr. Bhavani Prasad and Dr. Shivani (Coordinators, R&D) on behalf of Indira Gandhi Delhi Technical University for Women, as per submissions made by the first/ corresponding authors. This Publication is meant for the internal circulation only and has no commercial purpose.

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PREFACE

The faculty members and students of IGDTUW demonstrate a steadfast commitment to upholding high standards of excellence in both research and academics. The Research Excellence Awards exemplifies our University's commitment to recognizing and promoting a culture of unwavering dedication to research and innovation. These awards have become a catalyst for fostering high-quality research and cultivating a vibrant research ecosystem within the University.

Annually, IGDTUW offers four categories of awards, namely Outstanding Research Awards, Premier Research Awards, Commendable Research Awards, and Motivational Research Awards. The Outstanding Research Awards now recognize publications in journals categorized as outstanding, while the Premier Research Awards focus on publications in reputed journals with an impact factor of at least one. The Commendable Research Awards aim to acknowledge publications in journals with an impact factor of at least two.

The Motivational Research Awards aim to encourage researchers to contribute significant advances to esteemed journals with an impact factor of at least one. From the year 2022 onwards, the categories of awards have been revised to include patent awards, aiming to incentivize publications in highly esteemed international journals alongside patent filings. The University is dedicated to enhancing overall research performance and fostering a culture of research among both undergraduate and postgraduate students. To this end, Incentive to UG/PG Students has been started with the aim of nurturing the research ecosystem within the University and motivating students to publish their research work in esteemed journals. These incentives are exclusive to undergraduate and postgraduate students of the University.

IGDTUW celebrated its “3rd Research Excellence Award” of the University on 5th July 2024. Research Awards were given to the Researchers (faculty and students of IGDTUW) under different categories for their publications in SCIE/SSCI Journals and Grant of Patents for the Year 2023. The cash award amount along with a Certificate of merit, was given to faculty and students in recognition of their excellent contribution towards the Good Quality Research Publications and Grant of Patents in various disciplines of the University. The Research awards were given to Forty-three (43) faculty members and Ninety (90) students for their research publications for 2023, while eight (08) faculty members and twelve (12) students were awarded Commendable Patent awards for their patents granted during the year 2023. Fifteen UG/PG students were given incentive awards for their journal publications during 2023.

The University is proud to present the fourth edition of the Research Publications Compendium, showcasing works submitted by faculty members and students from January 2024 to December 2024. These publications were considered for the Research & Patent Awards and Incentives. This compendium stands as a valuable resource, designed to inspire young researchers and students as they embark on their academic journey at IGDTUW.

All publications featured and eligible for the Research Excellence Awards represent the authors' original contributions and have been published and indexed in accordance with university guidelines. In recognition of their achievements, all awardees will receive a certificate of merit along with a cash prize.

More than a record of academic achievement, this compendium serves as a beacon of inspiration, especially for young women researchers inviting them to be a part of IGDTUW's vibrant research community. On behalf of the Industrial Research and Development Cell, we extend heartfelt congratulations to all members of the academic fraternity on their well-deserved Research Excellence Awards.

Prof. Ranu Gadi
Dean (IRD)

Dr. Bhavani Prasad & Dr. Shivani
Coordinators (IRD)

FROM THE DESK OF VICE CHANCELLOR

Research is the foundation upon which the future is crafted, the gateway through which new insights, solutions, and possibilities emerge. In universities, research goes beyond discovery — it is a responsibility to innovate, challenge existing boundaries, and inspire change. At Indira Gandhi Delhi Technical University for Women, we take immense pride in nurturing this spirit of inquiry and intellectual curiosity. The Research Excellence Awards celebrate the brilliance, dedication, and transformative ideas of our scholars, shaping the future through knowledge and discovery.

At IGDTUW, we recognize and honour the unique cognitive and pragmatic contributions women bring to academia. Their sensitivity to societal needs enhances our research landscape, playing a pivotal role in shaping both knowledge and the economy of our nation. Committed to excellence in professional education, IGDTUW actively fosters the participation of women in Engineering, Science, Management, and Technology. As a national institution, we are dedicated to promoting gender equality and empowering women in the fields of innovation and research.

I am delighted to announce the release of the fourth edition of the research booklet, celebrating the outstanding achievements of our students and faculty in research. Congratulations to all the awardees for their dedication and hard work. We celebrate the awardees for their passionate, persistent, and purpose-driven approach, which will undoubtedly inspire and motivate the next generation to pursue excellence. At IGDTUW, we strive to nurture innovative thinkers and researchers, and we look forward to witnessing many more groundbreaking ideas and solutions in the future.

Ranjana Jha.

Prof. Ranjana Jha

RESEARCH AT THE UNIVERSITY

"We do not need magic to change the world; we carry all the power we need inside ourselves already: we have the power to imagine better."

Indira Gandhi Delhi Technical University for Women (IGDTUW) is on a mission to promote high quality scientific research with focus on Engineering, Technology, Science, Architecture, Management and Humanities. Research is of utmost importance for both the economic and social development of a nation. The cognitive and pragmatic approach of the female gender; blended with sensitivity; to the needs of our society helps in building the knowledge economy of our country.

Indira Gandhi Delhi Technical University for Women has evolved to become a national flagship, research-led University with a mission to foster an environment for excellence in professional education and ensure active participation of women in the field of Engineering, Science, Management and Technology, thereby attempting to strike out a fine balance between world of work and life. The University vows to devise sustainable systems and state of-the-art infrastructure to enable the Indian women to dawn the role of future leaders, managers, researchers and productive team players in the field of Science & Technology.

The Major Thrust areas of Research at the University are:

- Artificial Intelligence
- Data Communication
- Big Data Analytics
- Cryptography
- Speech Translation Systems
- Cyber Security & Cyber Forensics
- Web Technologies
- Optical Communication
- Fuzzy Database Management
- Digital Signal & Image Processing
- Wireless Censor Network
- Machine Learning
- VLSI Design
- Robotics & Automation
- Communication Studies
- English Literature
- Embedded System
- Internet of Things
- Medical Image Processing
- Algorithms Design
- Renewable Energy Resources
- Information Security
- Secure Wireless Networks
- Microelectronics
- Radio Frequency Circuits
- Clouding Computing
- Mathematical Programming
- Business Intelligence
- Allocation Problems
- Nanomaterial Fabrication & Engineering
- Robotics & Automation
- Composite Material
- Data Aggregation in wireless sensor networks
- Thin Film Technologies
- Applied Optics
- Analog Integrated Circuits
- Thermal Science & Engineering
- Evolutionary Algorithms
- Green Manufacturing
- Biomedical Engineering
- Bio-Composite Material
- Power Electronics
- Polymers
- Machine Design Engineering
- Atmospheric Sciences
- Tribology
- Panoramic & 3-D Imaging

In recent years, Indira Gandhi Delhi Technical University for Women (IGDTUW) has placed a stronger emphasis on fostering a culture of research excellence among students, scholars, and faculty members. The university is committed to developing sustainable systems and cutting-edge infrastructure to empower Indian women to excel as future leaders, managers, researchers, and valuable team members across various fields including Engineering, Technology, Science, Architecture, and Management.

To facilitate this mission, the Industrial Research and Development Cell (IRD) of the University serves as a vital link between external funding agencies and the University community. The IRD Cell provides comprehensive support for sponsored research projects and industrial collaborations, offering mentorship, facilitating partnerships, and identifying research opportunities. It also plays a crucial role in managing administrative aspects related to sponsored research, industrial consultancy, and other research and development activities.

With an array of new laboratories across departments and ongoing research projects funded by prestigious organizations such as DST, MHRD, MeitY, DKDF, DFSS and ICMR, the University is continuously enhancing its research capabilities. Faculty members are actively engaged in research endeavors that contribute to advancements in technology, innovation, and knowledge creation.

IGDTUW fosters a vibrant research ecosystem and encourages faculty members and students alike to contribute to this culture of inquiry. The university actively supports partnerships, networking, and collaborations with other academic and research institutions as well as industries and organizations.

The Research and Consultancy Wing of the University plays a pivotal role in promoting research excellence, aiming to achieve tangible outcomes such as products, patents, and publications (3Ps). By nurturing a conducive environment for quality research and innovation, the university strives to integrate cutting-edge technologies with novel ideas, ensuring that research findings are disseminated effectively to both scientific and industrial communities. Through these efforts, IGDTUW endeavors to enhance overall research performance and foster a culture of innovation and excellence among its stakeholders.

To strengthen the research culture in the campus and encourage the students to pursue quality research work, various Incentive/ Schemes/ Financial Assistance Schemes have been launched by the University. To name a few:

- JRF/SRF Scheme for Ph.D. Scholars.
- Financial Assistance to Full-time Ph.D. Scholars of IGDTUW who are not in receipt of any kind of Financial Assistance from any other sources.

- Financial Assistance to non-GATE M.Tech. and M.Plan. students who are not in receipt of any other kind of Scholarship/Stipend etc. from any other sources.
- Research Awards/Incentive to UG/PG Students for Publication of Research Papers in SSCI/SCI/SCIE/Scopus/ESCI Indexed Journals.
- Financial support to the Faculty Members and Students for presenting Research Papers in National and International Conferences.
- Direct Ph.D. Program (Full Time) after 4-years Bachelor's degree/1st year Master's Degree

IGDTUW proudly hosted its esteemed flagship conference: 6th International Conference on Artificial Intelligence and Speech Technology (AIST) on 13-14 November 2024.

The University shall be organizing following two international conferences in 2025:
14th International Conference on Computing Communication and Sensor Networks (CCSN-2025) to be jointly organized by IGDTUW and ACT (Applied Computer Technology, Kolkata) during September 12th -13th, 2025.

7th International Conference on "Artificial Intelligence and Speech Technology (AIST)' has been scheduled to be held during November 27th -28th, 2025.

The University pledges to develop sustainable systems and cutting-edge infrastructure that enable Indian women to emerge as future leaders, managers, researchers, and key contributors in the dynamic fields of Science and Technology. Through these efforts, the university seeks to catalyze positive change and pave the way for a brighter, more inclusive future for all.

GUIDELINES FOR RESEARCH AWARDS

I. The cash award will be given to Researchers (regular/contractual faculty members and students of IGDTUW) in the recognition of importance of the published research work and to motivate the individual excellence in research.

II. The award will be granted to the journal papers published in each year (1st January to 31st December), published along with Digital Object Identifier (DOI), vol., issue, no. pagination and month/year of publication.

III. Only Publications listed in SCI/SCIE/SSCI Journals are considered for the awards. The latest list of SCI/SCIE/SSCI indexing and impact factor by Clarivate are applied for deciding the indexing and impact factor of the journals.

IV. Only papers having the author's affiliation as Indira Gandhi Delhi Technical University for Women are considered for Research and Patent Awards.

V. Journal papers with complete information (DOI, vol., issue, no. pagination and month/year of publication) are only considered for award. The date when the final version of the paper appears/published online with complete citation information as mentioned is considered as the date of publication of the paper.

VI. The awards comprise of cash prize along with certificates. Certificates bearing complete citation information of the publications are presented to all awardees.

VII. The publications made in the journals, which seek publication fee in any form except overlength charges are not considered for cash awards (irrespective of the listing in the publication agencies specified in the following lists)

VIII. If at a later date the publication is withdrawn or retracted due to some reason the authors return the award (money as well as certificate).

IX. The distribution of prize money shall be on equal contribution basis and therefore the authors will get equal share. Only the authors from IGDTUW are eligible for the awards and the prize money corresponding to outside IGDTUW authors, if any, is deducted.

X. The applications of awards for patents are also to be treated similarly. However, the impact factor and indexing are not applicable for patents. Only Patents having the applicants name as Indira Gandhi Delhi Technical University for Women will be considered for awards.

XI. An application form in the format (provided by R & D Cell) is to be filled by Faculty Member/student for applying for the award. The Application form shall be duly verified by HOD and submitted to the R & D Cell along with all the requisite documents by 31st January of the succeeding year.

XII. A University level Screening Committee comprising of Dean (R & D), Dean (R&C), Dean (Academics)/Dean (Examinations) and three HODs shall be nominated by Hon'ble Vice Chancellor to review the applications. The Committee shall declare the list of faculty members and students eligible for Research awards with approval of the Vice Chancellor.

GUIDELINES FOR RESEARCH AWARDS

AWARD CATEGORIES & SELECTION CRITERIA

Following are the categories for the research and patent awards.

AWARDS FOR RESEARCH PAPERS:

Following are the four categories for the research awards:

A• Outstanding Research Awards : A cash prize of Rs. 5,00,000/- (Rupees Five Lakhs only) is awarded along with certificate of merit.

Selection Criteria: The paper must be published in the following journals.

1. Nature (British Multidisciplinary Scientific Journal)
2. Science (Academic Journal of the American Association)
3. Harvard Business Review (Management magazine published by Harvard Business Publishing, a wholly owned subsidiary of Harvard University)

B• Premier Research Awards: A cash prize of Rs. 1,00,000/- (Rupees One Lakhs only) is awarded along with certificate of merit.

Selection Criteria: The paper must be a journal paper of impact factor at least one (1.0) and indexed as SCI/SCIE/SSCI and published in the following:

1. American Mathematical Society
2. American Physical Society
3. American Society for Civil Engineers (ASCE)
4. American Society for Mechanical Engineers (ASME)
5. American Society of Testing Materials (ASTM)
6. Association for Computing Machinery (ACM) transactions
7. IEEE Transactions/Journals/Letters/Reviews
8. IET Transactions/Journals/Letters/Reviews
9. Institute of Civil Engineering publishing, London
10. Institute of Mechanical Engineering, London
11. Proceeding of Royal Society

In addition to the above list, the SCI/SCIE/SSCI journals with impact factor equal to or more than seven (7.0) are also considered for this award.

C • Commendable Research Awards: A cash prize of Rs. 50,000/- (Rupees Fifty Thousand only) is awarded along with certificate of merit.

Selection Criteria: The paper must be a journal publication (other than listed in category A and B above) of impact factor at least two (2.0) and indexed as SCI/SCIE/SSCI.

GUIDELINES FOR RESEARCH AWARDS

D • Motivational Research Awards: A cash prize of Rs. 20,000/- (Rs. Twenty Thousand only) will be awarded along with a certificate of merit.

Selection Criteria: The paper must be a journal publication (other than listed in category A and B above) of impact factor ⩾ one (1.0) and less than two (2.0) and indexed as SCI/SCIE/SSCI.

II. AWARDS FOR PATENTS:

Following are the two categories for the awards on patents.

A • Premier Patent Awards: A cash prize of Rs. 5,00,000/- (Rupees Five Lakhs only) is awarded along with a certificate of merit for grant of US/UK patent.

B • Commendable Patent Awards: A cash prize of Rs. 2,00,000/- (Rupees Two Lakhs only) is awarded along with a certificate of merit for grant of Indian patent.

In case of any dispute the decision of the Competent Authority, IGDTUW is final and binding to all the authors.

Prof. Ranu Gadi
Dean (R & D)

BIOGRAPHIES OF AWARDEES

DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES

PROF. RANU GADI
PROFESSOR

PROF. RANU GADI is a Professor in Dept. of Applied Sciences and Humanities, Indira Gandhi Delhi Technical University for Women. She is presently holding the dual responsibility of Dean (Industrial Research & Development) and Dean (Research & Consultancy) along with being the Director, University Incubation Centre. She did her Masters (1986) and PhD (1991) from IIT Roorkee and pursued Post-Doctoral Fellowship (1994-1995) at Environmental Sciences Division, Lancaster University, Lancaster, UK. She has been in the academics for more than twenty years and has research experience of almost thirty years.

Prior to joining IGDTUW, she worked as Research Associate and Senior Research Associate at Oil & Natural Gas Corporation, Dehradun and National Physical Laboratory, New Delhi. Her research areas of interest include Atmospheric Chemistry and Climate Change; Characterization and Source Apportionment of Atmospheric Aerosols; Biomass burning emissions; Speciation and Bioremediation of trace metals in water/wastewater; Synthesis, Characterization and Application of Nano-materials; Green Corrosion Inhibitors.

She is a recipient of Thomas Kuhn Honour Pin on the paper entitled "SO_2, NO_2, organic and elemental carbon emission studies from biofuels used in India", presented at the Third Int. Symposium on Non-CO_2 Green house Gases (NCGG-3), Jan 21st-23rd, 2002, Maastricht, The Netherlands. She received the Best Researcher Award (third position) for 2011-12 at Guru Gobind Singh Indraprastha University, Delhi. She is a Member of Executive Committee, Indian Association of Air Pollution Control (Delhi Chapter). She is a Life Member, Indian Association of Air Pollution Control (Delhi Chapter) and Indian Society of Analytical Scientists (Delhi Chapter)

She has successfully executed many Research projects funded by external agencies. She has authored/co-authored more than hundred research papers in International refereed journals of repute and National/International conferences. She has H-index 28, i10-index 46, total citations: 2,872.

DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES

PROF. CHHAYA RAVI KANT
PROFESSOR

PROF. CHHAYA RAVI KANT is a highly accomplished Physics professor with 30 years of teaching and research experience, currently serving as a Professor and the Dean of International Affairs at Indira Gandhi Delhi Technical University for Women (IGDTUW). Holding a Ph.D. in Physics from the University of Delhi, her research interests span diverse and interdisciplinary areas, including Energy Storage Devices, Supercapacitors, Nanocomposites, Direct X-Ray Sensors, Gas-Sensing Applications, and Photovoltaics. She has made significant contributions to the field through two granted Indian patents, over 50 publications in reputed international journals, and more than 35 conference papers.

Her academic profile is further strengthened by an MS in Software Systems, which supports her holistic and innovative approach to teaching and research. Prof. Kant has also played a crucial role in research mentorship, having successfully supervised seven Ph.D. students, with many more currently working under her guidance in various cutting-edge areas of physics and materials science. She established the “Research Advancements in Materials and Approaches in Nanotechnology (RAMAN)” lab at IGDTUW, fostering advanced research in nanotechnology and material science. In recognition of her outstanding research contributions, she was honoured with the Premier and Commendable Research Award by IGDTUW. Prof. Kant’s unwavering dedication to academic excellence, mentorship, and global collaborations continues to shape the future of physics and innovation in India.

DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES

PROF. SHALINI ARORA
PROFESSOR

PROF. SHALINI ARORA is presently working as Professor in Mathematics and Head at Applied Sciences and Humanities Department, Indira Gandhi Delhi Technical University for Women (IGDTUW). She has more than 20 years of Teaching experience. She did her Masters and Ph.D. in Mathematics from IIT Delhi. Prior to joining IGDTUW She worked as Assistant Professor at the Operations Management Group, IIM Calcutta and Department of Mathematics at Lady Shri Ram College. She is a recipient of the 'Young Scientist Award' by the SERC division of DST. Her areas of research interest include Mathematical Programming, Allocation Problems viz., Transportation and Assignment Problems, Combinatorial optimization etc. She has published more than 30 research papers in Journals of International and national repute. She is also one of the editors in the Book Series: Advances in Metaheuristics-1st Edition "Combinatorial Optimization under Uncertainty – Real Life Scenarios in Allocation Problems", Edited by, CRC Press, Taylor and Francis Group, May 2023.

DR. GEETA SACHDEV
ASSISTANT PROFESSOR

DR. GEETA SACHDEV is an Assistant Professor (Mathematics) in the Department of Applied Sciences and Humanities, IGDTUW, Delhi. She obtained her M.Sc. in Applied Mathematics and PhD in Mathematics from IIT Roorkee. She has published over twenty two research papers in the area of Mathematical Programming in various International Journals.

DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES

Dr. Bhavani Prasad
Assistant Professor

DR. BHAVANI PRASAD is presently working as Assistant Professor at IGDTUW. Prior to this, he worked as postdoctoral research fellow at the Zhejiang University, China under the supervision of Prof. Hong Zhanglian. He received his PhD in 2013, from Indian Institute of Technology, Roorkee, under the guidance of Prof. Raj Kumar Dutta, where he carried out studies on antibacterial and photocatalytic applications of ZnO nanoparticles. Currently, his research areas includes- Applications of metal oxides / carbon nanomaterials / polymers nanocomposites in photocatalysis, controlled targeted drug delivery, antimicrobial and anti cancer activity studies, etc. He has published 30+ research papers in SCI. He has published 30+ research papers in SCI/Scopus-indexed international referred journals and more papers and posters presented in international conferences also.

Dr. Aakanksha Singh
Assistant Professor

DR. AAKANKSHA SINGH has pursued her Ph.D. in Mathematics under the supervision of Prof. (Dr.) Shalini Arora, Department of Applied Science and Humanities, Indira Gandhi Delhi Technical University for Women, Delhi. She earned her B.Sc. (H) in Mathematics in 2006 and her M.Sc. in Pure Mathematics in 2008 from Miranda House, University of Delhi. She qualified the National Eligibility Test. Lectureship) in June 2011. Her research includes working on various types of transportation problems. She has published three research papers, contributed a book chapter and presented a couple of conference papers. With a teaching experience of more than 14 years, she is currently working as an Assistant Professor in the Mathematics Department of Aryabhatta College, University of Delhi.

DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES

Ms. Saumya
Pursuing Ph.D.

MS. SAUMYA is currently pursuing her Ph.D. in the Department of Applied Sciences and Humanities, Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi under the guidance of Dr. Bhavani Prasad. Her research area focuses on the application of nanomaterials in targeted drug delivery application for combination cancer therapy. So far, she has published 6 research papers in peer-reviewed journals. Also, she has presented her research work in 7 renowned international conferences. She has hands-on experience working with sophisticated instruments like Scanning Electron Microscope (Table-Top Jeol), UV-Vis spectrophotometer (Carry 100- Agilent), FTIR-ATR (IR Affinity-1S, Shimadzu). She has completed her Master's degree in Chemistry from G.B. Pant University of Agriculture and Technology, Pantnagar in 2019. In her Master's degree, she gained research experience of 6 months. She completed her thesis entitled "A green approach for the removal of Cadmium and Arsenic from synthetic waste water using Citrus limetts peels." For this research work, she has received the 'Young Scientist Award' in 2nd International Conference on Energy, functional materials and Nanotechnology and Sustainable Environment Management (ICEFN & SEM- 2019), Kumaun University, Nainital.

Ms. Saumya
Pursuing Ph.D.

MS. SHOBHNA SHANKAR is a doctoral candidate under the supervision of Prof. (Dr.) Ranu Gadi (Dean, R&D and Dean, R&C) in the Deptt. of Applied Sciences and Humanities, Indira Gandhi Delhi Technical University for Women. She completed her B.Sc. (H.) Zoology from University of Delhi, and M.Sc. Environmental Science from Central University of South Bihar. Her research interest includes monitoring of environmental pollutants, their chemical and morphological aspects and their interaction in the ambient environment. She is well experienced in equipment handling and conducting relevant experiments. She has published several research works and book chapter in revered journals, conference proceedings and book of International publishers.

DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES

DR. AISHWARYA SINGH
PH.D. SCHOLAR

DR. AISHWARYA SINGH worked as a PhD. Scholar in the Dept of Applied Sciences and Humanities, Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi, under the guidance of Dr. Bhavani Prasad Naik Nenavathu. Her research interests include the antibacterial and photocatalytic potential of Tellurite-ZnO-based nanocomposites. So far, she has published more than 10 quality research papers in peer-reviewed journals. She has more than 5 years of research experience in the field of Materials Science and 18 months of hands-on experience in a microbiology lab (BS-II lab). She was also an organizer of the prestigious ASMET conference series of IGDTUW. She has received the best paper presentation award in two prestigious international conferences held at NIT Puducherry and KCG College, Chennai, in 2023. She has hands-on experience working with sophisticated instruments like Scanning Electron Microscopy (Tabletop-Jeol), UV-Vis spectrophotometer (Cary 100-Agilent), FTIR-ATR (IRAffinity- 1S, Shimadzu). She has completed her master's degree in physical chemistry specialization and bachelor's degree in biology from Meerut College, Meerut. She was also the University Topper during her bachelor's program.

MS. PREETI JOSHI
PURSUING PH.D.

MS. PREETI JOSHI is currently pursuing her Ph.D. in the Department of Applied Sciences and Humanities, Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi under the guidance of Dr. Bhavani Prasad. Her research area focuses on the synthesis of nanomaterials for photocatalysis and sensing applications. She has hands-on experience on working with sophisticated instruments like Scanning Electron Microscope (Table-Top Jeol), UV-Vis spectrophotometer (Carry 100-Agilent), FTIR-ATR (IR Affinity-1S, Shimadzu). She has completed her Master's degree in Chemistry from G.B. Pant University of Agriculture and Technology, Pantnagar in 2019. In her Master's degree, she gained research experience of 6 months and completed her thesis entitled "Voltammetric quantification of cholesterol over polyindole tungsten carbide nanocomposite modified electrode."

DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES

MS RITA KUMARI
PURSUING PH.D.

MS. RITA KUMARI_SRF (05105I2020), a Ph.D. research scholar at Indira Gandhi Delhi Technical University for Women (IGDTUW), is immersed in pioneering research on utilizing waste biomass and used oils for Energy Storage Devices. Guided by Prof. Chhaya Ravi Kant since January 2021, she seeks sustainable, cost-effective solutions in the energy sector. She published 8 research papers in a reputed high-impact factor journal. Rita's journey includes a KIRAN-IPR internship at the Patent Facilitation Centre (PFC), TIFAC, and DST, showcasing her expertise in intellectual property rights. With a Master's in Engineering Physics from Guru Gobind Singh Indraprastha University and a prior Master's in Physics from the University of Delhi, Rita combines academic prowess with practical experience. Her impactful three-year stint as a Lecturer in Jaipur and diverse project involvement, including at the National Physical Laboratory, underscores her commitment to education and hands-on research. Proficient in various analytical techniques, Rita Kumari is a versatile professional shaping the intersection of academia, research, and sustainability.

MS. MEGHA PRAJAPATI
PURSUING PH.D.

MS. MEGHA PRAJAPATI is pursuing her Ph.D. in Physics at the Department of Applied Sciences & Humanities, Indira Gandhi Delhi Technical University for Women. She has been awarded James Cook University Postgraduate Research Scholarship (JCUPRS) to pursue Cotutelle Dual Degree PhD Programme at JCU, Australia. She completed her Masters in Physics Indian Institute of Technology Ropar, Ropar in 2020 and Bachelors in Physics from University of Delhi, 2018. She qualified the National Eligibility Test (NET) and Graduate Aptitude Test in Engineering (GATE) in 2020.Also, she qualified the Joint Admission Test for Masters (JAM) in 2018. Her research work primarily involves the synthesis and Investigations of Metal Organic Framework for Electrochemical Energy storage applications/Sensing applications.

DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES

MS. DEEPA KUMARI
PURSUING PH.D.

MS. DEEPA KUMARI is a Research Scholar pursuing PhD in Applied Sciences (Physics) from Indira Gandhi Delhi Technical University for Women, New Delhi and is in final year of PhD course. Her field of research is Electrochemical biosensors based on Metal-oxide and Carbon based nanostructures and also on Metal Organic Frameworks(MOFs). She has recently published one Research paper in SCIE indexed journal, ECS Journal of Solid State Science and Technology titled," Highly Efficient Non-Enzymatic Electrochemical Glucose Biosensor Based on Copper Metal Organic Framework Coated on Graphite Sheet" which is based on electrochemical biosensing of glucose.

She is also working on other important bio-analytes such as cholesterol and insulin. She has done M.Tech. in Nanotechnology from Maulana Azad National Institute of Technology, Bhopal (India) in 2008. She has also received her Bachelor's degree in Electronics and Telecommunication Engineering from Shri Govindram Seksaria Institute of Technology and Science, Indore (India) in 2005.

DR. RITU CHAUDHARI
ASSISTANT PROFESSOR

DR. RITU CHAUDHARI is an Assistant Professor in the Department of Physics at Noida Institute of Engineering and Technology (NIET), Greater Noida. She holds a Ph.D. in Physics and specializes in Sensors and Detectors. Her work has been featured in various reputed journals and she continues to contribute to the scientific community through active research, paper presentations, and collaborations. With a strong passion for both research and teaching, she actively mentors students and contributes to scientific advancements through her research work. Dr. Chaudhari is also involved in organizing academic events to foster scholarly dialogue and innovation within the academic community.

DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES

Dr. Sitakshi Gupta
Assistant Professor

DR. SITAKSHI GUPTA is presently working as Assistant Professor at the Department of Physics, Deshbandhu College, University of Delhi, Delhi. She has completed her Ph.D. in Physics from the Department of Applied Sciences & Humanities, Indira Gandhi Delhi Technical University for Women (IGDTUW), in collaboration with Department of Physics & Astrophysics, University of Delhi, Delhi and was awarded her PhD degree in 2024. She has previously been a recipient of the Premier Research Excellence Award 2021 at IGDTUW. She qualified the National Eligibility Test (Lectureship) and GATE in 2016.

Her research work primarily involves the synthesis and characterization of composites of reduced graphene oxide through chemical route for gas sensing applications. She has four international journal publications and has presented papers in nine international/national conferences. She has also gained experience in the electrochemical synthesis of conducting polymers and their derivatives in the research lab.

Ms Sarita Gahlawat
Pursuing Ph.D.

MS. SARITA GAHLAWAT got her Master's degree in mathematics from Kurukshetra University, Kurukshetra. Presently, she is pursuing Ph.D. from Indira Gandhi Delhi Technical University for Women, Kashmere Gate, Delhi. Her research interests include operations research and fuzzy mathematical programming.

DEPARTMENT OF INFORMATION TECHNOLOGY

DR. (MRS.) AMITA DEV
PROFESSOR

DR. (MRS.) AMITA DEV

Former Vice-Chancellor of Indira Gandhi Delhi Technical University for Women (IGDTUW), Government of Delhi, is a distinguished academician, visionary leader, accomplished administrator, and passionate researcher. She is currently serving as the Director General of Vivekananda Institute of Professional Studies, Delhi. Prior to this, she held the position of Joint Director (Technical) at the Directorate of Training and Technical Education (DTTE), Government of NCT of Delhi.

She is actively engaged in research in the fields of Deep Neural Networks, Speech Processing, Speech Modeling, Speech Recognition, and Speech Synthesis. With over three decades of extensive academic and administrative experience, she has an exceptional track record in leadership, quality teaching, innovation, and research. Dr. Dev has published more than 150 research papers in reputed national and international journals and conferences. She has also published over 51 patents, with 20 patents granted. A prolific speaker and inspiring mentor, she is frequently invited to speak at various national and international forums.

In recognition of her remarkable contributions, she has been conferred with several prestigious awards including the AICTE Young Teacher Career Award, State Best Teacher Award (Govt. of Delhi), ISTE Best Engineering Teacher Award, International ECONS Education Excellence Award, Vittiya Saksharta Abhiyan Award, Ambassador for Peace title, New Code of Education 2022 Award, Institution of Happiness Award, Prof. Rais Ahmed Memorial Lecture Award (ASI), and the Lifetime Achievement Award by Delhi Management Association. She has also received numerous appreciation letters from state and central agencies for her exemplary service in the field of technical education.

DEPARTMENT OF INFORMATION TECHNOLOGY

PROF. R.K. SINGH
PROFESSOR

PROF. R.K. SINGH

is a Professor in the Department of Information and Technology. Presently, he is Dean (Students Welfare). In the past, he served as founder Dean(Examination Affairs), Dean (Planning and Development), Registrar, and HoD (IT) in the University. He specializes in areas related to engineering, technology, and education. His research interests often encompass Information Security, Software Engineering, Software Testing, Software Project Management, etc. He has published more than 50 papers in International/National Journals/conferences of Repute. He has successfully guided 5 PhD Thesis.

Professor Singh is also involved in mentoring students and contributing to various academic and administrative initiatives within the university. He has immensely contributed in design and development of various Software Applications, ERPs and State of Art Intelligent Campus wide Network Infrastructure. He is Principal Investigator of ISEA Project phase - 3 in the thematic area of Digital Forensics worth Rs 02 Cr. He is Fellow, IETE, India and life time member of ACM, USA and CSI, India.

DEPARTMENT OF INFORMATION TECHNOLOGY

PROF. ARUN SHARMA
PROFESSOR

PROF. ARUN SHARMA completed his PhD. Degree from Thapar University, Patiala India in 2009. Prior to this, he did M. Tech. (CSE) from Punjabi University, Patiala in 1997. He has a teaching experience of more than 28 years.

Currently, he is working as Professor - IT and Dean (Academic Affairs) at Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi. He is also having the additional responsibilities as Managing Director – IGDTUW Anveshan Foundation, an Incubation Centre at IGDTUW, where total 31 Start-up companies mainly led by young women are working.

He has also been involved as Coordinator in establishing Centre of Excellence – Artificial Intelligence with a financial grant of approx. INR 80 million from DST, Govt. of India. He has been the Dean – Examination Affairs (2020-23), Founder Head of the Department – AI and Data Sciences (2020-22) and served as Head – Department of IT (2018-21), Head-Department of CSE (2022-23) and Dy. Dean – Examination Affairs (2025-18), Convener-BoS (2016-20), Admission Nodal Officer JAC during 2020-23 at IGDTUW.

His areas of interests include Machine Learning, Software Engineering, Soft Computing and Big Data. Under his guidance, 16 students have completed their PhD degree. He has published more than 195 papers in SCOPUS/SCI/SCIE indexed international journals and conferences. He is also the author of two books. He is a Senior Member-IEEE and Life Member- CSI.

Dr. Arun Sharma is serving as Expert Chair/Co-chair/Member for various high-level Committee set up by NAAC, NBA, DST, AICTE and others. He has been the Chairman of Computer Society of India - Ghaziabad Chapter and Member of IEEE Delhi Section Standing Committee on Technical & Professional Activities (Conferences). He has organized eight International Conferences as Conference Chair, Secretary or Convener and delivered Key Note Addresses in various Conferences and others in India and abroad including Singapore, Malaysia, Dubai and Thailand.

He has been awarded a grant of USD 10,000 by IBM in 2024. He has been nominated for World's Who's Who by Marquis, USA in 2013. Also, he has been recognized by Computer Society of India (CSI) for his significant contributions in 2017 and 2024.

DEPARTMENT OF INFORMATION TECHNOLOGY

PROF. BRIJESH KUMAR
PROFESSOR

PROF. BRIJESH KUMAR is a Professor in Department of Information Technology, Indira Gandhi Delhi Technical University for Women (IGDTUW). Before joining IGDTUW he was working as Professor and Registrar, MMMUT Gorakhpur, Uttar Pradesh (Technical University of UP Govt.) upto April 25, 2022.He has more than 25 years of experience in the field of Academic, Research and Administration. Presently, he is holding the responsibility of Director (Planning) of the University. He did his Ph.D. from IIT Roorkee. His research area of interest includes semiconductor novel device structures, memory designs, IoT based smart devices, AI, flexible electronics, organic electronic devices and circuits and VLSI design. He has authored/co-authored more than hundred and fifty-five (155) research papers, patents, book, book Chapter publications in International Publishers, refereed journals of repute and National/International conferences. He has received various awards and certificates of appreciation for his Academic, Research and Administration Activities. He has also received Four (4) awards from IEEE Uttar Pradesh Section also in different categories during 2017-2021. He has supervised six (6) Ph.D. Thesis and presently, supervising five (5) Ph.D. Scholars. He has also received the sponsored project grant of 2.895 Crore as a Co-chief Investigator from Ministry of Electronics and Information Technology (MeitY), New Delhi, Government of India for IoT and Drone based Research Project. He is a member of the Editorial Board/Reviewer of many international journals belonging to various organizations/publishers, including IEEE, IET, Taylor & Francis, Elsevier, and Springer.

DEPARTMENT OF INFORMATION TECHNOLOGY

PROF. A K MOHAPATRA
PROFESSOR

PROF. A K MOHAPATRA is working as an Professor in the Department of Information Technology, Indira Gandhi Delhi Technical University for Women (IGDTUW), Kashmere Gate, Delhi, India. Earlier, he has worked as an Associate Professor at USICT, GGSIP University. He also worked as the CTO and Chief Information Security Officer of Delhi Police. During his tenure of Delhi Police Heestablsiged center of Technology of Police, Cyber cell etc. He obtained his Ph. D in IT from GGSIPU in 2010. His research interests include Cyber Security, Deep fake Investigation, Cyber threat intelligence, Cryptography and quantum cryptography.

He has published various research papers in reputed international journals like ETT Wiley, IEEE IoT Journal, Computer Communication Elsevier,. He has served as session chair in many conferences and is also a reviewer of various reputed journals. He has more than 90 publications in referred journals and Conferences. He has 3 Indian patents in his credit He is currently PI of two funded projects.

DR. NONITA SHARMA
ASSOCIATE PROFESSOR

DR. NONITA SHARMA is working as Associate Professor, Indira Gandhi Delhi Technical University for Women, New Delhi. She has more than 15 years of teaching experience. Her major area of interest includes data mining, bioinformatics, time series forecasting and wireless sensor networks She has published several papers in the International/National Journals/Conferences and book chapters.She received several best paper awards for her research work in renowned international conferences. She has been awarded Best Teacher Award in view of recognition of contributions, achievements, and excellence in Computer Science & Engineering in NIT Jalandhar. She has been awarded Best Content Guru Award by Infosystwice. She hasauthored a book titled- “Analysis of Algorithms”. She has been the editor of various books published by eminent publishers like WILEY, Taylor & Francis, CRC Press etc. She is member, IEEE and has been shortlisted in Top 5 for IEEE Women Achiever Award. She is the reviewer of many peer reviewed journals and contributed to academic research in terms of projects, papers, and patents.

DEPARTMENT OF INFORMATION TECHNOLOGY

DR. DEEPAK KUMAR SHARMA
ASSOCIATE PROFESSOR

DR. DEEPAK KUMAR SHARMA is working as an Associate Professor in the Department of Information Technology, Indira Gandhi Delhi Technical University for Women (IGDTUW), Kashmere Gate, Delhi, India. He obtained his Ph.D in Computer Engineering from University of Delhi, India in 2016. His research interests include opportunistic networks, wireless ad hoc and sensor networks, Software Defined Networks and IoT Networks. He has over 20 years of experience in Academics. He has published various research papers in reputed international journals like ETT Wiley, IEEE Systems Journal, IEEE IoT Journal, Computer Communication Elsevier, IJCS Wiley etc. and conferences of repute like IEEE AINA, GLOBECOM etc. He has also authored various book chapters in edited books of IET, Wiley, Springer, Elsevier etc. He has served as session chair in many conferences and is also a reviewer of various reputed journals like ETT Wiley, AIHC Springer, IJCS Wiley etc.

DR. KAMAL KUMAR
ASSOCIATE PROFESSOR

DR. KAMAL KUMAR received his Ph. D in Wireless Sensor Networks, from Thapar University in 2014. Hereceived his M.Tech. as well as B.Tech degree from Kurukshetra University, Kurukshetra, India, and as Assistant Professor in Department of CSE, NIT Uttarakhand. Presently he is working as Associate Professor in IT Department, IGDTUW Delhi. He has also worked as Associate Professor in Centre for Information Technology (CIT) in University of Petroleum and Energy Studies. He has also served as Associate Professor in Computer Engineering Department in M.M. Engineering College, Ambala, India.

His total experience is more than 24 years. His research interest lies in WSNs, Adhoc Networks, MANETs, and Security Issues in Wireless Networks, Drug Design, Deep Learning and Grid & Cloud Computing. He has published 100+ research papers in SCI Journals, Referred Journals and International Conferences. He has served Chair NGCT2018, TPC Chair NGCT 2017, TPC member NGCT 2016, NGCT 2015 and many other reputed conferences. He has supervised 05 PhD Scholars and supervising 03 Scholars in PhD.

DEPARTMENT OF INFORMATION TECHNOLOGY

DR. MOHONA GHOSH
ASSISTANT PROFESSOR

DR. MOHONA GHOSH is currently working as an Assistant Professor in the Department of Information Technology at Indira Gandhi Delhi Technical University of Women (IGDTUW), Delhi. She has completed her M.Tech and PhD from Indraprastha Institute of Information Technology (IIIT-D) Delhi in Computer Science and Engineering with specialization in Information Security. She did her Postdoctoral from Nanyang Technological University (NTU), Singapore. She was a recipient of the prestigious TCS Research Fellowship during her PhD from 2013- 2016. She has guided 1 PhD student, 12 M.Tech students and supervising 4 PhD scholars. She has more than 30 research publications in reputed international journals and conferences andhas served as a reviewer for several SCI Journals including Wiley, Elsevier and Springer. Her research interests include Symmetric Key Cryptography, Blockchain and Cyber Security.

DR. BHAWNA NARWAL
ASSISTANT PROFESSOR

DR. BHAWNA NARWAL has been serving as an Assistant Professor in the Department of IT at Indira Gandhi Delhi Technical University for Women (IGDTUW) since March 2018. She holds a Ph.D. in Wireless Body Area Networks and has actively contributed to academia and research in the field of computer science. She has been a technical program committee member and session chair at numerous international conferences and has received the IGDTUW Premier Research Excellence Award for outstanding research contributions in 2020, 2021, 2023, and 2024. Her primary research interests include Cyber Security, Information Security, Internet of Things (IoT) Security, and Internet of Drones Security. Dr. Narwal has published several research papers in SCI and Scopus-indexed international journals and conference proceedings. In addition to her research, she has guided numerous M.Tech dissertations, MCA, and B.Tech major and minor projects. Currently, she is supervising five Ph.D scholars, contributing to the advancement of knowledge in her areas of interest.

DEPARTMENT OF INFORMATION TECHNOLOGY

DR. ALONGBAR WARY
ASSISTANT PROFESSOR

DR. ALONGBAR WARY is an Assistant Professor in the Department of IT, Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi. He has completed his M.Tech. and Ph.D. degree from National Institute of Technology (NIT) Nagaland, in the year of 2017 and 2022 respectively. Earlier, he worked as an Assistant Professor at Aditya Engineering College (Autonomous), Surampalem, Andhra Pradesh. He also worked as an Assistant Professor at Vellore Institute of Technology (VIT)-AP University, Andhra Pradesh campus. He has published SCI journal papers in his area of interest in peer-reviewed international journals of high repute.

His research interests include Image and Video Processing, Image Retrieval, Machine Learning, Deep Learning and Computer Vision.

DR. JYOTI SHOKEEN
ASSISTANT PROFESSOR

DR. JYOTI SHOKEEN is currently serving as an Assistant Professor in the Department of Information Technology at Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi. She earned her Ph.D. from the University Institute of Engineering and Technology (UIET), MDU Rohtak. With a strong research background, Dr. Shokeen has made significant contributions to the fields of Machine Learning, Deep Learning, Social Networks, and Blockchain. She has published over 30 research papers in reputed national and international journals, as well as in prestigious conference proceedings. Several of her research works have been featured in high-impact, SCI-indexed journals such as Artificial Intelligence Review and The Journal of Supercomputing, underscoring the depth and quality of her contributions to the academic and scientific community. She is currently the mentor of B.Tech 2nd Year and coordinator of SAMARTH ERP portal.

DEPARTMENT OF INFORMATION TECHNOLOGY

Ms. Rashmi Raj
Pursuing Ph.D.

MS. RASHMI RAJ is a PhD student in Department of Information Technology at Indira Gandhi Delhi Technical University of Women (IGDTUW), Delhi. She has received her B.Tech from Uttar Pradesh Technical University and M.Tech from Indraprastha University. Her area of research includes Blockchain, information security, and IoT (Internet of Things).

Ms. Shivangi Batra
Pursuing Ph.D.

MS. SHIVANGI BATRA is pursuing her PhD in Information Security from the IT Department of IGDTUW and completed her M.Tech in Information Security Management (ISM) from IGDTUW in 2023. She attained her B.Tech in Information and Technology from GGSIPU in 2021. She has received the best oral presentation and best paper award for her research work at the 4th IEEE AIST Conference and in the International Conclave on Materials, Energy & Climate, India 2022. She has published one SCI Indexed Journal paper and 5 papers in International Conferences of repute. Her research interests include Cyber Security, Information Security, and Security in healthcare.

DEPARTMENT OF INFORMATION TECHNOLOGY

DR. RITU RANI
RESEARCH ASSOCIATE

DR. RITU RANI has worked as a Research Associate in Center of Excellence- Artificial Intelligence at Indira Gandhi Delhi Technical University for Women, Delhi under the Project "Centre of Excellence – Artificial Intelligence" funded by Department of Science and Technology (DST). She has more than 11 years of teaching experience. She received her Undergraduate Degree (B.Tech in ECE) with distinction from University Institute of Engineering and Technology, Kurukshetra University in 2010, received Post graduate degree (M.Tech in ECE) with distinction from Deenbandhu Chhotu Ram University of Science and Technology, Murthal in 2013 and Doctorate Degree (PhD, Electronics and Communication Engineering) in 2021 from Guru Gobind Singh Indraprastha University, Delhi. She is GATE and UGC-NET qualified. She has published more than 80 research papers in various renowned international conferences and SCI indexed journals/Scopus Indexed journal and UGC listed journals. Her research domain includes Image processing, Computer vision, Machine learning, Deep Learning, object detection.

MS. VIBHUTI DABAS
STUDENT

MS. VIBHUTI DABAS is an AI and Machine Learning enthusiast pursuing an MSc in Advanced Computer Science: AI at the University of Manchester, with a B.Tech in IT from IGDTUW. She has published research onhyperspectral image generation via CNN and NLP-based FAQ chatbots, showcasing her expertise in deep learning and AI applications for real-world problems. She has gained hands-on experience through multiple roles, including developing and deploying ML models for self-checkout kiosks, which portrays her ability to develop practical AI solutions for real-world problems. Her technical proficiency, combined with a passion for innovative AI applications, makes her a promising contributor to the evolving landscape of machine learning and artificial intelligence.

DEPARTMENT OF INFORMATION TECHNOLOGY

Ms. Anvita Gupta
Student

MS. ANVITA GUPTA completed her bachelor's degree in Information Technology from Indira Gandhi Delhi Technical University for Women, Delhi, India. Her interests include network security, cryptography, the Internet of Things (IoT), and information security. She is a software engineer at Visa.

Ms. Ayushi Jain
Student

MS. AYUSHI JAIN completed her bachelor's degree in Information Technology from Indira Gandhi Delhi Technical University for Women, Delhi, India. Her interests include the internet of drones, cryptography, and information security. She is a software engineer at Microsoft.

Ms. Mehak Garg
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MS. MEHAK GARG completed her bachelor's degree in Information Technology from Indira Gandhi Delhi Technical University for Women, Delhi, India. Her interests include network security, cryptography, and blockchain. She is a software engineer at Google.

DEPARTMENT OF INFORMATION TECHNOLOGY

Ms. Srishti Chanda

MS. SRISHTI CHANDA is a passionate and driven researcher with a strong academic foundation in Artificial Intelligence and Machine Learning. As a B.Tech graduate in Information Technology from Indira Gandhi Delhi Technical University for Women, she has actively contributed to research in AI, including recent work in the domain of facial recognition.Alongside her academic pursuits, she works as a Software Development Engineer II at Walmart Global Tech India, where she blends her research mindset with engineering excellence—building scalable, intelligent systems.

Ms. Yachika N Kumar

MS. YACHIKA N KUMAR is a passionate and driven researcher with a strong foundation in Artificial Intelligence and Machine Learning. Currently working as a Software Engineer at Wells Fargo, she brings a blend of academic insight and industry experience. Her research in facial recognition for forensic applications showcases her analytical thinking, problem-solving skills, and deep interest in computer vision. With hands-on experience in developing intelligent systems and a continuous drive to learn, Yachika is well-positioned to make meaningful contributions to the AI/ML field.

DEPARTMENT OF INFORMATION TECHNOLOGY

Ms. Manu Shree

MS. MANU SHREE has extensive experience in academia, having worked as an Assistant Professor and Guest Lecturer at multiple institutions. Her research in facial recognition for forensic applications, backed by DST-sponsored projects, highlights her strong analytical and technical skills.

Ms. Shrankhla Srivastava

MS. SHRANKHLA SRIVASTAVA is a software engineer in the Microsoft 365 Copilot team, working on cutting-edge AI solutions. With experience in machine learning, published research in facial recognition, and multiple national hackathon wins, she blends technical depth with creative problem-solving. She has been recognized as a Grace Hopper Scholar and GitHub Campus Expert for her leadership and impact in tech.

DEPARTMENT OF INFORMATION TECHNOLOGY

Ms. Fizza Rizvi

MS. FIZZA RIZVI, an M.Tech research student in the batch 2021-23 specializing in Information Technology at IGDTUW, Delhi. With a strong academic foundation and a keen interest in cybersecurity, she has been actively engaged in cutting-edge research, focusing on advanced detection techniques for cyber threats. Her research work culminated in the publication of a paper titled "An Evolutionary KNN Model for DDoS Assault Detection Using Genetic Algorithm-Based Optimization," published in March 2024. This paper presents an innovative approach to enhancing the accuracy and efficiency of DDoS (Distributed Denial of Service) attack detection using an evolutionary K-Nearest Neighbors (KNN) model optimized through genetic algorithms. Her work significantly contributes to network security by addressing real-time threat detection and system performance optimization. In addition to this, Fizza has published two conference papers during her third semester of M.Tech, showcasing her dedication to research from the early stages of her academic journey. She was also among the top 10 students in her M.Tech program to receive a scholarship, reflecting her academic excellence and commitment to her studies. Fizza's research demonstrates strong analytical skills and a deep understanding of machine learning algorithms, cybersecurity protocols, and data analysis techniques. She actively participates in academic discussions, workshops, and seminars, continuously seeking opportunities to expand her knowledge and contribute to the evolving field of cybersecurity. Her dedication to research, combined with innovative problem-solving skills, positions her as a promising researcher in network security and machine learning, with a clear passion for advancing cybersecurity solutions.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

PROF. ASHWNI KUMAR
PROFESSOR

PROF. ASHWNI KUMAR is a distinguished academician and administrator with over 31 years of extensive experience in teaching, research, and institutional governance. He earned his BE (1991) and ME (1993) in Electronics and Communication Engineering from Delhi College of Engineering, Delhi University, followed by an MBA in Technology Management (1998) from the Faculty of Management Sciences, Delhi University. He was awarded a Ph.D. in Digital Signal Processing in 2000 by Delhi College of Engineering. Currently serving as Professor in the Department of Electronics and Communication Engineering at Indira Gandhi Delhi Technical University for Women (IGDTUW) Dr. Kumar has also held several pivotal leadership roles including Pro Vice-Chancellor, Dean (International Affairs), Dean (Student Welfare), Registrar, and Head of the ECE Department? His academic contributions are noteworthy, with over 90 research papers published in reputed international journals and conferences. A dedicated research mentor, he has successfully guided 10 Ph.D. scholars and is presently supervising 9 more. His core areas of expertise include digital signal processing, 5G/6G MIMO Antenna Design, academic leadership, and technology management, through which he continues to contribute meaningfully to the advancement of higher technical education and institutional development.

PROF. JASDEEP KAUR DHANOA
PROFESSOR

PROF. JASDEEP KAUR DHANOA , B.E, M.Tech (DCE), Ph.D-GGSIPU (Low Voltage Analog Design) is Professor and Head (second term) in the Dept of Electronics and Communication Engineering at IGDTUW, Delhi. She is also the Training and Placement Officer since 2018. She recently completed her tenure of Dean-Academic Affairs (2020- 2023). With a keen interest in technology and passion to contribute to the student community, she is a Senior Member & Vice Chair- IEEE Delhi section-2023-24, member of Delhi Section IEEE Electron Device Society. She is also the core member of Women in Big Data, the International Technical group, supporting the Returning Mothers at various forums.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

PROF. NIDHI GOEL
PROFESSOR

PROF. NIDHI GOEL, Ph.D. is working as a full-Professor at the Department of Electronics and Communication Engineering, Indira Gandhi Delhi Technical University, Delhi, India. She was the head of the ECE Department for two consecutive terms (2018-2023).Prior to joining IGDTUW, she was associated with Delhi Technological University (formerly, DCE), Delhi, India. She has a teaching and research experience of approximately 20 years. She pursued her research interest and completed her PhD from the Indian Institute of Technology Roorkee, India. Her area of interests includes medical image processing, deep learning, artificial intelligence applications, multimedia security, computer vision, soft computing techniques. She has organized several biomedical challenges, workshops, has granted patents, research project grants, and published more than 80 research articles, editorials, and chapters in journals and conferences of international repute.

PROF. VANDANA NIRANJAN
PROFESSOR

PROF. VANDANA NIRANJAN is working as Professor in the Dept of ECE at IGDTUW Delhi. She graduated in the year 2000 and received her B.Tech degree in ECE from Government Engineering College, Bhopal. In the year 2002, she received her M.Tech degree from the Dept of ECE at IIT Roorkee with VLSI Design as specialization. In the year 2015, she was awarded her Ph.D degree in the area of Low Voltage VLSI Design from GGSIP University Delhi. She has a teaching and research experience of approximately 20 years at IGDTUW. Her areas of interest includes Low-voltage Low-Power VLSI circuits. She has several publications to her credit in various international journals & conferences and Book chapters.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

PROF. SHOBHA SHARMA
PROFESSOR

PROF. SHOBHA SHARMA had been IC design engineer in world's top MNCs before joining IGDTUW. Area of research interest VLSI design. Dr. Shobha Sharma is Professor in the department of Electronics and Communication Engineering in IGDTUW. She did her PhD from Guru Gobind Singh Indraprastha university. She had her M.E. from BITS Pilani. She had worked in world's top US/European MNCs in India and abroad as chip design engineer before joining IGDTUW. She had got offer of PhD with scholarship in University of west of England but refused before joining IGDTUW. Her area of specialization is Digital VLSI design. She is multitalented person with many awards in various field since childhood.

DR. PANKAJ GUPTA
ASSOCIATE PROFESSOR

DR. PANKAJ GUPTA received B. E. degree in Electrical Engineering from Bhillai Institute of Technology, Pt. Ravi Shankar Shukla University, Raipur, India, in 2000 and M. E. degree in Electrical Engineering from Delhi College of Engineering, Delhi University, Delhi, India, in 2003. He obtained Ph.D degree in Electrical Engineering from NIT, Kurukshetra, India in 2017. He is conferred with prestigious POSOCO Power System Award-2017 for outstanding PhD research work entitled, "Protection issues of grid connected distributed generation" by the Power System Operation Corporation Limited, a subsidiary of Power Grid Corporation, India in partnership with Foundation for Innovation and Technology Transfer, IIT, Delhi. Currently he is working with Indira Gandhi Delhi Technical University for Women, Delhi, India as Associate Professor. He has many publications in reputed international and national journals and conferences. He is conferred with Premier research award and commendable research award in 2022 and 2023 by IGDTUW for publication in journal with high impact factor. His research interests include power system protection, microgrid control and protection, smart grid technologies and islanding detection techniques.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

DR. RICHA YADAV
ASSISTANT PROFESSOR

DR. RICHA YADAV received her B.Tech and M.Tech degrees in Electronics and Communication Engineering from the M.D.U. University, Haryana, in 2003 and 2007 respectively. She received her Ph.D. degree from University of Delhi, in 2015. Dr. Yadav held the positions of Lecturer at the ECE Department of PDMU, Haryana and Bharati Vidyapeeth College of Engineering, New Delhi from 2007 to 2009. She was with the Division of Electronics and Communication Engineering, NSIT, as Teaching-cum-Research Fellow from Aug. 2009 to Aug. 2013. She joined Indira Gandhi Delhi Technical University of Women (IGDTUW), New Delhi as Assistant Professor in the Department of Electronics and Communication Engineering in 2015 and since then she has been working in the same institute. Her research interests are in Analog and Digital Signal Processing (SP) with emphasis on optimization; Evolutionary Algorithms and VLSI Design. She has authored/co-authored over 25 research papers in various international journals of repute and over 35 International Conference papers so far. Three research scholars have completed Ph.D. and, currently, five research scholars are currently working under her guidance.

MS. VAISHALI KIKAN
SENIOR RESEARCH FELLOW

MS. VAISHALI KIKAN received B.Tech. degree in Electronics and Communication Engineering from Indira Gandhi Delhi Technical University (IGDTUW), Kashmere Gate, India in 2017 and MTech degree from Delhi Technological University (DTU), India in 2019. She cleared UGC NET JRF in 2019. She is pursuing her PhD as UGC sponsored JRF degree from the Department of Electronics and Communication Engineering, IGDTUW, Kashmere Gate, India in 2017. She worked as an Assistant Professor in KIET Group of Institutions from 2019 to 2022. She is providing free education with her YouTube channel, Dopamine to 53500+ subscribers. Her research interest includes printed 5G-MIMO/ array antenna, wideband/ super wide band /ultra wide band antennas, dual band/ triple band printed antennae, antennas for healthcare, and designing of Microstrip antennas using Machine Learning and Artificial network.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

Ms. Harshita Prasad
Research Scholar

MS. HARSHITA PRASAD received B.Tech. Degree in Electronics and Communication Engineering from Kumaon Engineering College, Uttarakhand in 2012 and M.Tech. Degree from Uttarakhand Technical University, Dehradun in 2015. She cleared UGC-NET in 2022. She is pursuing her Ph.D. Degree in the Department of Electronics and Communication Engineering from Indira Gandhi Delhi Technical University, Kashmere Gate, India. She worked as a Lecturer in various Govt. Colleges from 2015 to 2018. Her research interest includes Low Power VLSI for FPGAs, Power Estimation for VLSI circuits, Machine Learning.

Ms. Siddhi Bhardwaj
Student

MS. SIDDHI BHARDWAJ has completed bachelor of technology in Electronics and communication engineering from Indira Gandhi Delhi Technical university for Women (IGDTUW). She is currently doing research on the antenna designs for future 5G applications. She is also writing and reviewing research papers for the latest 5G antennae. Her interests include designing antennas, communication technologies, networking technologies, designing databases and building applications with web technologies. She has done internship in Cuckoo appliances private limited, India in the field of Augmented reality. She has developed. She has made projects in Augmented reality, web development and databases which are publicly accessible on Github.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

Ms. Neha
Student

MS. NEHA completed her bachelor of technology in electronics and communication engineering from Indira Gandhi Delhi Technological University for Women. She had done her research word on antenna technology for potential 5G applications. Her interests include constructing antennas for communications technology, designing databases, and creating software applications. She has written review paper on 5G technology along with the antenna having 28 GHz, 38 GHz frequencies. She has completed projects in web development and databases that are deployed on the GitHub platform, as well as an internet of things (IoT) internship with the Anveshan Foundation and IGDTUW.

Ms. Takshish Bano
Student

MS. TAKSHISH BANO completed bachelor's degree in electronics and communication engineering from Indira Gandhi Delhi Technical University for Women (IGDTUW). She is now conducting research on antenna designs for potential 5G applications. She has written review papers and research papers on 5G technology. Her interests include online application development, database design, antenna design, and networking technology. She has made many projects on web applications which are accessible on Github with the Anveshan Foundation and IGDTUW.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

Ms. Swati
Research Scholar

MS. SWATI received her B.Tech and M.Tech degree in Electronics and Communication Engineering from UPTU, Lucknow. She has done her PhD from Department of Electronics and Communication, Indira Gandhi Delhi Technical University for Women, Delhi. Her areas of interest are different materials, analog circuits and CMOS-VLSI Design.

Dr. Reshma Sinha
Research Scholar

DR. RESHMA SINHA received her B.E. degree in Electronics and Instrumentation from Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal, India in 2009, the MTech degree in VLSI Design (2015), and Ph.D. degree at the Department of Electronics and Communication Engineering (2025) from Indira Gandhi Delhi Technical University for Women (IGDTUW), Govt of NCT of Delhi, India. She is currently working as an Assistant Professor in Instrumentation Department of Shaheed Rajguru College of Applied Sciences for Women, University of Delhi, India. With a keen interest in technology and hardworking in nature, she has 4 publications in International and National Journals, 2 book chapters, and 9 publications in International Conferences. Her area of interest are VLSI design, spintronics, MRAM memory devices and modelling and simulation of low-dimensional 2D materials.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

Ms. Shalu Garg
Research Scholar

MS. SHALU GARG is currently pursuing a Ph.D. in VLSI at Indira Gandhi Delhi Technical University for Women (IGDTUW) under the guidance of Prof. Jasdeep Kaur Dhanoa. She completed her M.Tech from Delhi Technological University (DTU) in 2013 and her B.Tech from Guru Gobind Singh Indraprastha University in 2009. Since 2014, she has been serving as an Assistant Professor at Maharaja Agrasen Institute of Technology (MAIT), Delhi. She has a strong research interest in the field of VLSI and has published eight papers in international conferences and three papers in reputed SCI journals.

Ms. Anushree
Research Scholar

MS. ANUSHREE is a researcher and Ph.D. scholar in the Department of Electronics and Communication Engineering at Indira Gandhi Delhi Technical University for Women, Delhi. She has received her B.Tech. degree in Electronics and Communication Engineering from F.E.T Agra College, Agra, in 2010 and M.Tech. degree in VLSI System Design from Hindustan College of Science and Technology, Mathura in 2012. She has 5+ years of rich academic & research experience. With 4+ years of corporate experience in Analog Mixed Signal Design and Verification across organizations, she has practically put her research & technical knowledge to design valuable advanced chips.

She has led a team of engineers in testing, verification and authentication of various electronic products against Bureau of Indian Standards (BIS) and Bureau of Energy Efficiency (BEE). With having published 19+ research papers in National & International Conferences and esteemed Journals in VLSI Design, she has vastly contributed to the intellectual base of semiconductors industry. Her research area includes low power VLSI design, VLSI interconnects, ultra-low power (subthreshold) circuits and systems, Analog and mixed signal designing.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

Ms. Isha Malhotra
Senior Research Fellow

MS. ISHA MALHOTRA is an SRF currently affiliated with the Dept. of ECE at IGDTUW. She is a UGC-NET qualified professional. She is actively engaged in research focusing on Machine Learning, Statistical Modeling, Data Science, Forecasting, Hybrid Modeling, and Epidemiology. With a professional background spanning over 5 years, she has gained valuable experience during her tenure as a Programmer Analyst Advance at Aon Hewit. In addition to her corporate experience, she has also shared her knowledge as a visiting faculty at DTU. During her graduation, she was honored with the prestigious 'Chairman Gold Medal of Excellence Award' for her outstanding performance in academics.

Furthermore, her contributions to client work during her industrial tenure were acknowledged with the 'Gold Award' multiple times. She also received the 'Research Excellence Award' in the 'Premier Research Category' from IGDTUW in July 2024. Outside the realm of academics, she has also been a National Kho-Kho Championship Player.

Ms. Nirma Peter
Research Scholar

MS. NIRMA PETER is a dedicated researcher and academician with a strong background in Electrical and Electronics Engineering. She completed her B.Tech in Electrical and Electronics Engineering with Honours from FISAT, Kerala, in 2012. Her passion for power systems and energy technologies led her to pursue an M.Tech in Power Electronics and Power Systems Engineering, which she successfully completed in 2014. From 2014 to 2022, she served as an Assistant Professor at the Albertian Institute of Science and Technology, Kerala, where she actively contributed to teaching and mentoring students.In 2022, she took leave from her academic position to pursue a Ph.D. at the Department of Electronics and Communication Engineering, IGDTUW, under the esteemed guidance of Prof. Nidhi Goel.Her doctoral research focuses on leveraging machine learning and deep learning techniques to enhance the protection strategies of modern power systems. Her research interests span multiple domains, including power systems, power electronics, machine learning, and deep learning. Through her work, she aims to bridge the gap between traditional power system protection and intelligent, data-driven methodologies, contributing to the advancement of smart and resilient energy networks.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

Ms. Pooja Pandey
Research Scholar

MS. POOJA PANDEY is a research scholar at the Department of Electronics and Communication Engineering, Indira Gandhi Delhi Technical University, Delhi. Her research area includes image processing, computer vision, deep learning and artificial intelligence applications.

Ms. Garima
Research Scholar

MS. GARIMA is a research scholar in the Department of Department of Electronics and Communication Engineering Department under the guidance of Prof. Nidhi Goel at Indira Gandhi Delhi Technical University (IGDTUW), New Delhi. She is also working as an Assistant Professor at Maharaja Surajmal Institute of Technology, Delhi. She has obtained her B.Tech degree and M.Tech degree in Electronics and Communication Engineering from GGSIPU, Delhi. Her Research areas includes Digital System Design, VLSI circuits, Signal Processing and Artificial Intelligence & its varied applications. To pursue her research interest in EEG signal processing, she is currently working on Emotion recognition via EEG signals.

Ms. Jasmine
Research Scholar

MS. JASMINE works on Artificial Intelligence (AI) algorithms for manual-to-automation transition of medical procedures. She particularly leverages Deep Learning (DL) mechanisms in biomedical image analysis. Apart from it, she is profound in analog electronics, microprocessors, microcontrollers, and embedded systems. With her former industrial experience (Cadence Design Systems, Noida), she expert in providing insights into industrial demands to guide students in their future endeavours.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

Ms. Vidhi Bishnoi
Research Scholar

MS. VIDHI BISHNOI is a Research Scholar in the Department of Electronics and Communication Engineering at the Indira Gandhi Delhi Technical University, New Delhi. She received her B.Tech and M.Tech in Electronics and Communication. She has published 10 conferences and 3 journal papers in reputed international journals. Her areas of interest include medical image processing, deep learning, artificial intelligence applications, and computer vision.

Dr. Palak Handa
Research Scholar

DR. PALAK HANDA, Ph.D. is a working as a Scientist at the Research Centre for Medical Image Analysis and Artificial Intelligence (MIAAI), Department of Medicine, Danube Private University, Austria since June 2024. She completed her M. Tech. in Very Large-Scale Integrated Circuits (VLSI) from Department of Electronics and Communication Engineering, Indira Gandhi Delhi Technical University for Women, New Delhi, India and Ph.D. in Computer Vision and Medical Image Processing from Department of Electronics and Communication Engineering, Delhi Technological University, New Delhi, India. Her research area of interest includes medical image analysis, computer vision, artificial intelligence, biomedical signal processing and CAD simulations. She has developed and open-sourced 10 biomedical datasets with different biomedical modalities including video capsule endoscopy, colonoscopy, electroencephalography, and ultrasound imaging. She has authored 12 journal articles, 20 conference articles, 8 book chapters, and 2 granted national patents of international repute. She has co-organized 3 biomedical challenges in collaboration with famous international conferences and association namely ICIP 2024, Abu Dhabi, CVIP 2023, IIT Jammu, and IEEE Delhi Section and EDS Society.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

Ms. Arushi Garg
Student

MS. ARUSHI GARG is a recent graduate of B.Tech in Electronics and Communication Engineering, Indira Gandhi Delhi Technical University for Women, Delhi, India. She is currently associated with Adobe, Bangalore, India as a Member of Technical Staff-software engineering. Her research area of interest includes artificial intelligence, computer vision, medical image processing, deep learning, transformers and large language models. She has authored 6 conference articles. She was the AWS Cloud Captain in the year 2023, and GGSoC program manager in the year 2024, and has actively participated in training and placement cell at her university.

Ms. Smridhi Gupta
Student

MS. SMRIDHI GUPTA is a recent graduate of B.Tech in Electronics and Communication Engineering, Indira Gandhi Delhi Technical University for Women, Delhi, India. She is currently associated with Citi, Pune as a technology analyst. She has actively participated in the research internship from Artificial Intelligence Institute of South Carolina and was a GWC scholar, flipkart, and Millennium Fellow, United Nations Academic Impact. Her research area of interest includes artificial intelligence, computer vision, medical image processing, deep learning, transformers and large language models and she has authored 5 conference articles.

Ms. Soumya Vats
Student

MS. SOUMYA VATS is a recent graduate of B.Tech in Electronics and Communication Engineering, Indira Gandhi Delhi Technical University for Women, Delhi, India. She is currently associated with Deutsche bank as a graduate analyst. Her research area of interest includes artificial intelligence, computer vision, medical image processing, deep learning, transformers and large language models and she has authored 2 conference articles. She has actively participated in the training and placement cell and technical and non-technical clubs at her university.

DEPARTMENT OF ELECTRONICS & COMMUNICATION

Ms. M.Tirupathamma
Research Scholar

MS. M.TIRUPATHAMMA is pursuing her Ph. D degree at Indira Gandhi Delhi Technical University Delhi, India , under the supervision of Dr. Vandana Niranjan . Her areas of research interest include Image Processing, Image analysis, Thermal infrared imaging, Machine Learning etc. She has published papers at various international journals and conferences. She is currently working as an Associate professor in the Department of Electronics and communication Engineering at JNTUH University college of engineering Jagitial, Telangana, India. with a teaching experience of more than 18 years. She is a life member of ISTE and Member of IEI.

Ms. Neeraj
Research Scholar

MS. NEERAJ is pursuing her Ph.D. degree under the supervision of Dr. Shobha Sharma, Department of Electronics and Communication Engineering, IGDTUW. Currently, she is working in Maharaja Agrasen Institute of Technology (MAIT), GGSIPU, Delhi as an Assistant Professor. She has published five SCI indexed research papers in international journals, 2 copyrights , 1 published patent and 10 papers in International IEEE indexed conferences in the research area of NW FET for high frequency applications, VLSI.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROF. SRN REDDY
PROFESSOR

PROF. SRN REDDY is a Professor and Head of the Computer Science & Engineering Department at Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi. He earned his Ph.D. in Embedded Systems Design in 2009 and an M.Tech in 2002 from Jawaharlal Nehru University, New Delhi. His research expertise includes Embedded Systems Design, IoT, Mobile Architecture, and Engineering Education.He has published over 100 research papers, authored books, and filed four Indian patents, including "My Smart Phone Kit," which has been commercialized. Dr. Reddy is actively engaged in research, serving as Principal Investigator or Co-PI in three externally funded projects by DIC, MHRD, and completing six projects with Microsoft, Intel, and Nokia. He also collaborated with IIT Delhi and IIIT Delhi on two MHRD-sponsored projects. He established advanced Embedded & Mobile Design and IoT Innovation labs at IGDTUW in collaboration with Intel, Microsoft, Nokia, Atmel, and ARM. He has conducted over 40 workshops and training programs on IoT and Mobile Architecture for professionals, faculty, and students and has delivered keynote sessions and tutorials at international conferences. Recognized for his contributions, Dr. Reddy has received industry grants and Intel travel fellowships, driving innovation in academia and research.

PROF. ELA KUMAR
PROFESSOR

PROF. ELA KUMAR is Currently working as Professor in Computer Science Department, Indira Gandhi Delhi technical University for Women, Delhi. She has completed Ph. D. from University of Delhi, in 2003 and M. Tech (CS), IIT Roorkee 1990. B.E. (E&C) IIT Roorkee in 1988.She has professional experience more than 33 year of Teaching and research Technical Organization. She has published more than 115 research papers in International journals / National journals / International conferences of repute. She has delivered many expert talks, keynote speaker, session chair in national / international conferences.She has represented her research work in countries like USA, UK, Hong Kong and Thailand. She has authored 4 books and more than 10 IGNOU course material for MCA / BCA program. Her research area of interests are Artificial Intelligence, Neural Network, Natural Language Processing, Expert system development, knowledge engineering, Machine Learning, Deep Learning.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROF. SEEJA K. R.
PROFESSOR

PROF. SEEJA K. R. is Professor in the Department of Computer Science and Engineering, Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi. She has received her Ph.D. degree in Computer Science from Jamia Hamdard, New Delhi, India. Her research interest includes Data Mining, Intelligent Computing, Biometrics, Health Informatics and Algorithm Design. She has published many research papers in various international journals and conference proceedings.

PROF. VIVEKANAND JHA
PROFESSOR

PROF. VIVEKANAND JHA is a Professor in the Department of Computer Science and Engineering at Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi, where he has been serving since 2007. He holds a Ph.D. in Computer Science and Engineering from IGDTUW (2018), an M.Tech. in Information Technology from the Indian Institute of Information Technology (IIIT), Gwalior (2006), and a B.Tech. in Computer Science and Information Technology from Rohilkhand University. With over 19 years of teaching and research experience, Dr. Jha has made significant contributions to academia and the research community. He has authored and co- authored more than 50 research papers published in reputed international journals and conferences. His scholarly work spans a broad range of areas including Wireless Sensor Networks (WSNs), the Internet of Things (IoT), Intelligent Networks, Software Defined Networks (SDNs), and Machine Learning. Dr. Jha is deeply committed to academic excellence, innovation, and mentoring the next generation of engineers and researchers. His ongoing research is focused on developing intelligent, scalable, and adaptive network architectures to meet the evolving demands of modern computing and communication systems.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DR. RAVINDER M.
ASSISTANT PROFESSOR

DR. RAVINDER M. is presently working as an Assistant Professor (CSE) at Indira Gandhi Delhi Technical University for Women (IGDTUW) New Delhi. He has received his Ph.D. in Computer Science and Engineering from Jawaharlal Nehru Technological University, Kakinada (JNTUK), Andhra Pradesh, India. He has received his B.Tech (Computer Science and Engineering) from BV Raju Institute of Technology (BVRIT), Medak, Telangana and M.Tech (Computer Science) from School of Information technology (SIT), Jawaharlal Nehru Technological University, Hyderabad, Telangana.He has published many research papers in reputed conferences and journals, including Web of Science and Scopus. His research area of interest includes Image Processing, computer vision, Machine Learning and Deep Learning.

DR. VIJAY KUMAR YADAV
ASSISTANT PROFESSOR

DR. VIJAY KUMAR YADAV is an Assistant Professor in the Department of Computer Science and Engineering at Indira Gandhi Delhi Technical University for Women, Kashmere Gate, New Delhi. He holds an M.Tech and Ph.D. from the Indian Institute of Information Technology, Allahabad, with his doctoral research focusing on oblivious transfer for location-based services. He has published extensively in SCI/SCIE-indexed journals and has presented his work at various international conferences.With over twenty SCI/SCIE-indexed publications, including four papers in IEEE Transactions and one in ACM Computing Surveys, his contributions reflect a strong research commitment. Additionally, he has served as a reviewer for several esteemed peer-reviewed journals.His research interests span Cryptography, Information Security, Machine Learning, and Quantum Computing.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Ms. Karuna Kadian
Assistant Professor

MS. KARUNA KADIAN is an Assistant Professor in the Department of Computer Science and Engineering at Indira Gandhi Delhi Technical University, Delhi. She is pursuing a Ph.D. in Computer Science and Engineering in Quantum Computing from Thapar Institute of Engineering and Technology, Patiala, Punjab. She has done her M.Tech (I.T.), in 2014 and B.Tech (C.S.E.), in 2012 from G.G.S.I.P.U, Delhi. She has also qualified for U.G.C. (NET-JRF) in 2015 and GATE (2012). She has teaching and research experience of more than six years. Her research interests include Quantum Computation and quantum information, Blockchain technology, and algorithm design. She has published articles in the domain of quantum computing, quantum walks, quantum machine learning, cybersecurity, AI/ML and healthcare domains. She has done consultancy project in the cybersecurity domain with leading industry partners to strengthen the academic-industry collaboration.

Ms. Bhawna Jain

MS. BHAWNA JAIN is pursuing a PhD. in Computer Science under joint supervision from Delhi Technological University (DTU)- University of Michigan Flint, USA. She is an Assistant Professor in the Department of Computer Science and Engineering at Indira Gandhi Delhi Technical University for Women (IGDTUW). She has over three years of experience working as a Software Developer in the industry. She has won awards like All Rounder Performer and ACE Excellence award for being Growth Catalyst and received appreciation for her remarkable efforts in the R\&D department during her industry experience. She also contributed to the Guinness Book of World Records for the "Largest online video chain of people handing over an object." She has research publications with IEEE and Springer. Her areas of interest are Artificial Intelligence, Deep Learning, Software Maintenance, and Generative AI.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DR. JAGRATI SINGH
ASSISTANT PROFESSOR

DR. JAGRATI SINGH is working as an Assistant Professor in the Department of Computer Science & Engineering. She completed her Ph.D. from Motilal Nehru National Institute of Technology Allahabad in the field of Text Data Analysis. Her Thesis work deals with the Twitter Data Analytics using Machine Learning based Approaches. She has published Seven SCI/Scopus journal papers and 15 Conference papers during and after her Ph.D. She received her M.Tech and B.Tech both degrees from Banasthali Vidyapith Rajasthan. During her M.Tech, one year Internship program is done at IIIT Hyderabad in the field of Natural Language Processing. She has taken various hands-on training sessions in the Summer training programs named "Data Driven Computing and Networking" and "Data Analytics and Machine Learning in R (DAMLR)" organized by the Department of Computer Science & Engineering, MNNIT Allahabad.

MS. JYOTI GUPTA

MS. JYOTI GUPTA is a PhD. Scholar in the Department of Computer Science & Engineering at Indira Gandhi Technical University for Women, Delhi. Her research interests include Machine Learning, Deep learning, and explainable Artificial Intelligence. She completed her Master's degree from Banasthali University, Rajasthan.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Ms. Manasi Mishra

MS. MANASI MISHRA

is a part time PhD. scholar of CSE department at IGDTUW with specialization in Internet of Things application layer protocols. She presently serves as the Lead Product Manager at Reliance Jio (New Energy Vertical) in Bengaluru. She holds an M.Tech degree in Mobile and Pervasive Computing as well as a B.Tech degree in Electronics and Communication Engineering. With over 8 years of expertise in research, product management, and entrepreneurship, she has established herself in the industry. Additionally, she has established a startup named ETI Labs Pvt. Ltd., which specializes in delivering IoT-based products and services to both academia and industry.

In 2021, she was honored with the "All India Women Entrepreneur Award" in the "Young Achiever" category by the Delhi Management Association. For her innovation, she received the prestigious "Gandhiyan Young Technical Innovation National Award" at Vigyan Bhawan, in the esteemed presence of the Hon'ble Vice President of India in 2019. Ms. Mishra has conducted numerous expert sessions and facilitated various practical workshops and seminars nationwide, targeting faculty and students in the fields of embedded systems, IoT, and machine learning. Her passions lie in the realms of the Internet of Things, Advanced Metering Infrastructure, and the fusion of sustainable design with innovation.

Ms. Kavita Sharma
Senior Research Fellow

MS. KAVITA SHARMA

is currently pursuing Ph.D. as a Senior Research Fellow under the guidance of Prof. S.R.N. Reddy(HoD) CSE) at Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi. Her research area is embedded systems, IoT, Real Time Operating Systems and AI. She holds multiple advanced degrees, including a M.Sc. (Computer Science Software), an M.Phil. an M.Tech.(IT), and an M.Tech.(CSE) from IGDTUW (2020), where she was awarded a gold medal for her academic excellence. Kavita has successfully cleared competitive exams like GATE (2016, 2017) in Computer Science and UGC NET (2017).

Since 2022, she has been actively involved in a Design and Innovation project at IGDTUW under the guidance of Prof. S.R.N. Reddy. She has approximately nine years of teaching experience in government, government- aided, and private schools which demonstrate her dedication to both research and education.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Ms. Rishika Anand
Ph.D. Scholar

MS. RISHIKA ANAND is a full-time Ph.D. scholar in the Computer Science & Engineering Department at Indira Gandhi Delhi Technical University for Women (IGDTUW), specializing in the Internet of Medical Things (IoMT) and Artificial Intelligence (AI). She currently serves as a Senior Research Fellow in the department. Rishika holds an M.Tech in Mobile and Pervasive Computing and a B.Tech in Electronics and Communication Engineering. With over four years of experience in research and teaching, she has contributed to various international journals and conferences through her research publications. Her work focuses on IoT and AI-driven healthcare solutions. Rishika is passionate about leveraging cutting-edge technologies to enhance medical systems and improve patient care. She continues to advance her expertise in IoMT and AI while contributing significantly to research in real-time health monitoring systems.

Ms. Shivangi Tyagi

MS. SHIVANGI TYAGI is currently a Business Technology Solutions Associate at ZS Associates, Bengaluru, Karnataka. She completed her M.Tech from the Department of Computer Science and Engineering (CSAI) at Indira Gandhi Delhi Technical University for Women (IGDTUW). During her M.Tech tenure, she published two journal papers, reflecting her commitment to research and innovation. Shivangi's domain expertise lies in Artificial Intelligence (AI) and its applications in agriculture. Her work focuses on leveraging AI-driven solutions to address challenges in the agricultural sector, contributing to advancements in precision farming and sustainable practices. At ZS Associates, she applies her technical knowledge and problem-solving skills to provide impactful technology solutions. Shivangi is passionate about blending AI with real-world applications, aiming to drive meaningful change through innovation and research in her field.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Ms. Anu Yadav
Research Scholar

MS. ANU YADAV, Research Scholar in Computer Science Department, Indira Gandhi Delhi technical University for Women, Delhi. She has completed M. Tech (IT) from USICT, GGSIPU in 2016 & B.Tech (CSE) from GGSIPU in 2014. She has qualified GATE (2 times), UGC NET (5 times), and HTET. She has professional experience more than 3 year of Teaching and Technical Organization.She has published more than 12 research papers in International journals / National journals / International conferences/ National conferences of repute. She has delivered 1 expert talks and 1 keynote speaker. Her research area of interests are Artificial Intelligence, Neural Network, Machine Learning, Deep Learning and Data Science.

Ms. Aditi Sabharwal

MS. ADITI SABHARWAL is a dedicated researcher currently pursuing her PhD from Indira Gandhi Delhi Technical University for Women (IGDTUW) under the supervision of Prof. SRN Reddy. She holds a BTech and MTech from Guru Gobind Singh Indraprastha University, Dwarka, and has authored publications in her field. Her PhD research focuses on Sustainable Agriculture and the integration of AIoT-based systems for Soil Nutrient Management, aiming to develop practical solutions for improving crop productivity. With expertise in IoT systems and data-driven applications, Aditi is passionate about bridging the gap between research and real-world implementation, contributing to technological advancements through her innovative work.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Ms. Arti Ranjan

MS. ARTI RANJAN is working as an Assistant Professor (CSE) at Sharda School of Engineering & Technology, Sharda University, Greater Noida, Uttar Pradesh, India. She has received her M.Tech degree in Computer Science and Engg. from Motilal Nehru National Institute of Technology (MNNIT), Allahabad in 2015 and B.Tech from I.E.R.T. Allahabad. (UP state govt. College) in 2009. She is also Pursuing PHD from Indira Gandhi Delhi Technical University for Women (IGDTUW), New Delhi. She has 14 years of teaching experience. Her area of research interests are Image Processing, computer vision, NLP, Machine Learning and Deep Learning.

She has published several research articles in reputed conferences and peer-reviewed journals with high impact factors indexed in SCIE, Scopus, Google Scholars, UGC care. She has received Commendable Research Award-2023 from Indira Gandhi Delhi Technical University for Women (IGDTUW), New Delhi for her research contributions. She has served as reviewer for various conferences and journals, including IEEE, Springer, Elsevier, and other international journals with a Scopus index.

Dr. Garima

DR. GARIMA is an Assistant Professor at Maharaja Agrasen Institute of Technology (MAIT), Delhi. She holds a Ph.D. (2023) and an M.Tech (2015) in Computer Science and Engineering from Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi. Her research expertise spans Passive Optical Networks, Wireless Sensor Networks, Machine Learning, and Deep Learning. Her doctoral work focused on optimizing next- generation communication networks, contributing to the development of more efficient and intelligent networking solutions. Dr. Garima is actively involved in academic research, scholarly publications, and student mentorship.

She is passionate about leveraging emerging technologies to address complex challenges in data communication and intelligent systems. Her work reflects a strong commitment to innovation, interdisciplinary collaboration, and advancing the frontiers of computer science.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Ms. Yusra Nasir
Student

MS. YUSRA NASIR

is currently an M.Tech student at Department of Computer Science and Engineering at Indira Gandhi Delhi Technical University for Women, Delhi. She completed her B.Tech (CSE) from Jamia Millia Islamia University, Delhi in 2022. She has also qualified GATE (2021). Yusra has also written a paper in the proceedings of Smart Trends in Computing and Communications 2024. Her research interests include machine learning, quantum machine learning, deep learning, and explainable AI.

Ms. Diksha Malik
Student

MS. DIKSHA MALIK

is pursuing a B.Tech in Computer Science Engineering at Indira Gandhi Delhi Technical University for Women. With a valuable internship experience gained at Uber, she has successfully demonstrated her skills in a professional setting. She also actively participated in the Microsoft Engage program, which showcased her dedication to continuous learning as a mentee. Under the supervision of Ms. Bhawna Jain, she is actively involved in research. Her research interests include Artificial Intelligence and Deep Learning.

Ms. Ganiti Jagota
Student

MS. GANITI JAGOTA

is pursuing a B.Tech in Computer Science Engineering at Indira Gandhi Delhi Technical University for Women. Her experience as a software engineering intern at Microsoft has been instrumental in shaping her professional journey. Engaging actively in the Deshaw Ascend Educare Mentorship program, she gained valuable industry insights and training. Additionally, she contributed significantly to Microsoft Engage Mentorship, demonstrating diligence on projects that expanded her technical expertise. Under the guidance of Ms. Bhawna Jain, she is actively involved in research, focusing on Deep Learning, and Data Science.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Ms. Gyanvi
Student

MS. GYANVI is currently pursuing a Bachelor's degree in Computer Science at Indira Gandhi Delhi Technical University for Women (IGDTUW). She has gained practical experience as a Software Development Engineer during her internship at Microsoft and has also been recognized for her achievements in programs such as Deshaw Ascend Educare Mentorship program and Microsoft Engage. Her areas of interest are Deep Learning and Generative AI.

Ms. Ishita Chandra
Student

MS. ISHITA CHANDRA is pursuing Bachelor's degree in Computer Science from Indira Gandhi Delhi Technical University for Women (IGDTUW). She has previously interned as a Software Development Engineer at MotorQ. She has received several accolades as part of several prestigious programs like Flipkart Girls Wanna Code and Generation Google Scholarship. Under the supervision of Ms. Bhawna Jain, she is actively involved in research. Her areas of interest are Artificial Intelligence, Deep Learning, and Generative AI.

ms. Khushi Anand
Student

MS. KHUSHI ANAND is currently a pre-final year student pursuing a B.Tech in Computer Science at Indira Gandhi Delhi Technical University for Women. She has actively engaged in research, focusing on Deep Learning and Transfer Learning methodologies. She has showcased her work at prestigious conferences such as UTCA'23 and AIST'23, highlighting her contributions to the field. She has gained practical experience as a research intern, particularly in software maintenance within Deep Learning. Her areas of interest include Deep Learning, Evolutionary Algorithms, and Quantum Computing.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MS. PUSHPA
STUDENT

MS. PUSHPA completed her B.Tech in Computer Science from Maharshi Dayanand University, a public university in Rohtak, Haryana. She is currently a pre-final year M.Tech student in Cyber Security at Indira Gandhi Delhi Technical University for Women, specializing in the Department of Information Technology. Actively engaged in research, she focuses on cryptographic techniques such as threshold cryptography and zero-knowledge proof protocols. Her M.Tech thesis explores an incentive-based and efficient anonymous authentication scheme for Vehicular Ad-Hoc Networks (VANETs).

MS. VANSHIKA SEHRAWAT
STUDENT

MS. VANSHIKA SEHRAWAT is a dedicated Computer Science student in her fourth year at Indira Gandhi Delhi Technical University for Women (IGDTUW), Kashmiri Gate, New Delhi. She completed her schooling at Delhi Public School, Vasant Kunj, New Delhi, and has maintained a CGPA of 8. Her areas of interest include machine learning, cybersecurity, and cryptography.She has worked on projects such as fake news detection using machine learning, gender prediction based on acoustic parameters, and threshold scheme development in cryptography. She has also explored Shamir's Secret Sharing, Schorr threshold scheme and various other threshold scheme while gaining foundational knowledge in cryptography. Beyond academics, Vanshika has also worked in data analysis, focusing on structured data conversion, pivot table analysis, and identifying trends in subscription and expiration data. Her ability to integrate theoretical concepts with practical applications highlights her analytical mindset and problem-solving skills. With a strong drive for innovation and research, Vanshika aims to make a significant impact in the fields of computer science, cybersecurity, and cryptography. Her dedication to learning and excellence makes her a deserving candidate for this recognition.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MS. SHOBHITA KHATRI
STUDENT

MS. SHOBHITA KHATRI is a fourth year student in the Department of Computer Science and Engineering at Indira Gandhi Delhi Technical University for Women(IGDTUW), Kashmere Gate, New Delhi. She has completed her schooling from The Mann School, Delhi and has continued to engage in both academic and extracurricular activities throughout college. Particularly driven towards research, her areas of interest include machine learning, cybersecurity, cryptography and Industrial Internet of Things(IIoT). She has previously worked on projects such as Fake News Detection using Machine Learning, Rice Disease Detection using Deep Learning, Applications of Threshold Signature Scheme in real- world systems. She has studied in-depth different cryptographic protocols and built a foundational understanding of multi-party schemes like Shamir Secret Sharing Scheme, Schnorr Digital Signature and Threshold Signature Scheme . Her previous publications include a systematic review of the use of IIoT in Smart Energy Systems, highlighting the benefits and drawbacks, gaining an in-depth understanding of the intersection between technology, innovation and society. She has also separately worked on data analysis and the various methods involved in data interpretation such as trend analysis, data visualisation and data forecasting. Beyond academics, she has remained connected with organizations like OPTICA through its student chapter and supervised the creative and thematic vision for the society as a creative and content head. Dedicated towards finding efficient and accessible technological solutions for the society through her research and innovation, Shobhita aims to make technology that is easy to use and accessible for all. Her inquisitive nature and ambition makes her a deserving candidate for this recognition.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Ms. Khushi Dabas
Student

MS. KHUSHI DABAS completed her higher secondary education from Vikas Bharati Public School, New Delhi, and is currently pursuing her B.Tech. in Computer Science from Indira Gandhi Delhi Technical University for Women (IGDTUW), Kashmiri Gate, Delhi, maintaining a CGPA of 8. Her areas of interest include cybersecurity, cryptography, ethical hacking, threat detection, and machine learning. She is particularly focused on integrating cryptographic techniques for enhanced security. She has developed expertise in penetration testing, network security, vulnerability analysis, and ethical hacking, with skills in footprinting, scanning, enumeration, and threat detection.

She has also explored machine learning applications in cybersecurity, particularly in identifying and mitigating security threats. Additionally, she holds a Cisco Certified Support Technician (CCST) Cybersecurity certification, validating her knowledge in network security, threat intelligence, and incident response. Khushi has worked on multiple projects in cybersecurity and cryptography. She developed a Keylogger System to explore its ethical applications in security monitoring and worked on a Fake News Detection System, using machine learning algorithms to identify misinformation. In cryptography, she has explored threshold schemes, including Shamir's Secret Sharing and the Schnorr Threshold Scheme, while gaining a deeper understanding of secure key management and authentication. She has also applied threshold cryptography in projects, including image authentication for document protection. With a strong foundation in cybersecurity, cryptography, and ethical hacking, Khushi is dedicated to continuous learning and developing secure digital solutions. Her work reflects a commitment to research, problem-solving, and the practical application of cryptographic security techniques. Her dedication to learning and excellence makes her a deserving candidate for this recognition.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MS. MUSKAN KAMBOJ
STUDENT

MS. MUSKAN KAMBOJ has been a computer science engineering student pursuing Bachelor of Technology from Indira Gandhi Delhi Technical University for Women since 2019. Her areas of interest include Machine Learning, Deep Learning, Artificial Intelligence, Data Structures and algorithms. She has done Research based internships in the field of Machine Learning and Deep Convolutional Networks. During her course of study she has made several projects on Database Management, Mobile Computation, Data, Structures, Wireless Networking etc. Her hobbies include computer programming and writing poetry.

MS. SWASTIKA OJHA
STUDENT

MS. SWASTIKA OJHA has been a computer science engineering student pursuing Bachelor of Technology from Indira Gandhi Delhi Technical University for Women since 2019. Her research interests include Machine Learning, Deep Learning, AI, Data Structures, and Algorithms. She has keen interest in Wireless networking, Database management.

DEPARTMENT OF MECHANICAL & AUTOMATION ENGINEERING

PROF. N R CHAUHAN
PROFESSOR

PROF. N R CHAUHAN is working as Professor in the Department of Mechanical & Automation Engineering at Indira Gandhi Delhi Technical University For Women (IGDTUW) Delhi (India). He has also looked after the placement and internship activities of Department as Training and Placement Officer (TPO) from more than five years and achieving almost 100% placement for Mechanical students. He received his Ph.D. degree in Mechanical Engineering from IIT, Roorkee and M.Tech with specialization in Machine Design Engineering from IIT Roorkee. He did B.Tech in Mechanical Engineering from BIET Jhansi (An Autonomous Institute Funded by the U.P. Government).He completed two terms as Head of Department of Mechanical & Automation Engineering from December, 2020 to December, 2023 and December, 2014 to December, 2017. He has also worked as Course Coordinator for M.Tech in Robotics and Automation during October, 2014 to July 2019. He attended the various Workshops, Short Term Courses, Training Course and Faculty Development Programmes, National and International Conferences of repute. He organised FDPs, training programmes and Conference in the Department. He has also delivered several expert lectures in various Faculty Development Programmes. During his Headship, the students participated in various car design and fabrication events inside and outside of India and won many awards. He is the member of various committees such as Board of studies, Academic Council, Financial Committee, Departmental Research Committee and others. He was a Coordinator of Joint Departmental Research Committee of ECE and MAE Departments. He is a Life Member of TSI (Tribology Society of India), and was member of SAE, Society of Automotive Engineers, India. He has supervised 05 PhD Thesis and currently supervising 07 Ph.D in the field of Alternate Fuels, Tribology, Fluid Film Bearings, Machine Design Engineering, Composite Materials, Robotics & Automation and five PhD in the field of alternate fuels, composite materials and tribology have already awarded under his supervision. He has supervised 40 M.Tech. Dissertation and 50 B.Tech. Projects. He has a teaching experience of more than 22 years. He has published more than 140 papers in International/National Journals, Book Chapters and Conferences of repute. He got three research excellence awards in the field of mechanical engineering.

DEPARTMENT OF MECHANICAL & AUTOMATION ENGINEERING

PROF. ARVIND JAYANT
PROFESSOR

PROF. ARVIND JAYANT did B.E. (Production & Industrial Engg.) degree from Delhi College of Engineering, Delhi (DTU Delhi) and M.Tech. (Industrial Engineering & Operation Management) from IIT, Delhi. He obtained his Ph.D. degree in the field of Reverse supply chain management under joint research collaboration of SLIET Deemed University & Delhi Technological University, Delhi. His research area includes Industrial Engineering & Operation Management, Logistics & Supply Chain Management, Reverse Logistics, Sustainable Systems.Presently working as Professor of Mechanical and Automation Engineering at Indira Gandhi Delhi Technical University for Women, Delhi.He formerly headed the department of Management at IGDTUW Delhi. Formerly he was working as Professor of Mechanical Engineering at Sant Longowal Institute of Engineering & Technology, deemed to be University (CFTI under MHRD, Govt. of India), Longowal, Sangrur, Punjab India since 1996. Formerly, he worked as Visiting Professor in School of Engineering & Technology, Asian Institute of Technology (AIT), Bangkok, Thailand in year 2020. Prof. Jayant possesses 30 years of experience in academics, industry, and research. Prof. Jayant has the rich administrative experience and worked as Head of the Department; Chairman, School Management Committee, HOD (T&P), Chief Warden, Warden Administration, Chairman Time Table, Chairman Purchase, Senator, Chairman-Techfest, Chairman & Vice Chairman-Institute Scio-Cultural Fest, IQAC Coordinator, Centre Superintendent, Coordinator of Examinations, Observer- Admission Test, AICTE Project Evaluator, Member Secretary- DAAC etc.

In addition to teaching at UG & PG Level, Prof. Arvind Jayant has made a significant contribution to R&D in the area of Logistics & Supply Chain Management. He has been completed 04 sponsored research projects of Rs. 150 Lacs funded by Government organizations, MHRD, CSIR, MSJE, New Delhi & Corporate sectors. He has been published more than 230 research papers in International/national journals and proceedings of International and national conferences in India & abroad. He also has published 08 books/proceedings & 10 book chapters to his credit. He is also on the editorial board of 08 international journals and also works as a reviewer for 65 SCI/SCIE high impact International. He has attended 45 International/National conferences and STTP in India & Abroad. He has been organized 15 Conferences and AICTE/ISTE/TEQIP Sponsored STTP. He has been delivered several Keynote/Invited Lectures in India & abroad.

DEPARTMENT OF MECHANICAL & AUTOMATION ENGINEERING

Prof. Jayant has presented his research work at Universities, research organization and industries in India & abroad particularly in the University of Chicago, USA, University of Barcelona, Spain, Asian Institute of Technology, Bangkok, Thailand, Nagoya University, Japan, Imperial College London, National University of Singapore and Bangkok University, Thailand etc. He has guided/guiding 15 Ph.D. students & more than 100 students for their final year PG and UG level Industry oriented thesis/projects. He is the members of different International professional bodies like IIE (USA), IACSIT (Singapore), IAEngg. (Hongkong), IEOM (USA), VERLOG (Germany), Quarterly Franklin Membership (London), ISTE, SMIIIE (Mumbai), ISME, IWS etc.

DR. SUBHASH SINGH
ASSOCIATE PROFESSOR

DR. SUBHASH SINGH is currently working as Associate Professor in the Department of Mechanical And Automation Engineering, Indira Gandhi Delhi Technical University for Women, New Delhi. He earned his B. Tech degree from Kamla Nehru Institute of Technology, Sultanpur in 2003 and his M. Tech degree from National Institute of Technology Kurukshetra in 2007. He completed his Ph. D from Indian Institute of Technology, Roorkee in 2017. He has teaching experience of more than 16 years in various Institutions/Universities like National Institute of Technology (NIT) Jamshedpur, Lovely Professional University Punjab, Graphic Era University Dehradun, and Mody University Rajasthan.Dr. Singh specializes in areas such as Modification of Nano materials, Thin coating, Synthesis of Nanocrystalline spinel, Metal Matrix Composites (MMCs), Synthesis of 2D Materials, Friction Stir Processing (FSP), Un-Conventional Machining of Biodegradable Materials. He has published more than fifty research papers in various prestigious International journals. He has also authored the twenty book chapters. Dr. Singh completed three research projects under his supervision. Dr. Singh also published four books with the publisher like Springer and Taylor & francis. One of the research project entitled “MXene Based Conducting Electrodes for Dye-Sensitized Solar Cells Application”awarded by Science and Engineering Research Board (SERB), Department of Science and Technology, Government of India. Another research project is entitled “Indo-US Joint Center for Transition metal carbide nanomaterials for Energy Storage Application”, awarded by Indo-U.S. Science and Technology Forum (IUSSTF) and the third one is awarded by TEQIP-III.

DEPARTMENT OF MECHANICAL & AUTOMATION ENGINEERING

DR. POOJA BHATI
ASSISTANT PROFESSOR

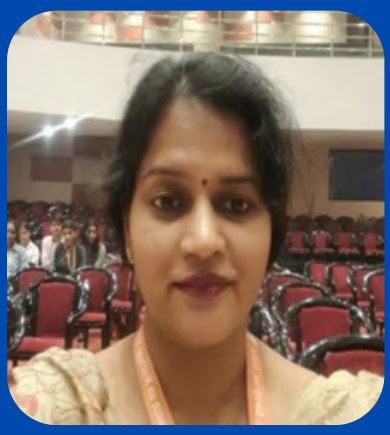
DR. POOJA BHATI is an Assistant Professor in the Mechanical and Automation Engineering Department. She completed her Ph.D. at the Indian Institute of Technology, Delhi. She is the recipient of the IIT Delhi student fellowship and was also selected for the international travel grant by DST, GoI. Her research areas include biomaterials, implants, scaffolds, polymer composites, polymer processing, surface modification, and soft robotics, to name a few. She has guided many M.Tech and B.Tech projects. Currently, She is guiding three research students in the various areas of materials and manufacturing.

DR. V.K CHAWLA
ASSISTANT PROFESSOR

DR. V.K CHAWLA earned his PhD. from NIT Kurukshetra, M.Tech. in Production Engineering from DITE, Delhi, PGDBA Operations Management from Symbiosis, Pune and B.Tech. (Mechanical Engineering) from AKGEC, U.P. Technical University. He is associated with this university as a faculty member since 2012; prior to this, he worked in the Automotive industry for 4 years. He has teaching experience at the graduate and postgraduate levels and industrial experience in the field of design and development of press tools and managing new product development lines for end-to-end solutions in the Automobile and FMCG sectors.

in the area of Composite Materials, Fault Diagnosis, Advance Metrology, Robotics and Automation, Production Engineering and Supply Chain Management. He is the faculty advisor for SAE and ASME student chapter at IGDTUW. He is a member of professional bodies including the Society of Automotive Engineers and ASME. Dr. V. K. Chawla has authored more than 75 research papers and patents, published in reputed and SCI/SCOPUS/WOS indexed international journals and granted by Patent Office. Dr. Chawla has a keen interest in the research areas of Production Engineering, Operations Management, New Product Development, Flexible Manufacturing Systems, and Sustainable Project Management. Presently, Dr. Chawla has an H18 index and 25 as an I10 index with 800 plus citations.

DEPARTMENT OF MECHANICAL & AUTOMATION ENGINEERING



Dr. Kanika Gupta

DR. KANIKA GUPTA is a skilled mechanical engineer and researcher with a strong focus on sustainable and eco-friendly materials. She earned her Ph.D. from Indira Gandhi Delhi Technical University for Women (IGDTUW), where her research centered on the development and characterization of Grewia optiva reinforced polyurethane composites—a novel form of green composite material aimed at advancing environmentally sustainable engineering.Her doctoral work was guided by Prof. Nathi Ram Chauhan, under whose mentorship she conducted extensive studies on the mechanical and thermal properties of these bio-based composites. She has published 2 papers in journals and 5 papers in conference. Her research contributes meaningfully to the field of materials engineering, particularly in the context of sustainability and renewable resources. Dr. Gupta successfully defended her thesis in October 2024, and since then, she has continued to apply her expertise in the industrial sector. She is currently associated with SixD Engineering Solutions Pvt. Ltd., as Manager- Digital Transformation, a leading engineering firm specializing in digital plant design, 3D modeling, and AR/VR-based industrial solutions. In her role, she integrates her academic knowledge with practical engineering applications to support innovation in sustainable product design and development.Dr. Kanika Gupta's academic journey and professional endeavors highlight her dedication to advancing green technologies and contributing to a more sustainable industrial future.

Dr. Tanvi Saxena

DR. TANVI SAXENA has completed her PhD. (MAE) from IGDTUW in 2024. She did her B.Tech (Mech Engg) and M.Tech (Advance CAD) from BBS College of engineering in Technology (UPTU) in 2009 and 2014 respectively. She has eight research papers from her PhD published in various SCI/Scopus journals and conferences. Currently she is working as an Academic Editor in an MNC. Moreover, she has an experience of 6.5 years of working as an Assistant Professor in an engineering college (UPTU) and 3 years of working experience as a Tech writer in the Edutech and semiconductor industry. Her research interests include hybrid composites, mechanics of solid, simulation techniques..etc.

DEPARTMENT OF MECHANICAL & AUTOMATION ENGINEERING

Ms. Ekta Yadav
Student

MS. EKTA YADAV has completed her B.Tech. degree in Mechanical engineering from Vaish college of engineering, MDU Rohtak, Haryana in 2011 and MTech degree in Manufacturing and Automation from UIET, MDU, Rohtak, Haryana in 2013. She is pursuing her Ph.D. degree from Indira Gandhi Delhi Technica University for Women, Kashmere gate, New Delhi. She has worked as an assistant professor for 8 years in engineering college. She has published two conference paper in scopus journal and two in sci journal. Alongwith, she has 5 patents granted in her name in India. She has received one research excellence award in 2023, and one in 2024. Her research interests include Fault Diagnosis in Mechanical equipment.

Ms. KHUSHI RAJPUT

MS. KHUSHI RAJPUT is a Mechanical and Automotive Engineering graduate who transitioned into software development. She has 5 patents granted in her name in India. Now working at Citi, she builds software solutions, APIs, and works with data analysis tools. Passionate about technology and problem-solving, she is continuously learning and growing in the fintech industry.

Ms. Vaishnavi Rout

MS. VAISHNAVI ROUT completed her B.Tech in Mechanical and Automation from IGDTUW , Delhi in 2023. Now based in Bangalore, India she is an enthusiastic and dedicated automotive professional with a strong passion for innovation in the powertrain domain. Currently applying expertise in the Railway industry, she aspires to expand her impact through a patent and contribute significantly to the advancement of efficient powertrain systems.

DEPARTMENT OF MECHANICAL & AUTOMATION ENGINEERING

Ms. Rinki Gupta

MS. RINKI GUPTA is a Mechanical Engineer working at TechnipFMC Hyderabad. She graduated with a B.Tech. in Mechanical and Automation Engineering from IGDTUW in 2023. During her studies, she published two research papers and completed a three-month internship at NMRC. At TechnipFMC, she works on subsea product design and analysis. She independently manages one project and leads a major project within her team. Her role involves handling subsystem components and ensuring efficient design processes. She is keen on learning and improving her technical skills.

Ms. Ritika Aggarwal

MS. RITIKA AGGARWAL has completed her B.Tech. in Mechanical and Automation engineering from Indira Gandhi Delhi technical University for women from Delhi in 2022. Two patents have been granted in her name in India one for the pedal assembly and the other for non pneumatic tyre design. She has been working as an operations Manager at Amazon for the last 3 years.

Ms. Priya Garg

MS. PRIYA GARG has completed her B.Tech. degree in Mechanical and Automation Engineering from Indira Gandhi Delhi Technical Women's University, Kashmiri Gate, New Delhi. She has worked as an intern at Amazon as an Operations Manager. Currently, she is employed as an Automotive Engineer at Tata Motors.

DEPARTMENT OF MECHANICAL & AUTOMATION ENGINEERING

Ms. Ambika Mathur

MS. AMBIKA MATHUR completed her B.Tech. in Mechanical and Automation from IGDTUW, Delhi, in 2024. She is currently employed as a Manufacturing Engineer specializing in ITOT at Tata Motors. Ambika has also gained internship experience at DRDO, DMRC, and Trane Technologies. Her team achieved All India Rank 1 in the ATVC Championship.she also worked on a project focused on optimizing the connecting rod through material & design modifications.

Ms. Sonal Mehta

MS. SONAL MEHTA is a Ph.D. student in Aerospace Engineering at the Georgia Institute of Technology, specializing in Space Traffic Management. She recently passed her qualifying exams and is preparing to propose her thesis on advancing frameworks for sustainable and secure space operations. Originally from Delhi, India, she earned her bachelor's degree in mechanical and Automation Engineering from Indira Gandhi Delhi Technical University for Women (IGDTUW). She later pursued a master's in aerospace engineering at Georgia Tech, working on projects including AEDT noise validation, lunar base modeling, flex-fuel combustors, and cislunar power systems. Her work on the lunar base has been published at SciTech Forum 2024. She has also served as a technical advisor on mission studies involving Nuclear Thermal Propulsion and asteroid retrieval. The work of her teams is being published at ASCEND 2025. Sonal's academic journey reflects a strong foundation in systems thinking, mission analysis, and interdisciplinary design. She brings a unique blend of technical depth and visionary thinking to the aerospace sector, aiming to contribute meaningfully to the future of space exploration and governance.

DEPARTMENT OF MECHANICAL & AUTOMATION ENGINEERING

Ms. Charu Kathpalia

MS. CHARU KATHPALIA is a highly skilled professional with a B. Tech in Mechanical and Automation Engineering. After completing her degree, she developed a keen interest in data analytics and machine learning, which led her to transition into the field of consulting. Currently, Charu works as a consultant at ZS Associates, where she specializes in utilizing complex machine learning algorithms and regression models to forecast future market trends in the pharmaceutical industry. In her role, Charu applies her technical expertise to analyze large datasets, uncover patterns, and build predictive models that support strategic decision-making for clients in the pharma sector. Her work involves understanding intricate market dynamics and using data-driven insights to help clients optimize their operations, enhance efficiency, and plan for future market shifts. Charu's technical proficiency combined with her analytical mindset makes her a valuable asset to ZS Associates. Her ability to translate complex data into actionable strategies has earned her recognition within the firm and the industry. Driven by a passion for continuous learning and problem-solving, Charu continues to explore innovative ways to harness the power of data to shape the future of the pharmaceutical market.

Ms. Tanya Paul

MS. TANYA PAUL is a dynamic professional with expertise in engineering, analytics, product management, and banking. She holds a B. Tech in Mechanical and Automation Engineering from IGDTUW and an MBA from IIM Visakhapatnam, where she excelled academically, securing the highest scores in various subjects. A natural leader, she held multiple leadership positions during both her studies. She started her career as a Data Analyst at Myntra, later working as an Associate Mechanical Engineer at McDermott International on large-scale EPC projects. At Whirlpool, she contributed to product management and innovation in home appliances. Beyond corporate roles, Tanya has been recognized for her impact in education and innovation. She, along with her team, initiated the "Desh Ke Mentors" project to promote STEM education among young girls and was later awarded for it. She also holds a published patent for a novel warehouse loading and unloading device. Now joining Federal Bank as a Relationship Manager, she brings her analytical skills, leadership experience, and customer-centric approach to the banking sector. A trailblazer at the intersection of technology and business, Tanya's record of innovation, leadership, and tangible impact marks her as an exceptional talent poised for continued success.

DEPARTMENT OF MECHANICAL & AUTOMATION ENGINEERING

Ms. Shreya Vajpayee

MS. SHREYA VAJPAYEE is a graduate student at Duke University, presently pursuing a Master's in Engineering Management. Originally from Delhi, India, she holds a Bachelor's degree in Mechanical Engineering from Indira Gandhi Delhi Technical University for Women. After completing her undergraduate studies, Shreya worked as a Product Design Engineer at Becton Dickinson in Bengaluru, India, where she contributed to innovative medical device designs and process optimization initiatives. Her work focused on enhancing user experiences and driving operational efficiency across healthcare products. Currently, Shreya is working as a Product Strategy Co-op at Oriental Bank in Charlotte, North Carolina. In this role, she is leveraging her expertise in product management and data analytics to develop scalable tools, improve customer satisfaction, and drive strategic business decisions. Shreya's career reflects her passion for innovation and her ability to bridge technical execution with strategic goals, making her a dynamic contributor to any organization focused on growth and impactful solutions.

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCES

PROF. POONAM BANSAL
PROFESSOR

PROF. POONAM BANSAL is the Head of the AI & Data Sciences Department at IGDTUW, Delhi. With a Ph.D. in Engineering and Technology from Guru Gobind Singh Indraprastha University, her research focuses on speech recognition techniques. She has over two decades of academic experience, having served as a Professor at IGDTUW and MSIT, New Delhi. Her industrial experience includes roles in system engineering and project management. Prof. Bansal has been honored with several awards, including the IEEE Region 10 Outstanding Branch Counselor Award, and holds certifications in management and leadership.

DR. SHAILESH D. KAMBLE
ASSOCIATE PROFESSOR

DR. SHAILESH D. KAMBLE is working as Associate Professor in department of Artificial Intelligence and Data Science , Indira Gandhi Delhi Technical University for Women, Delhi, India . He received Bachelor of Engineering degree in Computer Technology from Yeshwantrao Chavan College of Enginering, Nagpur, India under the Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur, India. He received Master of Engineering degree from Prof Ram Meghe Institute of Technology and Research, formerly known as College of Engineering, Badnera under Sant Gadge Baba Amravati University, Amravati, India.

He received Ph.D. degree in Computer Science Engineering under Department of Computer Science Engineering from R.T.M. Nagpur University, Nagpur, India on 13th November, 2018. He is guiding 5 PhD students in Indira Gandhi Delhi Technical University for Women, Delhi, India. He was working as the Associate Professor in Department of Computer Science and Engineering at Yeshwantrao Chavan College of Enginering, Nagpur, India. He is having over 22 years of teaching and research experience. His current research interests include image processing, video processing and language processing. He is the author or co-author of more than 100 scientific publications in International Journal, International Conferences, and National Conferences. He is the life member of ISTE, India and Fellow IE(I), India.

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCES

DR. HIMANSHU MITTAL
ASSOCIATE PROFESSOR

DR. HIMANSHU MITTAL is an Associate Professor in the Department of Artificial Intelligence and Data Sciences, Indira Gandhi Delhi Technical University for Women, India. He received his Ph.D. in the field of computer vision. The keen research areas of Dr. Mittal are image analysis, machine learning, and evolutionary algorithms. He has an excellent academic record as well as research background with the papers in reputed journals including IEEE Transactions. Also, he has been the co-principal investigator of the research project funded by the Science and Engineering Research Board, Department of Science and Technology, India. Dr. Mittal is also reviewer of many International Journals and Conferences.

DR. RAHUL SACHDEVA
ASSISTANT PROFESSOR

DR. RAHUL SACHDEVA is currently working as an Assistant Professor in the Department of Artificial Intelligence & Data Science at Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi. Prior to joining IGDTUW, he worked as Incubation Manager at Anveshan Foundation, one of Delhi's leading innovation and incubation centers, where he actively contributed to nurturing startups and fostering an entrepreneurial ecosystem. He holds a B.Tech and M.Tech in Information Technology, and has recently completed his Ph.D. in the area of Opportunistic Networks from Guru Gobind Singh Indraprastha University (GGSIPU), Delhi.

His research interests span across Wireless Networks, Communication Networks, Opportunistic and Delay Tolerant Networks, the Internet of Things (IoT), and Cyber Security, among other emerging areas in computer science. He has authored and published several research papers in reputed journals and conferences. With a blend of academic, research, and industry incubation experience, he is passionate about guiding students, fostering innovation, and contributing to the advancement of AI and communication technologies.

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCES

Ms. Surbhi Khurana

MS. SURBHI KHURANA an IT luminary with a B.Tech. and M.Tech. from Bharati Vidyapeeth and IGDTUW, Delhi respectively, is a trailblazer in Speech Analytics and Deep Learning. Her research, spanning emotion analysis to recognition, has earned her an Indian patent for innovative applications of Deep Learning. A sought-after speaker and collaborator, Surbhi' s impact transcends academia. Committed to mentorship, her legacy lies in shaping the next generation of researchers. An exemplar of passion and intellect, Ms. Surbhi continues to redefine the boundaries of technology in Speech Analytics and Deep Learning.

DEPARTMENT OF MANAGEMENT

DR. SHIVANGI VERMA
ASSISTANT PROFESSOR

DR. SHIVANGI VERMA is an accomplished academician, researcher, and mentor dedicated to excellence in management education and social impact. She holds a Ph.D. in Management from Delhi Technological University (DTU) and an MBA from Ambedkar University Delhi. Currently, she serves as an Assistant Professor at Department of Management, Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi, where she actively contributes to teaching, research, and institutional development.Her research interests include various aspects of organization behaviour, human resource management, business ethics, technology, techno-ethics, education, and psychology.

She has published research papers and a book chapter in peer-reviewed SSCI, ABDC, and SCOPUS-indexed national and international journals with high cite score and impact factor. With an experience of five years, Dr. Verma's teaching prowess extends across diverse programs, including BBA, MBA and PGDM at renowned institutions such as University of Delhi, Delhi Technological University and IMS Ghaziabad. She is actively engaged in guiding and assisting students through various projects, summer internship reports, and dissertations.

MR. HIMANSHU
ASSISTANT PROFESSOR

MR. HIMANSHU is an Assistant Professor at Department of Management, Indira Gandhi Delhi Technical University for Women, India. He is pursuing his Ph.D. in the field of finance and information technology management from University School of Management Studies, Guru Gobind Singh Indraprastha University, India. He has completed his Masters in Business administration and Bachelors in Commerce. He has received NCMP Level 4 certification by National Stock Exchange, India. His research Interest focuses on Blockchain Technology, FinTech, and Financial Markets.

DETAILS OF RESEARCH AWARDS

S.No	IGDTUW Author Name	Paper name	Journal with Publication Details	Award Category
DEPARTMENT OF APPLIED SCIENCES AND HUMANTIES				
1.	**Rita Kumari, Megha Prajapati, Chhaya Ravi Kant**	NiCo MOF@ Carbon Quantum Dots Anode with Soot Derived Activated Carbon Cathode: An Efficient Asymmetric Configuration for Sustainable High-Performance Supercapacitors	Advanced Sustainable Systems, Volume 8 Issue 10 Pages 2400109	PREMIER
2.	**Ranu Gadi**	Chemical characteristics, morphology and source apportionment of PM10 over National Capital Region (NCR) of India	Environmental Monitoring and Assessment, SPRINGER NATURE, Volume 196, article number 163, 17 January 2024	COMMENDABLE
3.	**Shobhna Shankar, Ranu Gadi,**	Identification of sources of coarse mode aerosol particles (PM10) using ATR-FTIR and SEM-EDX spectroscopy over the Himalayan Region of India	Environmental Science and Pollution Research, Volume 31, 15788–15808, 02 February 2024	COMMENDABLE
4.	**Megha Prajapati, Chhaya Ravi Kant,**	Binder free cobalt Manganese layered double hydroxide anode conjugated with bioderived rGO cathode for sustainable, high-performance asymmetric supercapacitors	Journal of Electroanalytical chemistry, Elsevier, Volume 961, 15 May 2024, 118242	COMMENDABLE
5.	**Megha Prajapati, Chhaya Ravi Kant**	Hierarchical NiCo-LDH layered composite on PANI coated Ni foam for highly efficient supercapattery applications	New Journal of Chemistry, Volume 48, Issue 43, Pages 18376-18391, Publisher Royal Society of Chemistry	COMMENDABLE
6.	**Sitakshi Gupta, Chhaya Ravi Kant,**	Novel flexible chemiresistive ammonia sensors based on rGO/ZIF-8 composites deposited on conductive graphite sheets	Diamond and Related Materials, Volume 148, Pages 111473, Publisher Elsevier	COMMENDABLE

7.	**Sitakshi Gupta, Chhaya Ravikant**	Facile synthesis of nitrogen-doped reduced graphene oxide/zinc oxide nanocomposites for enhanced room-temperature ammonia gas detection	Journal of Materials Science: Materials in Electronics Volume 35 Issue 2 Pages 151 Publisher Springer US	COMMENDABLE
8.	**Ritu Chaudhari, Chhaya Ravi Kant,**	Organic-inorganic hybrids of BiI3-polymers with embedded conductive carbon fillers displaying high SNR for direct X-ray imaging detectors	Radiation Physics and Chemistry, Volume 222, Pages 111795 Publisher Elsevier	COMMENDABLE
9.	**Rita Kumari, Chhaya Ravikant**	Ion beam irradiation induced modification of PPy/ZnO nanocomposite thin films for supercapacitor applications	Surfaces and Interfaces, Volume 51 Pages 104647 Publisher Elsevier	COMMENDABLE
10.	**Deepa Kumari, Megha Prajapati, Chhaya Ravi Kant**	Highly Efficient Non-Enzymatic Electrochemical Glucose Biosensor Based on Copper Metal Organic Framework Coated on Graphite Sheet	ECS Journal of Solid State Science and Technology, Volume 13 Issue 4 Pages 047007 Publisher IOP Publishing	COMMENDABLE
11.	**Rita Kumari, Megha Prajapati, Chhaya Ravi Kant**	X-Ray Irradiation-Induced Enhancement of Supercapacitive Properties of Bio-derived Activated Carbon	Journal of Electronic Materials, Volume 53 Issue 9 Pages 4985-4996 Publisher Springer US	COMMENDABLE
12.	**Aakanksha Singh, Shalini Arora**	A new Fermatean fuzzy multi-objective indefinite quadratic transportation problem with an application to sustainable transportation	International Transactions in Operational Research, 32(4), 1977-2002.	COMMENDABLE
13.	**Saumya, Bhavani Prasad Naik Nenavathu**	Dual pH and ultrasound responsive curcumin loaded g-C3N4/Ba(OH)2 nanocarrier for chemo-photodynamic therapy-	New Journal of Chemistry, 48,28, 12769-12782	COMMENDABLE
14.	**Preeti Joshi, Aishwarya Singh, Bhavani Prasad Naik Nenavathu**	Sunlight-mediated removal of endocrine disruptors from wastewater using trimetallic core-shell Ag-TeO2@ ZnO nanocomposites	Nanotechnology, IOP Publishing, 35, 39, 395601	COMMENDABLE

15.	**Preeti Joshi, Saumya, Bhavani Prasad Naik Nenavathu**	Highly Selective Ag-Ca@CuO Nanocomposite-Based Sensor for Trace-Level Cr (VI) Detection in Water	Water, Air, & Soil Pollution, 236, 1, 1-14.	COMMENDABLE
16.	**Aakanksha Singh, Shalini Arora**	An approach to optimize transportation problems with neutrosophic numbers based on a new ranking function	ARCHIVES OF CONTROL SCIENCES, POLSKA AKAD NAUK (POLISH ACAD SCIENCES), 34/3/625-640/11October2024	MOTIVATIONAL
17.	**Sarita Gahlawat, Geeta Sachdev, Shalini Arora**	Solution of transportation problems under Pythagorean fuzzy framework using new score function	Sadhana, Springer & Indian Academy of Sciences	MOTIVATIONAL
DEPARTMENT OF INFORMATION TECHNOLOGY				
18.	**Ayushi Jain, Mehak Garg, Anvita Gupta, Amar Kumar Mohapatra, Bhawna Narwal, Deepak Kumar Sharma**	A Walkthrough of Blockchain-Based Internet of Drones Architectures	IEEE Internet Of Things Journal,Vol. 11, NO. 21, 1 NOVEMBER 2024	PREMIER
19.	**Yusra Nasir, Karuna Kadian, Arun Sharma**	Interpretable machine learning for dermatological disease detection: Bridging the gap between accuracy and explainability	Computers in Biology and Medicine, Volume 179, September 2024, 108919.	PREMIER
20.	**Kamal Kumar**	Deep learning based automated vein recognition using swin transformer and super graph glue model	Knowledge-Based Systems, 310, 112929.	PREMIER
21.	**Prof Brijesh Kumar**	Review—Organic Solar Cells: Structural Variety, Effect of Layers, and Applications	ECS Journal of Solid State Science and Technology, Volume 13, Number 3	COMMENDABLE
22.		High Performance Flexible H-Shaped Single Layered Organic Light Emitting Diode	Optical Materials,Volume 150,2024,115109,	COMMENDABLE

23.	**Prof Brijesh Kumar**	Design and analysis of SPR-based refractive index sensor with enhanced sensitivity based on graphene/BP heterostructure	Opt Quant Electron 56, 1323 (2024)	COMMENDABLE
24.		Performance enhancement of OLED employing CuSCN interfacial layer	J Opt (2024). https://doi.org/10.1007/s12596-024-01766-5	COMMENDABLE
25.		Method to determine the maximum current density of p-MoS2/p-CdSe/n-WS2/n-ITO solar cell	J Opt (2024). https://doi.org/10.1007/s12596-024-02291-1	COMMENDABLE
26.	**Manu Shree, Amar Kumar Mohapatra**	ConFERNet: a low trainable parameters based novel light-weight convolutive feature extraction recurrent network for high accuracy suspect identification	Signal Image and Video Processing 19, 153 (2025)	COMMENDABLE
27.	**Srishti Chanda, Yachika N. Kumar, Shrankhla Srivastava, Ritu Rani, Manu Shree & A. K. Mohapatra**	Optimizing facial feature extraction and localization using YOLOv5: An empirical analysis of backbone architectures with data augmentation for precise facial region detection	Multimedia Tools and Applications, 83(29), 73627-73648.	COMMENDABLE
28.	**Nonita Sharma**	Enhancing security of internet of medical things in fog-edge environment: a study on attack detection performance	Sādhanā, 49, 299 (2024)	COMMENDABLE
29.		Spatio-temporal analysis and prediction of land use land cover (LULC) change in Wular Lake, Jammu and Kashmir, India	Environmental Monitoring Assessment 196, 782 (2024)	COMMENDABLE
30.		Multimodal sentiment analysis of english and hinglish memes	Multimedia Tools and Applications Publisher - Springer Date of publishing- 20 June 2024	COMMENDABLE
31.		An oceanographic data collection scheme using	Multimedia Tools and Applications, 1-	COMMENDABLE

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ABSTRACTS WITH PUBLICATION DETAILS

BINDER FREE COBALT MANGANESE LAYERED DOUBLE HYDROXIDE ANODE CONJUGATED WITH BIODERIVED RGO CATHODE FOR SUSTAINABLE, HIGH-PERFORMANCE ASYMMETRIC SUPERCAPACITORS

Megha Prajapati , Chhaya Ravi Kant , Mohan V. Jacob

Metal-organic frameworks (MOFs) possess multifunctional characteristics such as tuneable pore structure and high specific surface area and are being designed with great interest to enhance the electrochemical properties of current energy storage devices. In this aspect, MOFs-derived layered double hydroxides (LDHs) are important candidates for advanced supercapacitors due to their high electrochemical activity and electric conductivity. Herein, we report synthesis of Cobalt Manganese layered double hydroxides (CoMn LDH) utilising Co MOF as a precursor via ion exchange method, while optimising the dosage of Mn to achieve the best possible structural outcome. The unique structure of CoMn LDH expressed high electrochemical parameters possessing specific capacitance of 1305F/g at 1 A/g. Afterwards, an asymmetric supercapacitor device was fabricated employing CoMn LDH as cathode and coffee grounds derived rGO (reduced graphene oxide) as anode. The as-prepared asymmetric supercapacitor device demonstrated a maximum working potential window of 1.2 V with energy and power density of 23.8 Wh/kg and 0.30 kW/Kg respectively. The device also exhibits superior coulombic efficiency and capacitance retention of 71.11 % and 82.7 % respectively over 3010 charge–discharge cycles that represents an effective approach towards sustainable and effective energy storage devices. In a nutshell, our study centred on adjusting composition, engineering structures, and assembling devices.

For Details refer DOI : https://doi.org/10.1016/j.jisa.2023.103665

HIERARCHICAL NICO-LDH LAYERED COMPOSITE ON PANI COATED NI FOAM FOR HIGHLY EFFICIENT SUPERCAPATTERY APPLICATIONS

Megha Prajapati, Chhaya Ravi Kant, Aasim Hussain and Mohan V. Jacob

Supercapatteries combine the high-power density characteristic of supercapacitors with the high energy density typically found in batteries, offering a promising solution for advanced energy storage applications. We present an efficient two-step method to fabricate hierarchical, binder-free NiCo layered double hydroxide (LDH) nanosheet arrays supported on polyaniline layered nickel foam (NF). A PANI@NiCo-LDH/NF nanocomposite serves as the anode in the supercapattery, leveraging the high capacitance and improved conductivity of the combined materials, yielding a significantly high specific capacity of 1481 C g−1 (3703.33 F g−1). Coffee grounds derived reduced graphene oxide (rGO), providing a sustainable and environmentally friendly material with excellent electrical conductivity and high mechanical strength, serves as the cathode.

The synergy between the PANI@NiCo-LDH/NF anode and the rGO cathode creates a novel and highly efficient supercapattery system. The fabricated supercapattery device offers an energy density of 54.44 W h kg−1 at a power density of 0.702 kW kg−1 and exhibits good cyclability with capacitance retention of 84.88% and Coulombic efficiency of 77.68% over 5000 charging/discharging cycles. This innovative approach addresses the limitations of traditional energy storage devices, paving the way for more versatile and sustainable energy solutions.

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NOVEL FLEXIBLE CHEMIRESISTIVE AMMONIA SENSORS BASED ON RGO/ZIF-8 COMPOSITES DEPOSITED ON CONDUCTIVE GRAPHITE SHEETS

Sitakshi Gupta, Chhaya Ravikant, Amarjeet Kaur

This work presents novel investigations on room temperature chemiresistive ammonia (NH_3) gas sensing capability of composite materials based on reduced graphene oxide (rGO) and ZIF-8 metal organic framework (MOF), deposited on flexible graphite substrate. These rGO/ZIF-8 composites synthesized via a facile one-pot wet chemical route were found to exhibit a fast, highly sensitive and reversible response over successive exposure cycles towards various concentrations of NH_3. The enhanced response is attributable to the synergistic performance of the appreciably conductive rGO and the highly porous ZIF-8. ZIF-8 with its high specific surface area, microporous structure and hydrophobicity, serves to provide greater gas adsorptive capacity as well as resistance to effects of ambient moisture. rGO, on the other hand, has limited specific surface area due to π-π restacking of its sheets but it is capable of providing a conductive template to the hybrid material. Consequently, the NH_3 gas sensing performance parameters of rGO/ZIF-8 were measured to be exceedingly better than those of bare rGO and ZIF-8 synthesized separately. A response of 15.98 % was recorded towards 10 ppm NH_3 with response/recovery times as 2.8/6 s for the rGO/ZIF-8 composites. The enhanced gas sensing performance is credited to the formation of hierarchical pore structure which allows for greater adsorption at the micropore sites and faster diffusion through the mesopores. The effect of rGO loading in the hybrid materials was also assessed. The composite materials exhibited appreciable stability with respect to ambient aging. The adsorption behaviors and the resultant gas sensing mechanisms have also been discussed for the investigated materials.

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FACILE SYNTHESIS OF NITROGEN-DOPED REDUCED GRAPHENE OXIDE/ZINC OXIDE NANOCOMPOSITES FOR ENHANCED ROOM-TEMPERATURE AMMONIA GAS DETECTION

Sitakshi Gupta, Chhaya Ravikant, Amarjeet Kaur

The present investigations demonstrate for the first time, fast and reversible ammonia (NH_3) gas sensing performance of nitrogen-doped reduced graphene oxide/zinc oxide (N-rGO/ZnO) nanocomposites at room temperature. The motivation to use nitrogen as a dopant stems from the fact that it lies next to carbon in the periodic table, therefore is similar in size and covalent nature. The synthesis of N-rGO/ZnO was carried out by a simple two-step in situ method via the wet chemical route. The NH_3 sensing potential of reduced graphene oxide (rGO), nitrogen-doped rGO (N-rGO), and rGO–ZnO nanocomposites synthesized by similar routes was also assessed. N-rGO/ZnO was found to exhibit superior NH_3 sensing performance as compared to rGO, N-rGO, and rGO–ZnO. Further, the study of the sensing mechanism also affirms that the improved response in N-rGO/ZnO is attributed to the formation of p–n heterojunction sites and the charge activation due to N-dopant. To study the effect of N-doping levels on the NH_3 sensing performance of N-rGO/ZnO, different samples were prepared by altering the amount of nitrogen source ammonia solution (0.05, 0.1, 0.2, 0.3 µL mg^{-1} of GO) in the reaction. Consequently, ZnO nanoparticles of different morphologies anchored to flexible N-rGO sheets were obtained. The nitrogen doping has been quantified using X-ray photoelectron spectroscopy analysis. An optimal gas sensing performance of 18.35% toward 10-ppm NH_3 with response/recovery time 2.5/72 s was obtained for the 0.1-µL mg^{-1} sample. The variation in NH_3 sensing response in the presence of different %RH levels of humidity was also assessed. The response changed only by 2.6% when %RH is changed from 10 to 80%. The sensor also displayed appreciable stability with ambient aging.

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ORGANIC-INORGANIC HYBRIDS OF BiI_3-POLYMERS WITH EMBEDDED CONDUCTIVE CARBON FILLERS DISPLAYING HIGH SNR FOR DIRECT X-RAY IMAGING DETECTORS

Ritu Chaudhari, Chhaya Ravi Kant, Sonu Chiller

Organic polymers are light weight, low toxic and environmentally stable candidates of interest in X-ray detection application. But low attenuation and high recombination rate of charge carriers cause low sensitivity is major limitation of these detectors. In this work, organic polymers (PS/PMMA) composites were prepared with high-Z inorganic BiI_3 by simple dry mixing technique. The organic-inorganic hybrid further embedded with conductive carbon filler (MWCNT, CB, GP) to improve the charge collection of the samples. Resistivity and mobility of the samples were studied with help of Hall measurements and mobility-lifetime was calculated by Hecth equation and found $(2.1 + 0.2) \times 10^{-3}$ cm^2V^{-1}.

The elemental analysis of the samples had been done by XPS analysis. The X-ray investigations done by using dental X-ray source and the sensitivity of the samples increases from 3.4 to 200 μGy−1 cm−3 by incorporating CB filler with a low leakage current of order of 33.3 pA/cm2.

For Details refer DOI : https://doi.org/10.1016/j.radphyschem.2024.111795

ION BEAM IRRADIATION INDUCED MODIFICATION OF PPY/ZNO NANOCOMPOSITE THIN FILMS FOR SUPERCAPACITOR APPLICATIONS

Aasim Hussain, Rita Kumari, Farha Jabeen, Indra Sulania, Anju Dhillon, Chhaya Ravikant, Nazeer Hasan, Prashant Kesharwani, Azher M Siddiqui

Thin films of Polypyrrole/Zinc Oxide (PPy/ZnO) nanocomposite were fabricated using electrodeposition and subjected to 100 MeV Ag10+ ion beam irradiation at various fluences ranging from 1.0 × 1010 to 1.0 × 1012 ions cm-2. We characterized the well-synthesized PPy/ZnO nanocomposite thin films and examined the modification induced by irradiation using XRD, Raman, FTIR, FESEM-EDS, and AFM techniques. FESEM and AFM images reveal that PPy/ZnO exhibits a cauliflower-like nanosphere structure. An increase in roughness indicates a larger surface area of the electrode, which improves capacitive performance at 1.0 × 1010 ions cm-2, enhancing ion transport from the electrode surface to the bulk. The damage tracks formed by highly energetic ions along their path may contribute to more charge storage by increasing the roughness of the nanocomposite thin film electrodes for energy storage applications. We evaluated the electrochemical performance of thin films using CV, EIS, and GCD measurements. Electrochemical studies reveal enhanced capacitive properties up to 1.0 × 1010 ions cm-2 fluence and decrease at higher fluences. The irradiated nanocomposites achieve a higher specific capacitance of 323.11 F g-1, and the fabricated device shows cyclic stability of 86 %, a remarkable power density (P) of 0.72 kW kg-1, and an energy density (Ep) of 6.32 Wh kg-1.

For Details refer DOI : https://doi.org/10.1016/j.surfin.2024.104647

HIGHLY EFFICIENT NON-ENZYMATIC ELECTROCHEMICAL GLUCOSE BIOSENSOR BASED ON COPPER METAL ORGANIC FRAMEWORK COATED ON GRAPHITE SHEET

Deepa Kumari, Megha Prajapati and Chhaya Ravi Kant

Detection of glucose is highly informative, creating a constant demand for fabricating high-precision glucose biosensors. Metal–organic frameworks, a family of porous materials renowned for their tunability, can be an excellent choice for developing such sensors. We have developed a highly-sensitive, non-enzymatic sensor for electrochemical detection of glucose fabricated using Copper Metal–Organic Framework (Cu MOF), synthesized by a simple, room-temperature stirring method using Benzene-1,3,5-tricarboxylic acid (BTC) as ligand and Copper nitrate trihydrate as precursor.

The synthesized nanostructure was characterized using Fourier transform infrared spectroscopy, scanning electron microscopy, and energy-dispersive X-ray analytical techniques. Powder X-ray diffraction study and thermogravimetric analysis were also done. Further, Brunnauer-Emmett-Teller analysis revealed the porous nature of Cu MOF. The materials exhibited strong electro-catalytic activity for glucose oxidation as revealed from cyclic voltammetry and chronoamperometric studies done under alkaline pH conditions. The Cu MOF deposited on a conducting graphite sheet electrode displayed a significantly low detection limit of 0.019 mM through a broad detection range (1–15 mM) and a strong sensitivity of 229.4 μAmM−1 cm2. Overall, the Cu MOF/GS exhibits exceptional stability, short response time (less than 1 s), and good repeatability and reproducibility, making it a promising future material for non-enzymatic glucose detection.

For Details refer DOI : 10.1149/2162-8777/ad3fe5

NICO MOF@ CARBON QUANTUM DOTS ANODE WITH SOOT DERIVED ACTIVATED CARBON CATHODE: AN EFFICIENT ASYMMETRIC CONFIGURATION FOR SUSTAINABLE HIGH-PERFORMANCE SUPERCAPACITORS

Rita Kumari, Megha Prajapati, Chhaya Ravi Kant

Metal-organic frameworks (MOFs) exhibit excellent crystalline, hierarchical porous structures and have garnered great scientific interest as a key material for supercapacitor applications. However, the low conductivity of MOFs poses a great challenge to fully utilize their potential. Carbon quantum dots (CQDs) prepared from waste edible soybean oil have been skillfully incorporated into NiCo MOF to enhance supercapacitive performance with its high electronic conductivity and rapid charge transfer kinetics. Symmetrical, spherical CQDs synthesized using the hydrothermal method have been decorated on NiCo MOF nanosheets using a facile solvothermal technique to form the NiCo MOF@CQDs composite. The new composite retains the desirable crystalline structure and hierarchical porosity of MOFs, while the integration of CQDs contributes to enhanced conductivity, yielding a superior specific capacitance of 1063.02 Fg−1 (0.5 Ag−1). An asymmetric supercapacitor device has been fabricated using NiCo MOF@CQDs as positive electrode and waste soybean oil-derived activated-carbon as negative electrode. The assembled device shows a remarkable energy and power density of 30.61 Whkg−1 and 0.62 kWkg−1, respectively. Moreover, the device demonstrates a promising Coulombic efficiency of 84.53%, with capacitance retention of 88.61% over 5000 charge–discharge cycles. This work highlights existing challenges and potential sustainable solutions in the realm of emerging energy storage devices.

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X-RAY IRRADIATION-INDUCED ENHANCEMENT OF SUPERCAPACITIVE PROPERTIES OF BIO-DERIVED ACTIVATED CARBON

Rita Kumari, Megha Prajapati, Chhaya Ravi Kant

The rising global energy demand calls for the development of highly efficient energy storage devices, particularly supercapacitors with remarkable power density. Because of its high surface area, activated carbon (AC) is crucial as a supercapacitor electrode material. X-ray irradiation of AC leads to modifications in its surface chemistry by altering the sp2 hybridization of the surface carbons. In the current work, we present x-ray irradiation studies on the supercapacitive properties of AC prepared by adopting an oil wick lamp method using soot derived from waste soybean oil. The activated soot is irradiated at a dose rate of 16 mGy/s under a 60 kV x-ray source and investigated as an electrode active mass for an electric double-layer capacitor (EDLC). The device studies reveal that x-ray irradiation is crucial in determining the sample's physisorption and energy storage properties. The irradiated sample demonstrates high specific power density (135.9 W kg−1) and specific energy density (3.2 Wh kg−1). The energy density of the irradiated AC soot electrode sample is nearly double that of AC, i.e., 3.2 Wh kg−1 versus 1.6 Wh kg−1, respectively, making it a potential candidate for efficient electrodes in EDLC devices. The internal resistance of the supercapacitor shows a reduction from 25.5 Ω to 24.1 Ω after irradiation, thereby increasing the electrode conductivity. The investigations in the current work reveal a significant enhancement of the energy storage capacity of x-ray-irradiated AC for high-performance supercapacitor devices. Moreover, the environmentally friendly methodology adopted to synthesize AC soot can help reduce environmental pollution and contribute to the development of sustainable energy storage devices.

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A NEW FERMATEAN FUZZY MULTI-OBJECTIVE INDEFINITE QUADRATIC TRANSPORTATION PROBLEM WITH AN APPLICATION TO SUSTAINABLE TRANSPORTATION

Aakanksha Singh, Ritu Arora and Shalini Arora

In this work, a Fermatean fuzzy (FF) multi-objective indefinite quadratic transportation problem (TP) is introduced. Due to some unavoidable reasons, real-life transportation parameters such as supply, demand and costs are indeterminate in nature and cannot be expressed in crisp terms. We represent these parameters using FF numbers, an extension of fuzzy numbers, which are capable of representing indeterminacy efficiently. A multi-objective indefinite quadratic TP where each objective is a product of two linear factors (cost functions) is considered. Defuzzification of FF numbers is accomplished by the introduction of -cut for the first time. The obtained crisp TP is solved using the intuitionistic fuzzy programming approach and FF programming approach to arrive at a compromise solution.

To substantiate the work, solution methodology based on defuzzification using the ranking function is also deliberated. The applicability of the model is demonstrated through a sustainable TP, which simultaneously minimizes transportation cost with depreciation cost and packaging cost with wastage cost. The resulting value of the objective functions and the aspiration levels are compared to depict the efficacy of the proposed method over the ranking function method. The concluding section summarizes the work, and future avenues along with some limitations of the work are also specified.
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AN APPROACH TO OPTIMIZE TRANSPORTATION PROBLEMS WITH NEUTROSOPHIC NUMBERS BASED ON A NEW RANKING FUNCTION

Aakanksha Singh, Ritu Arora, Rajkumar Verma and Shalini Arora

A transportation problem (TP) is built on the framework of supply-demand and cost parameters which are uncertain in nature. Neutrosophic numbers are capable of handling incomplete information. This paper introduces a new solution approach to optimize TPs with neutrosophic parameters based on a new ranking function. This function utilizes the attitudinal character of a basic unit-interval monotonic function inspired from the domain of continuous ordered weighted average operators. Ranking rules are established followed by defining a neutrosophic transportation problem. A solution methodology followed by solved numerical illustrates the efficiency of the proposed method. Conclusion and future directions summarize the work.
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CHEMICAL CHARACTERISTICS, MORPHOLOGY AND SOURCE APPORTIONMENT OF PM10 OVER NATIONAL CAPITAL REGION (NCR) OF INDIA

Rubiya Banoo, Sarika Gupta, Ranu Gadi, Anit Dawar, Narayanasamy Vijayan, Tuhin Kumar Mandal & Sudhir Kumar Sharma

The present study frames the physico-chemical characteristics and the source apportionment of PM10 over National Capital Region (NCR) of India using the receptor model's Positive Matrix Factorization (PMF) and Principal Momponent Mnalysis/Absolute Principal Component Score–Multilinear Regression (PCA/APCS-MLR).The annual average mass concentration of PM10 over the urban site of Faridabad, IGDTUW-Delhi and CSIR-NPL of NCR-Delhi were observed to be 195 + 121, 275 + 141 and 209 + 81 μg m−3, respectively. Carbonaceous species (organic carbon (OC), elemental carbon (EC) and water-soluble organic carbon (WSOC)), elemental constituents (Al, Ti, Na, Mg, Cr, Mn, Fe, Cu, Zn, Br, Ba, Mo Pb) and water-soluble ionic components (F−, Cl−, SO42−, NO3−, NH4+, Na+, K+, Mg2+,

Ca2+) of PM10 were entrenched to the receptor models to comprehend the possible sources of PM10. The PMF assorted sources over Faridabad were soil dust (SD 15%), industrial emission (IE 14%), vehicular emission (VE 19%), secondary aerosol (SA 23%) and sodium magnesium salt (SMS 17%). For IGDTUW-Delhi, the sources were SD (16%), VE (19%), SMS (18%), IE (11%), SA (27%) and VE + IE (9%). Emission sources like SD (24%), IE (8%), SMS (20%), VE + IE (12%), VE (15%) and SA + BB (21%) were extracted over CSIR-NPL, New Delhi, which are quite obvious towards the sites. PCA/APCS-MLR quantified the similar sources with varied percentage contribution. Additionally, catalogue the Conditional Bivariate Probability Function (CBPF) for directionality of the local source regions and morphology as spherical, flocculent and irregular were imaged using a Field Emission–Scanning Electron Microscope (FE-SEM).

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IDENTIFICATION OF SOURCES OF COARSE MODE AEROSOL PARTICLES (PM10) USING ATR-FTIR AND SEM-EDX SPECTROSCOPY OVER THE HIMALAYAN REGION OF INDIA

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This study attempts to examine the morphological, elemental and physical characteristics of PM10 over the Indian Himalayan Region (IHR) using FTIR and scanning electron microscopy-energy dispersive X-ray (SEM-EDX) analysis. The study aimed at source identification of PM10 by exploring the inorganic ions, organic functional groups, morphology and elemental characteristics. The pollution load of PM10 was estimated as 63 + 22 μg m−3; 53 + 16 μg m−3; 67 + 26 μg m−3 and 55 + 11 μg m−3 over Mohal-Kullu, Almora, Nainital and Darjeeling, respectively. ATR-FTIR spectrum analysis revealed the existence of inorganic ions (SiO_4^{4-}, TiO_2, SO_4^{2-}, SO_3^{-}, NO_3^{-}, NO_2^{-}, CO_3^{2-}, HCO_3^{-}, NH_4^{+}) and organic functional groups (C–C, C–H, C=C, C≡C, C=O, N-H, C≡N, C=N, O-H, cyclic rings, aromatic compounds and some heterogeneous groups) in PM10 which may arise from geogenic, biogenic and anthropogenic sources. The morphological and elemental characterization was performed by SEM-EDX, inferring for geogenic origin (Al, Na, K, Ca, Mg and Fe) due to the presence of different morphologies (irregular, spherical, cluster, sheet-like solid deposition and columnar). In contrast, particles having biogenic and anthropogenic origins (K, S and Ba) have primarily spherical with few irregular particles at all the study sites. Also, the statistical analysis ANOVA depicts that among all the detected elements, Na, Al, Si, S and K are site-specific in nature as their mean of aw% significantly varied for all the sites.

The trajectory analysis revealed that the Uttarakhand, Jammu and Kashmir, the Thar Desert, Himachal Pradesh, Pakistan, Afghanistan, Nepal, Sikkim, the Indo-Gangetic Plain (IGP) and the Bay of Bengal (BoB) contribute to the increased loading of atmospheric pollutants in various locations within the IHR.
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SOLUTION OF TRANSPORTATION PROBLEMS UNDER PYTHAGOREAN FUZZY FRAMEWORK USING NEW SCORE FUNCTION

Sarita Gahlawat, Rajkumar Verma, Geeta Sachdev, Shalini Arora

The transportation problem is one of the most significant mathematical programming applications that appears in various real-world decision-making problems. In an actual scenario, the supply, demand, and cost parameters of a transportation problem cannot be exactly quantified due to market instability. To deal with such types of impreciseness, the researchers have widely used fuzzy numbers and their extensions. Pythagorean fuzzy set theory is a prominent tool for handling uncertain and vague information in complex decision-making situations. This paper aims to develop a solution approach to solve the transportation problem with uncertainty in input parameters by incorporating Pythagorean fuzzy numbers. To do so, first, a new score function is proposed to rank Pythagorean fuzzy numbers more efficiently. A comparative study highlights some flaws in existing score functions, which depicts the advantages of the proposed score function over existing ones. Afterward, we solve the Pythagorean fuzzy transportation problem using the proposed score function. The solution technique is demonstrated with the help of some numerical examples. In addition, a comparative study is also included to show the efficacy of the proposed approach over existing ones.
For Details refer DOI: https://doi.org/10.1007/s12046-024-02554-4

DUAL PH AND ULTRASOUND RESPONSIVE CURCUMIN LOADED G-C3N4/BA(OH)2 NANOCARRIER FOR CHEMO-PHOTODYNAMIC THERAPY-

Saumya, Faqua Zarreen, Masood Nadeem, Srinivas voddumalla, Moshahid A Rizvib and Bhavani Prasad Naik Nenavathu

Curcumin (Cur)-loaded graphitic carbon nitride/barium hydroxide (g-C3N4/Ba(OH)2) nanocarriers (GCNB NCRs) were synthesized using a chemical precipitation method and were proved to be an effective drug delivery vehicle with ultrasound and pH sensitivity. The highest drug encapsulation efficiency of 85% was found in the GCNB nanocarrier, and upon the incorporation of polyvinylpyrrolidone (1 mg mL−1) into the nanocarrier, the encapsulation efficiency was found to be 80%.

After ultrasound treatment, the curcumin drug release from the folic acid (FA)-GCNB nanocarrier at pH 5.4 increased from 54.86% to 88.39%. The release of the drug at this pH occurs gradually over an extended duration of 72 h compared to the release observed in studies conducted at pH values of 1.5 and 7.4. The cell viability at 1000 μg mL−1 concentration for different drug-loaded NCs under light irradiation is as follows: CUR/FA-GCNB-PVP: 25.00%, curcumin: 9.81%, Cur (5 mg)/FA-GCNB: 18.58%, and Cur (10 mg)/FA-GCNB: 15.86%, whereas that under dark conditions is as follows: CUR/FA-GCNB-PVP: 32.05%, curcumin: 17.50%, Cur (5 mg)/FA-GCNB: 25.90%, and Cur (10 mg)/FA-GCNB: 23.20%. IC50 values of Cur (5 mg)/FA-GCNB and Cur (10 mg)/FA-GCNB correspond to 154.62 and 128.96 μg mL−1, respectively, for the MCF-7 cell line treated under light conditions. Moreover, Cur (5 mg)/FA-GCNB and Cur (10 mg)/FA-GCNB showed IC50 values of 181.11 and 165.02 μg mL−1, respectively, under dark conditions. The eradication of tumor cells is accomplished by inducing the production of reactive oxygen species (ROS), as confirmed by 2′-7′-dichlorodihydrofluorescein diacetate (DCFH-DA), 1,3-diphenylisobenzofuran (DPBF) and EPR studies. A cytotoxicity study against the HEK-293 cell line confirmed the nontoxicity of the nanocomposite.

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SUNLIGHT-MEDIATED REMOVAL OF ENDOCRINE DISRUPTORS FROM WASTEWATER USING TRIMETALLIC CORE-SHELL AG-TEO2@ ZNO NANOCOMPOSITES

Preeti Joshi, Rajendra Patel , Aishwarya Singh , Bhavani Prasad Naik Nenavathu, Manu Sharma , Swati Verma and Mika Sillanpää

The current work emphasizes the preparation of trimetallic core-shell Ag–TeO2@ZnO nanocomposites (NCs) by thermo-mechanical method for the efficient photocatalytic degradation of 2,4-Dichlorophenol and β-naphthol pollutants. FE-SEM shows that Ag and TeO2 nanoparticles are deposited on the surface of ZnO nanotubes. The band gap of pristine ZnO NPs and 5 wt% Ag–TeO2@ZnO nanocomposites are found to be 3.16 and 2.96 eV, respectively. The calculated specific surface area (SBET) of pristine ZnO NPs and 5 wt% Ag–TeO2@ZnO nanocomposites are 40.47 and 45.66 m2 g−1 respectively, confirming that Ag and TeO2 nanoparticles contribute to increasing in surface area of pure ZnO. The synthesised nanocomposite showed excellent photocatalytic performance for the degradation of β - naphthol (95.6%) in 40 min at the concentration of (0.6 mg ml−1) and 2,4-DCP (99.6%) in 180 min (0.4 mg ml−1) under natural sunlight. Cyclic Voltammetry and Electrochemical Impedance Spectroscopy were carried out to study the electrochemical properties. The determination of reactive oxygen species (ROS) confirmed that the degradation of the pollutants by 5 wt% Ag–TeO2@ZnO NCs was due to the formation of superoxide radicals. Electron paramagnetic resonance revealed the presence of sharp signals in pure ZnO nanoparticles at g 1.95 and oxygen vacancy peak at g 2.01 in 5 wt% Ag–TeO2@ZnO NCs.

To study the mechanism behind the degradation of pollutants, Scavenger test using histidine and ascorbic acid (ROS scavengers) was performed. The synthesised nanocomposites are highly stable and showed enhanced efficiency up to three cycles, confirming their reusability as a photocatalyst.

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HIGHLY SELECTIVE AG CA@CUO NANOCOMPOSITE BASED SENSOR FOR TRACE LEVEL CR (VI) DETECTION IN WATER

Preeti Joshi, Saumya, Bhavani Prasad Naik Nenavathu

Cr (VI) is a highly toxic metal ion and is considered as a carcinogen, teratogen, and mutagen. To address its sensing in water samples, Ag-Ca@CuO nanocomposites are synthesised using a simple, less expensive, effective method and are used for determining Cr (VI) by colorimetric approach. The nanocomposites have been characterized through several methods. Scanning electron microscopy revealed the formation of rice grain-shaped CuO nanoparticles. Upon incorporation of Ca and Ag, a change in the morphology was noticed. The oxidase-like activity is shown by Ag-Ca@CuO nanocomposites in the presence of chromium (VI) and a chromogenic substrate i.e., 3, 3′, 5, 5′- tetramethylbenzidine (TMB). Our established method showed superior sensitivity with a detection limit of 0.033 µM, a linear range of 10–600 µM and recoveries ranged from 100.16% to 110.32%. Reactive oxygen species include superoxide anion (O_2^{*-}), hydroxyl radicals (OH*), singlet oxygen ($^1O_2$), etc. Superoxide radicals ($O_2^{\bullet-}$) are generated from the prepared nanocomposites and these radicals in the presence of chromium (VI) caused oxidation of 3,3′,5,5′-tetramethylbenzidine (TMB), and are recovered as oxTMB in blue colour. The role of $O_2^{\bullet-}$ in the oxidation of TMB was confirmed from the reactive oxygen species (ROS) scavenging studies using ascorbic acid as an $O_2^{\bullet-}$ scavenger. In addition, singlet oxygen also caused oxidation of TMB and is confirmed from diphenylisobenzofuran (DPBF) assay. Selective detection of Cr (VI) in the Yamuna River water sample, by the obtained nanocomposites is confirmed from the interference studies carried out in the existence of several metal ions.

For Details refer DOI: https://doi.org/10.1007/s11270-024-07662-9

REVIEW—ORGANIC SOLAR CELLS: STRUCTURAL VARIETY, EFFECT OF LAYERS, AND APPLICATIONS

P. Chamola, P. Mittal and Brijesh Kumar

This review is focused on the current development in domain of organic photovoltaic cells (OPVs). Solar cells play a vital role for electricity production by converting sunlight to electric current. This paper presents an exhaustive literature review on advancements in field of OPVs. The solar cells, as a substitute for fossil fuels are, at the forefront in a wide range of research applications. The organic solar cells efficiency and operational lifespan made outstanding advancement by refining materials of the photoactive layer and presenting new inter-layers. The functioning of organic solar cells is centered on photoinduced electron transfer. Organic solar cell technology has immense potential owing to lower production cost and flexible characteristics. The latest advancement in the material engineering and sophisticated device structure have significantly improved the solar cells commercial feasibility. Further, we highlight the research and advancements of organic bioelectronics in powering numerous bio-medical electronic devices. The important challenges, engineering result, and forthcoming prospects driving the progress of OSCs are explored.
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HIGH PERFORMANCE FLEXIBLE H-SHAPED SINGLE LAYERED ORGANIC LIGHT EMITTING DIODE

A. Srivastava, A. Srivastava, N. A. Srivastava and Brijesh Kumar

Organic light emitting diodes (OLEDs) have gained a remarkable position in display industries, because of its high flexibility and wide color gamut features. A number of OLED structures have been demonstrated in the recent years with an aim to make proficient device. In this paper, an H-shaped single layer OLED design has been proposed. An intensive investigation over various design challenges such as, device potential, current density, luminescent power, electric field, recombination rate and single exciton densities have been analyzed with the help of analytical modeling and a number of mathematical simulations. The complete analyses of H-shaped OLED are performed by utilizing Atlas 2-D TCAD device simulation. The H-shaped structure of the device consists of small distance between anode and cathode in some regions that leads to high potential. Therefore, it directly results in the current density augmentation of the device and hence high performance is achieved. Furthermore, owing to high carrier injection that improves the overall recombination rate significantly and enables high singlet exciton density. Besides this, for fair estimation of H-shaped device performance, investigation at various intentional doping levels is analyzed.

Additionally, more depth analysis has been investigated with incorporation of graphene oxide buffer layer. This analysis results in superior luminosity that can be employed for high current and reliable applications.
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PERFORMANCE ENHANCEMENT OF OLED EMPLOYING CUSCN INTERFACIAL LAYER

D. Chandra, A. Sahu, Brijesh Kumar, A. Kannaujiya and S. K. Ojha

This research work outlines the effectiveness of multilayered organic light emitting diodes (OLEDs) that result in enhancement of performance of the device by incorporating a copper thiocyanate (CuSCN) interfacial layer, serving the dual purpose of facilitating hole-injection-layer and hole-transport-layer within the device. The CuSCN is used as a hole transport layer that lowered the drive voltage of OLED in the range of 1.0–1.5 V. Due to the exceptional properties of the CuSCN material, it offers distinct efficiency advantages. The upraised luminosity observed in OLEDs is attributed to a synergy between higher concentrations of electrons and holes within the emission layer. This occurrence corresponds to Langevin recombination in organic semiconductors, clarifying the process responsible for the increased luminosity. Incorporating the CuSCN layer in this investigation serves to amplify the abundant concentrations of electrons and holes in close proximity to the emission layer. The whole device behaviour is analyzed using the Silvaco Atlas tools, where, the parameters of device, including luminescent and current density are extracted. This research is precisely applicable for low-cost lighting and display applications.
For Details refer DOI: https://doi.org/10.1007/s12596-024-01766-5

DESIGN AND ANALYSIS OF SPR-BASED REFRACTIVE INDEX SENSOR WITH ENHANCED SENSITIVITY BASED ON GRAPHENE/BP HETEROSTRUCTURE

Shivangani, A. Sahu, D. Kumar, Brijesh Kumar, and S. K. Gupta

In this article, we propose a novel surface plasmon resonance (SPR) sensor design with the combination of two-dimensional (2D) nanomaterials including copper, nickel, and graphene, along with a bonding layer of black phosphorous, to achieve significant enhancements in plasmonic performance. Theoretical analysis of the parameters has been performed using the Fresnel equations and Transfer Matrix method, based on the Kretschmann setup. For the CaF_2 Prism/Cu/Ni/Graphene/BP/Sensing-Medium configuration, the optimized performance parameters include an angular sensitivity of 410°/RIU, a detection accuracy of

0.33789°, a figure of merit (FOM) of 138.538 RIU/deg, and a limit of detection of 2.439 for the medium being sensed at 633 nm. The utilization of both graphene and BP proves advantageous in increasing the SPR sensor's sensitivity since BP and graphene possess stronger adsorption energy, making it a more suitable candidate for actively binding biomolecules. The proposed device showcases considerable potential for the detection of large-sized molecules such as secretary vesicles and lysosomes. The numerical simulation has been performed in the COMSOL Multiphysics and MATLAB environment.

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METHOD TO DETERMINE THE MAXIMUM CURRENT DENSITY OF P-MOS2/P-CDSE/N-WS2/N-ITO SOLAR CELL

P. Pandey, S. Yadav, J. P. Pandey, R. K. Yadav, S. K. Ojha and Brijesh Kumar

Cadmium Selenide (CdSe) made solar cells are considered an auspicious technology in the arena of thin-film photovoltaics cell due to their favourable properties of optoelectronic. The performance of CdSe solar cells is estimated in this work based on various key parameters: fill factor (FF), open circuit voltage (Voc), operating temperature (Temp), short circuit current density (Jsc), and collection-efficiency. The act of the solar cell is meaningfully affected by its temperature, with certain value of efficiency losses subsequently from higher temperatures due to their increased value of carrier-recombination rates. The optimal performance is preserved with the help of proper thermal-management. The distinctive range for the open circuit voltage (Voc) of CdSe solar cells is from 0.5 to 1.0 V. For better material quality and effective junction properties, which are play a crucial role for attaining the high efficiency, that are also indicated by higher Voc values. The short circuit current density (Jsc) varies at 775 mA/cm2, which contingent on the light-absorption criteria as well as carrier-generation competences of the cell. More efficient value of photon-absorption and carrier-generation are replicated by the higher Jsc values. The fill-factor (FF) of the CdSe solar cells generally falls between 50 and 80%. For better performance of solar cell, specified by a higher fill-factor, that reflects their higher parallel resistance as well as lower series resistance, that are also vital for attaining their overall efficiency is too much high. The efficiency of carrier-collection and their utilization inside the solar cell is restrained by their collection-efficiency. Minimal value of recombination-losses and efficient carrier-transport quality are indicated by their high collection-efficiency.

For Details refer DOI: https://doi.org/10.1007/s12596-024-02291-1

0.33789°, a figure of merit (FOM) of 138.538 RIU/deg, and a limit of detection of 2.439 for the medium being sensed at 633 nm. The utilization of both graphene and BP proves advantageous in increasing the SPR sensor's sensitivity since BP and graphene possess stronger adsorption energy, making it a more suitable candidate for actively binding biomolecules. The proposed device showcases considerable potential for the detection of large-sized molecules such as secretary vesicles and lysosomes. The numerical simulation has been performed in the COMSOL Multiphysics and MATLAB environment.

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CONFERNET: A LOW TRAINABLE PARAMETERS BASED NOVEL LIGHT-WEIGHT CONVOLUTIVE FEATURE EXTRACTION RECURRENT NETWORK FOR HIGH ACCURACY SUSPECT IDENTIFICATION

Manu Shree, Amar Kumar Mohapatra, Hemmaphan Suwanwiwat, Virendra P. Vishwakarma, Ickjai Lee

In suspect identification systems, facial features play a crucial role in recognising individuals. However, the challenge lies in sustaining the accuracy of the system over a long period of time, ensuring that it remains consistently high, reliable, and effective. This research introduces a novel lightweight model that requires low trainable parameters, a significantly smaller number than pre-trained models, which use millions of trainable parameters. The newly proposed Convolutive Feature Extraction Recurrent Network (ConFERNet) integrates a convolutional neural network and long short-term memory into a single structure to synthesise diverse images. This approach leverages computer graphics techniques to effectively extract facial features. Computer graphics play a pivotal role at various stages of this process, employing techniques such as adaptive histogram equalisation and illumination normalisation to enhance image quality under varying lighting conditions and create diverse training datasets. The LSTM-based convolutive feature-recurrent system demonstrates a notable improvement in accuracy when tested on the Augmented Reality Database (AR-DB), Extended Yale B (E-Yale B), Enhanced Extended Yale B (EE-Yale B), and Extended Cohn-Kanade (CK+) face datasets, achieving accuracy rates of 96.20%, 98.53%, 99.59%, and 99.60%, respectively. These accuracies outperform traditional baseline accuracies of 68.65% for AR-DB, 84.21% for E-Yale B, and 88.37% for CK+, suggesting the potential of this approach in enhancing suspect identification systems. This research contributes to the field by providing an innovative solution through advanced facial image feature extraction, which leads to improved accuracy rates.

For Details refer DOI: https://doi.org/10.1007/s11760-024-03603-5

A WALKTHROUGH OF BLOCKCHAIN-BASED INTERNET OF DRONES ARCHITECTURES

Ayushi Jain, ShivamBarke, MehakGarg, Anvita Gupta, BhawnaNarwal ,
Amar Kumar Mohapatra, Deepak Kumar Sharma, Gautam Srivastava

The open and unreliable environment of drones could make data transfer and authentication challenging. Given the proliferation of drone applications, the Internet of Drones (IoD) represents a promising phenomenon to enhance flight reliability and security. IoD has recently acquired pace due to its exceptional flexibility in numerous challenging circumstances. Furthermore, the incorporation of drones holds the potential to enhance many network systems' performance metrics, such as throughput, scalability, connection, and latency. Regardless of its diverse domain, IoD is susceptible to malicious attacks owing to the wireless medium's inherent unreliability. Drone communication can be made secure, reliable, and affordable by utilizing blockchain (BC) concepts that can be used to develop security mechanisms for addressing IoD's shortcomings. This article reviews emerging BC-powered schemes, focusing on their application in drone communication, authentication, and security. Our study explores various drone applications and intricacies associated with BC-based drone technology. By leveraging BC concepts, security mechanisms can mitigate IoD's shortcomings. Unlike previous works, this survey offers a detailed examination of BC applications in drone technology. The research includes a thorough investigation into current IoD challenges and proposes insightful recommendations to fortify its security framework. Additionally, we conduct experiments on the runtime of consensus algorithms, providing a detailed comparison along with various security models. An analysis of recent work shows diverse approaches in BC for IoD, with a comparative study aimed at mitigating challenges. An overview of machine learning in IoD along with insightful research recommendations are also given that provide ways to improve IoD's security.

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OPTIMIZING FACIAL FEATURE EXTRACTION AND LOCALIZATION USING YOLOV5: AN EMPIRICAL ANALYSIS OF BACKBONE ARCHITECTURES WITH DATA AUGMENTATION FOR PRECISE FACIAL REGION DETECTION

Srishti Chanda, Yachika N. Kumar, Shrankhla Srivastava, Ritu Rani,
Manu Shree & A. K. Mohapatra

The task of object detection in computer vision revolves around the identification of objects within images or videos. A specific subtask within object detection is face detection, which focuses on detecting human faces. Within the realm of face detection, an important research area is facial feature detection, which has diverse applications ranging from facial recognition to emotion detection and facial expression analysis. The crucial step in facial feature detection is the identification and localization of key facial features such as the eyes, eyebrows, nose, mouth, and chin, which can also be called facial region detection.

Face region detection can be done in two ways: landmark detection and Bounding box- based detection. Bounding boxes offer computational benefits such as increased speed and efficiency. They are preferable when the objective is to accurately detect and locate the presence of an object or face in an image or video frame. Although most of the existing algorithms for facial feature detection based on bounding box predictions typically treat the eyes as a single entity, our approach using YOLOv5 addresses the separation of left and right eye detection. In this research study, we conducted experiments using YOLOv5, which provides bounding box predictions. We used a subset of LFW (Labelled Faces in the Wild) Dataset which we augmented using GFP-GAN, Gaussian Noise, Image Sharpening, and CLAHE. We explored the effectiveness of different backbone architectures when applied to YOLOv5 for the task of facial region detection. We evaluated three popular backbone networks: EfficientNet-bo, GhostNet, and CSP-Darknet53. Our objective was to identify the most suitable backbone architecture that yields accurate detection of facial features, including the left eye, right eye, nose, and lips. Our experiments show that when GhostNet is used as a backbone in the YOLOv5 architecture, it produces superior results for the detection and classification of features as compared to the other backbones. We present a detailed evaluation of our findings, including discussions of the experimental results using different IOU thresholds and backbone combinations. Our proposed methodology and findings make valuable contributions to the field of facial feature extraction and provide meaningful insights into the potential and performance of YOLOv5 for detecting and localizing key facial elements.

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AN EVOLUTIONARY KNN MODEL FOR DDOS ASSAULT DETECTION USING GENETIC ALGORITHM BASED OPTIMIZATION

Fizza Rizvi, Ravi Sharma, Nonita Sharma, Manik Rakhra, Arwa N Aledaily, Wattana Viriyasitavat, Kusum Yadav, Gaurav Dhiman, Amandeep Kaur

Distributed Denial of Service (DDoS) attacks continue to pose a significant threat to network infrastructures, exploiting vulnerabilities within existing security protocols and disrupting the seamless availability of online services. The intricate interconnections of nodes within computer networks contribute to the dynamic structure of this environment, complicating efforts to establish a secure and productive user experience. Effectively mitigating DDoS attacks in this complex networked setting remains a challenge. While current strategies primarily rely on anomaly detection and signature-based techniques, utilizing statistical analysis and predefined patterns to identify and thwart attacks, none have consistently demonstrated efficacy or reliability. Consequently, there is a compelling need for advancements in security mechanisms to address DDoS threats more effectively.

This research introduces an innovative and highly efficient approach that incorporates various classification algorithms, including Random Forest, Decision Tree, Gradient Boosting, Linear SVM, Logistics, K-nearest neighbors (KNN), and AdaBoost, for DDoS attack detection. The performance of these machine learning classifiers is evaluated using key metrics such as accuracy, recall, F1-score, and precision. Remarkably, experimental results reveal outstanding accuracy rates, with Random Forest achieving the highest accuracy in detecting attacks. Additionally, a genetic algorithm is employed to select optimal features from the dataset, further enhancing the performance of the classifiers. This results in a notable 25% increase in accuracy, surpassing AdaBoost and Logistics, with K-nearest neighbors emerging as the top performer in terms of accuracy.
For Details refer DOI : https://doi.org/10.1007/s11042-024-18744-5

AN OCEANOGRAPHIC DATA COLLECTION SCHEME USING HYBRID OPTIMIZATION FOR LEAKAGE DETECTION DURING OIL MINING IN MOBILITY ASSISTED UWSN

M Choudhary, N Goyal, D Gupta, B Sharma, N Sharma

Data acquisition is the process of collecting, measuring and analysing information using standardised, validated techniques for application-specific tasks. In mobility-assisted underwater wireless sensor networks (UWSNs), where nodes are not fixed due to water current of 3 m/sec, data collection becomes an arduous task. There are few works that provide a mobile sink with optimised data transmission path planning and scheduling. These systems do not transmit the data fast enough to provide real-time data transmission as these methods do not consider the buffer occupancy rate and latency in data acquisition. In this paper, a stimulating transmission path planning technique for mobile sinks using the hybrid Grey Wolf Optimizer Whale Optimization Algorithm (GWOWOA) is proposed. In contrast to other optimization techniques, this hybrid technique includes a number of update processes such as random position update, prey search by the Grey Wolf Optimizer (GWO) and prey search by the Whale Optimization Algorithm (WOA). In this paper, the fitness function is calculated in terms of distance to the mobile sink, buffer occupancy rate, energy level and data acquisition latency. The use of these variables makes the proposed technique innovative. To prove the efficiency of the proposed system, GWOWOA is compared with existing systems. The simulation results show that the proposed system increases the residual energy and accuracy of the collected data and minimises the delay.

MULTIMODAL SENTIMENT ANALYSIS OF ENGLISH AND HINGLISH MEMES

Aishvi Guleria, Kamya Varshney, Garima Pahwa, Shreya Singhal & Nonita Sharma

Memes now-a-days have become a popular form of internet communication that individuals use to express complex emotions and viewpoints in an engaging yet concise manner. This research paper presents a groundbreaking study on the multimodal sentiment analysis of Hindi memes. Combining visual and linguistic components, the study investigates the intricate emotional context hidden within these culturally significant artifacts. A collection of 3999 Hinglish memes was assembled, a low-resource language, to conduct this analysis. The dataset combines verbal information and graphical elements, making it possible to analyze multimodal interactions thoroughly. Every picture has been marked according to the message communicated or the intended purpose and intention and is classified as "negative", "positive" or "neutral". The technical novelty of the study lies in the proposed multimodal approach for the sentiment analysis of Hinglish and English memes using a combination of RoBERTa and CLIP models, attaining an accuracy of 0.82 in contrast to the accuracy of 0.64 for the BERT model, 0.42 for the SVM model, 0.34 for multinomial NB model and 0.11 for VADER, which are some of the most widely used models for sentiment analysis. The findings highlight the significance of multimodal analysis in understanding and decoding the sentiment of Hinglish and English memes.

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DEEP LEARNING BASED AUTOMATED VEIN RECOGNITION USING SWIN TRANSFORMER AND SUPER GRAPH GLUE MODEL

Kavi Bhushan, Surendra Singh, Kamal Kumar, Parveen Kumar

Finger vein recognition is a secure and emerging biometric modality, including applications from automated portals at immigration checkpoints to most contributive amenities like pay-by-finger and accessing PC. Its reliability makes it integral in embedded systems, including ATMs and access control systems. Despite recent breakthroughs in finger vein verification, current methods are completely reliant on domain expertise and lack the scalability required to identify finger vein features from raw photos. The swin transformer (SwinT) and the super graph glue model are used in this study to develop a deep learning-based automatic vein recognition solution. The finger vein images were initially gathered from three publicly available datasets: the finger vein dataset, Published_database_FV_USM, and HKPU dataset. Then, pre-processing is applied based on the determined quality of data from the dataset.The extended rolling guidance filter (ExRoLL) is used for filtering, and the contrast-limited adaptive histogram equalization (CLAHE) approach is used for contrast enhancement.

The osprey depthwise separable swin transformer model (ODSwiT) was then utilized to extract features such as Mean, Contrast, Energy, Smoothness, and vein pattern. The osprey optimization algorithm (OspA) was utilized to optimize the network model's hyperparameters. Finally, using the super graph glue (SGG) model, match the retrieved features from both training and testing. By matching the traits, the suggested technique determines whether the user is a real individual or an imposter. The suggested model has a high accuracy of 0.98113 % for finger vein, 0.99085 % for Published_database_FV_USM, and 0.984 % for HKPU Dataset when compared to current models.

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ENHANCING SECURITY OF INTERNET OF MEDICAL THINGS IN FOG-EDGE ENVIRONMENT: A STUDY ON ATTACK DETECTION PERFORMANCE

Ravi Sharma, Nonita Sharma

The Internet of Medical Things (IoMT) is increasingly utilized for patient health monitoring, treatment delivery, and healthcare enhancement. However, IoMT devices are vulnerable to attacks, posing risks to patient privacy and safety. Machine learning (ML) techniques are employed for attack detection to mitigate threats. IoMT devices generate substantial data, allowing ML algorithms to analyze and predict potential attacks. This study evaluates the performance of ML models for attack detection using datasets collected from medical devices. Both conventional and ensemble models are employed and trained on two datasets: one comprising all features and another with features selected based on importance. Ensemble models, which combine the strengths of multiple ML algorithms, are utilized to enhance detection accuracy and robustness. Results indicate that the ensemble model achieves superior detection rates and lower false positives than traditional ML algorithms. The stack ensemble model demonstrates the highest performance with a detection rate of 97.58%. Our proposed model outperforms existing models with a 5% improvement in detection rate and a 25% reduction in execution time. Proposed ensemble approaches hold promise for strengthening the security of IoMT devices and ensuring patient safety in fog-edge environments.

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SPATIO-TEMPORAL ANALYSIS AND PREDICTION OF LAND USE LAND COVER (LULC) CHANGE IN WULAR LAKE, JAMMU AND KASHMIR, INDIA

MoniaDigra, RenuDhir, Nonita Sharma

Landsat land use/land cover (LULC) data analysis to establish freshwater lakes' temporal and spatial distribution can provide a solid foundation for future ecological and environmental policy development to manage ecosystems better. Analysis of changes in LULC is a method that can be used to learn more about direct and indirect human interactions with the environment for sustainability. Neural network technology significantly facilitates mapping between asymmetric and high-dimensional data. This paper presents a methodological advancement that integrates the CA-ANN (cellular automata-artificial neural network) technique with the dynamic characteristics of the water body to forecast forthcoming water levels and their spatial distribution in "Wular Lake." We used remote sensing data from 2001 to 2021 with a 10-year interval to predict spatio-temporal change and LULC simulation. The validation of the calibration of predicted and accurate LULC maps for 2021 yielded a maximum kappa value of 0.86. Over the past three decades, the study region has seen an increase in a net change % in the impervious surface of 22.41% and in agricultural land by 52.02%, while water decreased by 14.12%, trees/forests decreased by 40.77%, shrubs decreased by 11.53%, and aquatic vegetation decreased by 4.14%. Multiple environmental challenges have arisen in the environmentally sustainable Wular Lake in the Kashmir Valley due to the vast land transformation, primarily due to human activities, and have been predominantly negative. The research acknowledges the importance of (LULC) analysis, recognizing it as a fundamental cornerstone for developing future ecological and environmental policy frameworks.

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A WALKTHROUGH OF BLOCKCHAIN-BASED INTERNET OF DRONES ARCHITECTURES

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Amar Kumar Mohapatra, Deepak Kumar Sharma, Gautam Srivastava

The open and unreliable environment of drones could make data transfer and authentication challenging. Given the proliferation of drone applications, the Internet of Drones (IoD) represents a promising phenomenon to enhance flight reliability and security. IoD has recently acquired pace due to its exceptional flexibility in numerous challenging circumstances. Furthermore, the incorporation of drones holds the potential to enhance many network systems' performance metrics, such as throughput, scalability, connection, and latency. Regardless of its diverse domain, IoD is susceptible to malicious attacks owing to the wireless medium's inherent unreliability.

Drone communication can be made secure, reliable, and affordable by utilizing blockchain (BC) concepts that can be used to develop security mechanisms for addressing IoD's shortcomings. This article reviews emerging BC-powered schemes, focusing on their application in drone communication, authentication, and security. Our study explores various drone applications and intricacies associated with BC-based drone technology. By leveraging BC concepts, security mechanisms can mitigate IoD's shortcomings. Unlike previous works, this survey offers a detailed examination of BC applications in drone technology. The research includes a thorough investigation into current IoD challenges and proposes insightful recommendations to fortify its security framework. Additionally, we conduct experiments on the runtime of consensus algorithms, providing a detailed comparison along with various security models. An analysis of recent work shows diverse approaches in BC for IoD, with a comparative study aimed at mitigating challenges. An overview of machine learning in IoD along with insightful research recommendations are also given that provide ways to improve IoD's security.

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SAGA: STABILITY-AWARE GAIT ANALYSIS IN CONSTRAINT-FREE ENVIRONMENTS

Dimple Sethi, Deepak Kumar Sharma, Koyel Datta Gupta, Gautam Srivastava

Gait abnormality detection is a challenging task in clinical practice. The majority of the current frameworks for gait abnormality detection involve the individual processes of segmentation, feature estimation, feature learning, and similarity assessment. Since each component of these modules is fixed and they are mutually independent, their performance under difficult circumstances is not ideal. We combine those processes into a single framework, a gait abnormality detection system with an end-to-end network.

Methods: It is made up of convolutional neural networks and Deep-Q-learning Methods: one for coordinate estimation and the other for classification. In a single joint learning technique that may be trained together, the two networks are modeled. This method is significantly more efficient for use in real life since it drastically simplifies the conventional step-by-step approach. Results: The proposed model is experimented on MATLAB R2020a. While considering into consideration the stability factor, our proposed model attained an average case accuracy of 95.3%, a sensitivity of 96.4%, and a specificity of 94.1%.

Significance: Our paradigm for quantifying gait analysis using commodity equipment will improve access to quantitative gait analysis in medical facilities and rehabilitation centers while also allowing academics to conduct large-scale investigations for gait-related disorders. Numerous experimental findings demonstrate the effectiveness of the proposed strategy and its ability to provide cutting-edge outcomes.

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GENERATING PRACTICAL ADVERSARIAL EXAMPLES AGAINST LEARNING-BASED NETWORK INTRUSION DETECTION SYSTEMS

Vivek Kumar, Kamal Kumar, Maheep Singh

There has been a significant development in the design of intrusion detection systems (IDS) by using deep learning (DL)/machine learning (ML) methods for detecting threats in a computer network. Unfortunately, these DL/ML-based IDS are vulnerable to adversarial examples, wherein a malicious data sample can be slightly perturbed to cause a misclassification by an IDS while retaining its malicious properties. Unlike image recognition domain, the network domain has certain constraints known as domain constraints which are multifarious interrelationships and dependencies between features. To be considered as practical and realizable, an adversary must ensure that the adversarial examples comply with domain constraints. Recently, generative models like GANs and VAEs have been extensively used for generating adversarial examples against IDS. However, majority of these techniques generate adversarial examples which do not satisfy all domain constraints. Also, current generative methods lack explicit restrictions on the amount of perturbation which a malicious data sample undergoes during the crafting of adversarial examples, leading to the potential generation of invalid data samples. To address these limitations, a solution is presented in this work which utilize a variational auto encoder to generate adversarial examples that not only result in misclassification by an IDS, but also satisfy domain constraints. Instead of perturbing the data samples itself, the adversarial examples are crafted by perturbing the latent space representation of the data sample. It allows the generation of adversarial examples under limited perturbation. This research has explored the novel applications of generative networks for generating constraint satisfying adversarial examples. The experimental results support the claims with an attack success rate of 64.8% against ML/DL-based IDS. The trained model can be integrated further into an operational IDS to strengthen its robustness against adversarial examples; however, this is out of scope of this work.

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MH-ARO: META-HEURISTIC BASED ADAPTIVE ROUTING FOR LARGE SCALE OPPORTUNISTIC NETWORKS

Soni Chaurasia, Kamal Kumar

In wireless sensor networks, sensor nodes (SNs) are placed throughout a wide area and gather information from the surroundings. SN used to detect and send data consumes a lot of energy and dies instantly, which causes network overhead issues. Due to network overhead, network faults occur and do not cover a significant region for data transmission. A meta-heuristic-based adaptive routing for large-scale opportunistic networks (MH-ARO) is proposed in this work to overcome these problems.

The network exploits the dragonfly approach (DA) with opportunistic routing in this protocol. The DA is based on local and global search (GS) optimization. In local search (LS), each node assigns/uses a rank for data transmission and selects the forwarder node after applying the decision level matrix in a single group. In GS, an opportunistic network has multiple groups. Each group sends optimal data to the next group. Each group assigns a relay ranking based on the forwarder node's highest rank. The BS receives critical data from the relay and increases the survival of the node. Based on LS and GS, MH-ARO is categorized into two parts: (1) optimal forwarder opt (OFO) and (2) optimal route selection (ORS). In OFO, forwarder node selection is based on the following factors: relay ranking, node density, group ranking, residual energy, forwarder distance, and relay distance. ORS follows the adaptive routing and sends the data to BS using the best optimal route. The BS receives critical data without network failure and increases the survival of the node. The maximum active node participates in the network and consumes less energy so that a node covers a large region for communication. Comparing MH-ARO's performance to competing routing protocols, key performance indicators such as PDR, MSR, alive node, survivability, AEC, AD, and throughput are examined. The results demonstrate that the MH-ARO performs noticeably better than its rivals regarding energy efficiency.

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INTERNET OF THINGS TECHNOLOGY, RESEARCH, AND CHALLENGES: A SURVEY

Amit Kumar Vishwakarma, Soni Chaurasia, Kamal Kumar,
Yatindra Nath Singh & Renu Chaurasia

The world of digitization is growing exponentially; data optimization, security of a network, and energy efficiency are becoming more prominent. The Internet of Things (IoT) is the core technology of modern society. This paper is based on a survey of recent and past technologies used for IoT optimization models, such as IoT with Blockchain, IoT with WSN, IoT with ML, and IoT with big data analysis. Suppose anyone wants to start core research on IoT technologies, research opportunities, challenges, and solutions. In that case, this paper will help me understand all the basics, such as security, interoperability, standards, scalability, complexity, data management, and quality of service (QoS). This paper also discusses some recent technologies and the challenges in implementation. Finally, this paper discusses research possibilities in basic and applied IoT Domains.

For Details refer DOI: https://doi.org/10.1007/s11042-024-19278-6

IRREGULAR EVENT CLASSIFICATION IN SURVEILLANCE VIDEOS USING AN AUTO-ENCODER DEEP LEARNING FRAMEWORK

Krishan Berwal, Shubham Rathore, Sanjay Dahiya,
Ajay Kumar, Kamal Kumar

Anomaly detection is a major deep-learning problem that has a vast area to work upon. We have used a Convolutional Long Short-Term Memory (LSTM) Auto-encoder for the detection of irregular events based on regular events. Anomaly detection can be approached as a supervised problem, but the problem arises when we dig into varieties of anomalies which has many options and can be difficult to supervise, so the use of an unsupervised method is taken, and the results are calculated based on the regularity score of the sequences. The higher the score of regularity, the higher the chances of regularity in the sequence of video frames. The anomaly is detected on the frame level i.e. which frame has the irregularity, and which has regularity in it. The proposed model outperforms in terms of precision (0.97), recall (0.91), and f-measure (0.94) than the existing techniques.

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BMST-NET: BIDIRECTIONAL MULTI-SCALE SPATIOTEMPORAL NETWORK FOR SALIENT OBJECT DETECTION IN VIDEOS

Gaurav Sharma, Maheep Singh, Sandeep Chand Kumain, Kamal Kumar

Video saliency prediction aims to simulate human visual attention by locating the most pertinent and instructive areas within a video frame or sequence. While ignoring the audio aspect, time and space data are essential when measuring video saliency, especially with challenging factors like swift motion, changeable background, and nonrigid deformation. Additionally, video saliency detection is inappropriate when using image saliency models directly neglecting video temporal information. This paper suggests a novel Bidirectional Multi-scale Spatio Temporal Network (BMST-Net) for identifying prominent video objects to address the above problem. The BMST-Net yields notable results for any given frame sequence, employing an encoder and decoder technique to learn and map features over time and space. The BMST-Net model consists of bidirectional LSTM (Long Short-Term Memory) and CNN (Convolutional Neural Network), where the VGG16 (Visual Geometry Group) single layer is used for feature extraction of the input video frames. Our proposed approach produced noteworthy findings concerning qualitative and quantitative investigation of the publicly available challenging video datasets, achieving competitive performance concerning state-of-the-art saliency models.

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NIDS-CBAD: DETECTING ADVERSARIAL ATTACKS IN NETWORK INTRUSION DETECTION SYSTEMS USING DOMAIN CONSTRAINTS

Vivek Kumar, Kamal Kumar, Maheep Singh

Deep learning has witnessed continuous improvement over the years, which has led to its application with notable results in several areas, including the development of Network intrusion detection systems (NIDS). However, such learning models are susceptible to adversarial attacks, whereby an imperceptible change in an input data sample can cause misclassification. Adversarial attacks in security-critical applications like NIDS can easily compromise network security and, therefore, require effective countermeasure techniques. In this paper, we propose NIDS-CBAD, a constraint based adversarial detection technique for NIDS. We show that it is possible to detect adversarial examples using the inherent constraints of features derived from a network flow. Unlike prevalent detection techniques, NIDS-CBAD relaxes the requirement of generating adversarial examples for training and also does not need an auxiliary classifier. This reduces the computational requirement as we use constraint violations to detect adversarial attacks. NIDS-CBAD even detects practical adversarial examples specifically designed to obey network constraints. The detection method is simple yet effective in its approach and poses difficulty even for a strong adversary in crafting successful attacks. We evaluate the performance of NIDS-CBAD on three prevalent intrusion datasets: NSL-KDD, UNSW-NB15 and CICIDS2017 against five state-of-the-art adversarial attacks. Experimentally, the proposed method yields an adversarial detection rate of upto 100% with very few false positives.

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A NOVEL METHOD FOR GLIOMA SEGMENTATION AND CLASSIFICATION ON PRE-OPERATIVE MRI SCANS USING 3D U-NETS AND TRANSFER LEARNING

Gaurisha R. Srivastava, Pooja Gera, Ritu Rani, Garima Jaiswal & Arun Sharma

This research paper proposes a novel approach that harnesses deep learning techniques to address two critical objectives in brain tumor analysis: segmentation and classification. We have used a 3D U-Net architecture to acquire spatial relationships and accurately delineate tumor regions from MRI images. These masks are superimposed onto the original images generating a lucid visualisation of the tumorous areas. For classification of tumors into HGG (high-grade gliomas) and LGG (low-grade gliomas) we created a customized CNN model and utilised transfer learning with VGG16, ResNet50, InceptionV3, MobileNetV2 and DenseNet121 as the pre-trained models. This approach has been tested using the BraTS 2019 dataset which bears a testimony to its cutting-edge performance in both segmentation and classification tasks. The denoising procedure yields an impressive average Peak Signal-to-Noise Ratio (PSNR) value of 97.82 dB, ensuring the production of denoised images of exceptional quality.

The 3D U-Net employed for mask segmentation demonstrates precise delineation with a mean Intersection over Union (IoU) value of 0.97. Our custom CNN model exhibits exceptional efficacy, attaining training, validation and testing accuracies to be 97.99%, 97.99%, and 97.14% respectively. The proposed model has been compared with some of the state-of-the-art techniques and it has been found to outperform them as well. These findings underscore the model's resilience, dependability, and potential to enhance brain tumor analysis, thereby facilitating accurate diagnosis and treatment planning.

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ADVANCED DETECTION TECHNIQUES FOR DRIVER DROWSINESS: A COMPREHENSIVE REVIEW OF MACHINE LEARNING, DEEP LEARNING, AND PHYSIOLOGICAL APPROACHES

Muskan Kamboj, Karuna Kadian, Vimal Dwivedi, Alongbar Wary & Swastika Ojha

Road mishaps, a global concern, see driver fatigue contributing to roughly 40% of accidents in India. Detecting drowsiness early is pivotal in countering this threat. Despite prior research in this domain, many investigations fall short in utilizing extensive, varied datasets or analyzing real-time video streams, both essential for practical implementations. Our research addresses these shortcomings by using a range of classifiers, such as Convolutional Neural Networks (CNN), Support Vector Machines (SVM), Hidden Markov Models (HMM), Fuzzy Logic, and several sensors, to assess eye movements and other physiological signs. An in-depth evaluation indicates that CNNs are superior, especially when handling expansive, diverse image sets. This paper provides a comprehensive overview of current models, their pros and cons, classification techniques, labeling of drowsiness, and detection approaches, serving as a valuable reference for researchers and professionals aiming to create enhanced systems for real-time driver fatigue detection.

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A NOVEL AND EFFECTIVE MULTI-CLASS CLASSIFICATION METHOD FOR IMBALANCED MEDICAL TRANSCRIPTIONS

Priti Bhardwaj, Niyati Baliyan

Natural Language Processing (NLP) techniques are used to glean information from Electronic Health Records (EHR) for identifying patients with unique clinical characteristics and defining phenotypes. The classification of imbalanced datasets is also one of the vital concerns in medical diagnosis. We built an improved framework for automating the multi-class classification of imbalanced medical transcriptions [1] into 40 medical specialties, by creating a set of important phenotypes/features.

We implemented and tested five machine learning models out of which Random Forest Classifier has achieved the highest performance of 0.99 F1 score (precision 0.99, recall 0.99) and roc-auc-score of 0.99 on test data.
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Road mishaps, a global concern, see driver fatigue contributing to roughly 40% of accidents in India. Detecting drowsiness early is pivotal in countering this threat. Despite prior research in this domain, many investigations fall short in utilizing extensive, varied datasets or analyzing real-time video streams, both essential for practical implementations. Our research addresses these shortcomings by using a range of classifiers, such as Convolutional Neural Networks (CNN), Support Vector Machines (SVM), Hidden Markov Models (HMM), Fuzzy Logic, and several sensors, to assess eye movements and other physiological signs. An in-depth evaluation indicates that CNNs are superior, especially when handling expansive, diverse image sets. This paper provides a comprehensive overview of current models, their pros and cons, classification techniques, labeling of drowsiness, and detection approaches, serving as a valuable reference for researchers and professionals aiming to create enhanced systems for real-time driver fatigue detection.
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VISUALIZATION AND FORECASTING OF STOCK'S CLOSING PRICE USING MACHINE LEARNING

Aditi Gupta, Akansha , Khushboo Joshi, Madhu Patel & Vibha Pratap

Stock market investments have become an essential part of our lives as they offer a means of growing wealth and securing financial stability for individuals and businesses alike. However, predicting and investing in a stock is a complex method and demands significant levels of knowledge, proficiency, and skill. Stock market prediction is the act of analyzing historical information and trends in the market in order to make informed forecasts about the potential future worth of a given stock or instrument that is traded on a financial instrument exchange. When making stock predictions, most stockbrokers use both fundamental and technical analysis and time series analysis. The study focuses on the implementation of Multi-Linear Regression, LSTM, CNN, and LSTM + GRU based Machine learning techniques using technical analysis to predict stock's closing values from the NYSE, and NASDAQ markets for multiple days.

The dataset has been taken from Yahoo, of 10-year span. The factors taken into consideration for predicting stock prices are open, close, low, and high. The model's effectiveness is measured using common strategic metrics like RMSE, MSE, MAE, and R2. A lower value for these variables suggests that the models are good at forecasting stock closing prices. After conducting a comprehensive evaluation, we found that LSTM + GRU model performs the best among the tested models for predicting multiple days, followed by CNN and LSTM. The tested models demonstrate a remarkable level of accuracy in predicting stock market prices. This research work provides a valuable contribution to the fields of financial and technical analysis in the stock market research community.

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GRAPH NEURAL NETWORK BASED PHISHING ACCOUNT DETECTION IN ETHEREUM

Siftee Ratra, Mohona Ghosh, Niyati Baliyan, Jinka Rashmitha Mohan, Sanjana Singh

In recent years, the widespread adoption of Ethereum-based transactions, such as cryptocurrencies and blockchain technologies, have revolutionized the way financial transactions are conducted. These decentralized and transparent systems offer numerous advantages, including enhanced security, immutability, and reduced transaction costs. However, alongside their benefits, Ethereum-based transactions have also attracted the attention of malicious actors seeking to exploit unsuspecting users through phishing scams. Phishing scams have thus become frequent in this scenario. Therefore, it is required to implement an effective and reliable phishing scam detection method. In this paper, we present the implementation of a highly efficient detection method by carrying out a graph-like data network formation, over which we then apply models that are based on graph neural networks like Magnet Link Prediction and Graph Auto Encoder Pathfinder Discovery Network Algorithm (GAE_PDNA). This helps in extracting useful information from the nodes of the graph. After relevant embeddings have been obtained, the classification of the phishing account is performed using AdaBoost classifier that helps in complex decision-making and detects the accounts related to the phishing scams. Our best model attains a precision of 0.99 and an F1 score of 0.99.

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MARKOV ENHANCED GRAPH ATTENTION NETWORK FOR SPAMMER DETECTION IN ONLINE SOCIAL NETWORK

Ashutosh Tripathi, Mohona Ghosh, Kusum Kumari Bharti

Online social networks (OSNs) are an indispensable part of social communication where people connect and share information. Spammers and other malicious actors use the OSN's power to propagate spam content.

In an OSN with mutual relations between nodes, two kinds of spammer detection methods can be employed: feature based and propagation based. However, both of these are incomplete in themselves. The feature-based methods cannot exploit mutual connections between nodes, and propagation-based methods cannot utilize the rich discriminating node features. We propose a hybrid model—Markov enhanced graph attention network (MEGAT)—using graph attention networks (GAT) and pairwise Markov random fields (pMRF) for the spammer detection task. It efficiently utilizes node features as well as propagation information. We experiment our GAT model with a smoother Swish activation function having non-monotonic derivatives, instead of the leakyReLU function. The experiments performed on a real-world Twitter Social Honeypot (TwitterSH) benchmark dataset and subsequent comparative analysis reveal that our proposed MEGAT model outperforms the state-of-the-art models in accuracy, precision–recall area under curve (PRAUC), and F1-score performance measures.

For Details refer DOI: https://doi.org/10.1007/s10115-024-02137-z

A BLOCKCHAIN BASED LIGHTWEIGHT AND SECURE ACCESS CONTROL FRAMEWORK FOR IOT-ENABLED SUPPLY CHAIN

Rashmi Raj & Mohona Ghosh

To ensure safe exchange of data in IoT-enabled-supply-chain network and safeguard other security issues, IoT devices should have an access control system that can regulate resource access in a permissioned manner. Traditional access control mechanisms (ACM) can guarantee that but lack wide adoption owing to centralized architecture, single point of failure, and limited security. A blockchain-based ACM can address all the above challenges, however, still some limitations exist. Firstly, blockchain provides data verifiability and user transparency, meaning that all stored information is accessible to network nodes for verification leading to privacy issues of sensitive data. Secondly, encryption-based solutions can address the privacy concern but require sharing of secret keys with unknown peers entailing another security risk. Thirdly, due to limited block size in blockchain, IoT-enabled-supply-chain networks prefer storing all the data in the cloud or a central server, which has their own threat concerns. In this work, we propose a blockchain-based ACM that integrates Bell La Padula (BLP) Model, Proxy Re-Encryption, and IPFS to address all the above challenges. BLP enforces fine-grained access control without performing high computation and ensures data confidentiality. With the Proxy Re-encryption, only authorized parties can decrypt data but without revealing the private key of the data owner. Meanwhile, IPFS eliminates the need for cloud servers and provides a more secure offsite storage. The security analysis of the proposed framework is presented using BAN logic. We also provide a thorough security comparison with other peer models to establish the superiority of our proposed work. Furthermore, smart contract-based implementation through Truffle is done to analyse the framework's effectiveness.

For Details refer DOI: https://doi.org/10.1007/s12083-024-01648-4

IOMT-BADT: A BLOCKCHAIN-ENVISIONED SECURE ARCHITECTURE WITH A LIGHTWEIGHT AUTHENTICATION SCHEME FOR THE DIGITAL TWIN ENVIRONMENT IN THE INTERNET OF MEDICAL THINGS

Ayushi Jain, Mehak Garg, Anvita Gupta, Shivangi Batra, Bhawna Narwal

A healthcare-focused version of the Internet of Things (IoT), the Internet of Medical Things (IoMT) enables real-time monitoring and remote medical support via integrated medical devices, programs, and support solutions. However, patients' safety and anonymity are in jeopardy by the open access networks employed in IoMT, which makes the systems susceptible to several threats and security lapses. By harnessing the synergies of blockchain, cloud computing, and digital twins, this study presents a comprehensive architecture and a secure lightweight authentication mechanism (which integrates the benefits offered by Yu and Park, Yu et al., and Amintoshi et al.) that addresses these concerns. The suggested method entails using session keys for secure communication while authenticating medical professionals and patients through a gateway. Cloud computing offers a flexible and robust framework for managing and storing medical data. Additionally, it simulates digital twins to enable data-driven decision-making and predictive analysis, and the incorporation of blockchain offers a decentralized and immutable ledger for recording and validating patient data and transaction logs enhancing data integrity, transparency, and traceability. Healthcare systems may confidently embrace the potential of IoMT by implementing this framework since it offers promising solutions to enhance the security and confidentiality of patient data in IoMT while supporting the provision of the best healthcare services, especially in emergency scenarios like the COVID-19 pandemic. The suggested approach is subjected to a thorough security evaluation using AVISPA, demonstrating its resistance to various attacks. A comparative analysis has also been carried out to assess the performance and computational cost of IoMT-BADT in comparison with other authentication schemes.
For Details refer DOI: https://doi.org/10.1007/s11227-024-06026-8

FNNET: A SECURE ENSEMBLE-BASED APPROACH FOR FAKE NEWS DETECTION USING BLOCKCHAIN

Poonam Rani, Jyoti Shokeen

Blockchain technology has unlocked the doors of building decentralized applications, where security plays a vital role. Any transaction ever created in a blockchain is recorded permanently. With the increasing usage of social media modalities today, many non-reputable sources create and publish fake and luring news. Due to the easy availability of the internet and excessive use of social media, fake news can spread like a flash. It causes the need to eliminate fake news posted on social media platforms. The main motive of the paper is to develop an ensemble model that assists in the automated identification of fake news. This paper addresses the identified gaps in detecting multi-modal fake news.

We propose Fake News Network (FNNet) as a novel secure blockchain-based deep learning model to detect fake news. It uses blockchain and deep learning to assure data integrity and learn data representations, respectively. The proposed model consists of four layers: the node layer, the deep learning layer, the blockchain layer, and the network layer. This is an ensemble deep-learning model that leverages Bi-LSTM and CNN models, where the Bi-LSTM model captures the sequential data in both directions, and CNN captures the hidden features. We use Pheme, CrisisLexT6, and ISOT datasets to train the model. FNNet achieves an average accuracy of 86.93%, 92.22%, and 98.53% on Pheme, CrisisLexT9, and ISOT datasets, respectively. Our results show that the proposed model is robust and applicable to real-time datasets and social media networks to detect fake news effectively.
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CONSTRUCTION OF HYPERSPECTRAL IMAGES FROM RGB IMAGES VIA CNN

Vibhuti Dabas, Garima Jaiswal, Mohit Agarwal, Ritu Rani, Arun Sharma

Hyperspectral imaging (HSI) is an approach that captures information spanning a broad spectrum of spectral bands or wavelengths. Unlike traditional RGB, HSI data contains numerous contiguous or narrow spectral bands, allowing for detailed spectral analysis and identification of materials in an image. HSI finds application in various fields, including medical, document forgery, remote sensing, agriculture, and environmental monitoring. The high cost of hyperspectral systems restricts its usage. Hence, we propose directly converting RGB images to hyperspectral images to bridge the gap between high-cost systems. In this study, we trained a 3D Convolutional Neural Network (CNN) to generate hyperspectral images from RGB images. We employed the band-by-band approach to process each band image individually. We used the ICVL and ARAD1K datasets for training and evaluation. Conducted performance evaluation using the peak signal-to-noise ratio (PSNR) and structural similarity index (SSIM) metrics. Compared to the proposed model against various state-of-the-art models, it demonstrated a successful generation of meaningful results.
For Details refer DOI : https://doi.org/10.1007/s11042-024-19289-3

ADAM OPTIMISED HUMAN SPEECH EMOTION RECOGNISER BASED ON STATISTICAL INFORMATION DISTRIBUTION OF CHROMA, MFCC, AND MBSE FEATURES

Surbhi Khurana, Amita Dev, Poonam Bansal

The textual or display-based control paradigm in human–computer interaction (HCI) has changed in favor of more natural control modalities like voice and gesture. Speech, in particular, contains a significant deal of information, revealing the speaker's inner state and intention. While word analysis makes understanding the speaker's request possible, other speech aspects reveal the speaker's attitude, goal, and motivation. As a result, it is now crucial for modern human–computer interface systems to recognize emotions from speech. Numerous techniques for sound analysis have been created in the past. This work aims to detect human emotions from their voice snippet; for this, an English language open source dataset Ryerson Audio-Visual Database of Emotional Speech and Song (RAVDESS) and Hindi-language dataset IITKGP-SEHSC are used. RAVDESS contains over 2000 voice samples recorded by 24 actors covering eight emotions: anger, fear, neutral, calmness, happiness, sadness, disgust, and surprise. The proposed model uses ADAM optimized deep learning model along with MFCC, chroma, and Mel band spectral energy features (MBSE) to classify and recognize eight different human vocal emotions. A multilayer perceptron (MLP) classifier is used for classification. The efficiency of the proposed model was compared to another state of the art, and the outcomes were assessed. Using the proposed structure of the model on the RAVDESS and IITKGP-SEHSC datasets, an overall accuracy of 85.19% and 80%, respectively, were achieved.

For details refer to DOI: https://doi.org/10.1007/s11042-024-19321-6

REVOLUTIONIZING CHRONIC HEART DISEASE MANAGEMENT: THE ROLE OF IOT-BASED AMBULATORY BLOOD PRESSURE MONITORING SYSTEM

Ganesh Yenurkar, Sandip Mal, Vincent O. Nyangaresi, Shailesh Kamble, Lalit Damahe, Nandkishor Bankar

Chronic heart disease (CHD) is a widespread and persistent health challenge that demands immediate attention. Early detection and accurate diagnosis are essential for effective treatment and management of this condition. To overcome this difficulty, we created a state-of-the-art IoT-Based Ambulatory Blood Pressure Monitoring System that provides real-time blood pressure readings, systolic, diastolic, and pulse rates at predefined intervals. This unique technology comes with a module that forecasts CHD's early warning score. Various machine learning algorithms employed comprise Naïve Bayes, K-Nearest Neighbors (K-NN), random forest, decision tree, and Support Vector Machine (SVM). Using Naïve Bayes, the proposed model has achieved an impressive 99.44% accuracy in predicting blood pressure, a vital aspect of real-time intensive care for CHD.

This IoT-based ambulatory blood pressure monitoring (IABPM) system will provide some advancement in the field of healthcare. The system overcomes the limitations of earlier BP monitoring devices, significantly reduces healthcare costs, and efficiently detects irregularities in chronic heart diseases. By implementing this system, we can take a significant step forward in improving patient outcomes and reducing the global burden of CHD. The system's advanced features provide an accurate and reliable diagnosis that is essential for treating and managing CHD. Overall, this IoT-based ambulatory blood pressure monitoring system is an important tool for the early identification and treatment of CHD in the field of healthcare.

For details refer to DOI: https://doi.org/10.3390/diagnostics14121297

QEFS: A NOVEL PLANT DISEASE PREDICTION APPROACH USING QUANTUM-INSPIRED EVOLUTIONARY FEATURE SELECTION

Khushi Anand, Bhawna Jain, Himanshu Mittal, Vijay Kumar Yadav

Plant disease prediction is crucial for global food security, prompting the development of novel detection techniques. Initially, Convolution Neural Networks (CNNs) were extensively employed in this domain for their image recognition and object detection capabilities. Recently, with the evolution of Quantum Computing (QC), Quantum Convolutional Neural Networks (QCNNs) have demonstrated improved classification and prediction performance in classical problems, such as medical image analysis and drug discovery. QCNNs excel in classification by leveraging effective features generated through their layers. Features extracted from QCNNs utilize quantum parallelism to explore various feature combinations simultaneously, enhancing the network's ability to capture intricate patterns and relationships in classical image datasets. However, the high-dimensional nature of these quantum-derived features necessitates effective Feature Selection (FS) to address the curse of dimensionality, improve model interpretability, and ensure computational efficiency in downstream tasks. The study presents Quantum-Inspired Evolutionary Feature Selection (QEFS), a unique method combining effective quantum feature extraction along with the FS approach employing an evolutionary algorithm to tackle this challenge. A hybrid evolutionary optimizer is formulated by integrating key attributes from fundamental optimizing algorithms, combining the strengths of basic optimizers to yield an enhanced hybrid algorithm. In this methodology, features are initially extracted using a QCNN model. Subsequently, these features undergo an FS process using the hybrid FS approach to determine the optimal feature count. The selected features are then fed into five Machine Learning (ML) classifiers for classification. To validate the effectiveness of this approach, the study leverages two distinct plant datasets—normal plants and medicinal plants. The primary objective of the research is binary as well as multi-class classification, specifically differentiating between healthy and diseased plant images. This methodological innovation aims to overcome current limitations in QCNN applications through effective FS using the evolutionary optimization technique.

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MULTI-OBJECTIVE OPTIMIZATION-BASED MEDICAL IMAGE WATERMARKING SCHEME FOR SECURING PATIENT RECORDS

Roop Singh, Raju Pal, Himanshu Mittal, Deepak Joshi

The integrity and authenticity of electronic patient records (EPRs) are essential concerns in the healthcare industry. To address these concerns, this paper introduces a novel, robust watermarking scheme using integer wavelet transform-singular value decomposition (IWT-SVD). The proposed scheme is divided into logo embedding and EPR text embedding, aiming to mitigate false-positive issues and maintain EPR integrity and authenticity. In the first part, medical image and watermark logo are encrypted using DMA (Diffused Mandelbrot set-Arnold map) to enhance security. Further, the encrypted medical image is segmented into four sub-bands (CA, CH, CV, CD) by one-level IWT transform. Then SVD is applied on sub-band CD to extract the principal component (PC), where the encrypted logo is embedded due to its higher magnitudes, thereby mitigating false-positive errors. Embedding the encrypted logo into the hybrid IWT-SVD domain enhances security and robustness. Moreover, for embedding, multiple optimal embedding factors (MOEFs) are determined through Non-dominated Sorting Genetic Algorithm II (NSGA-II) to balance imperceptibility and robustness. In the second part, EPR text is embedded into watermarked logo using SVD to verify authenticity. The performance of the proposed scheme is validated on standard medical image datasets against various attacks in terms of SSIM, PSNR, BER, and NC. The proposed scheme improves PSNR values by 48.44% and 19.66% for grayscale and color images, respectively. Similarly, NC values are also improved by 10%–12% for grayscale and color images. Therefore, the proposed scheme enhances security, imperceptibility, and robustness while reducing complexity compared to the state-of-the-art schemes. Moreover, it is also false-positive-free and maintain integrity simultaneously.
For details refer to DOI: https://doi.org/10.1016/j.compeleceng.2024.109303

SOYATRANS: A NOVEL TRANSFORMER MODEL FOR FINE-GRAINED VISUAL CLASSIFICATION OF SOYBEAN LEAF DISEASE DIAGNOSIS

Sharma, Ashish Kumar Tripathi, Himanshu Mittal, Lewis Nkenyereye

Plant leaf disease detection has a considerable influence on the safety of crop quality. However, distinguishing different symptoms in leaves is a challenging task. Newfangled CNN architectures have a “moving window” feature that extracts local information of the image only and fails to capture global features. Additionally, CNN architectures take the whole image as an input which lacks in identifying the small lesions that result in poor classification. Therefore, a novel robust model, the SoyaTrans network, is designed by pairing CNN architecture with swin transformers which efficiently work on real field images. In this, a new random shifting is introduced in comparison to cyclic shift which enhances the classification performance while reducing the computational complexity.

Moreover, the proposed SoyaTrans model ensembles the capabilities of conventional CNN with a swin transformer network that efficiently detects diseases on different types of crops. Furthermore, this paper presents a new soybean plant leaf disease dataset that is collected from real fields to overcome the challenge of a limited soybean leaf dataset. Experimental results of the proposed model are compared against the ten state-of-the-art methods in terms of five parameters, namely parameters, accuracy, precision, recall, and F1-score. In addition, the efficacy of the proposed model is validated on four publicly available datasets namely, Embrapa, Plant Village, AI2018, and PlantDoc. The proposed model surpassed all the ten state-of-the-art models, even under complicated backdrops, with an accuracy of 98.00%, 97.00%, 76.00%, and 92.00% on plantvillage, AI2018, PlantDoc, and Embrapa dataset with the least computational complexity of 5.2 million parameters. Lastly, the proposed model achieved 94.00% accuracy on the newly presented soybean leaf dataset.

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KERNEL EXTREME LEARNING MACHINE-BASED OPTIMIZATION MODEL FOR ROUTING IN OPPORTUNISTIC NETWORKS

Rahul Sachdeva, Amita Dev

Opportunistic networks are the most used network for communication in this modern era. Many applications are provided by this network, even end-to-end connectivity and fast communications. While the attackers are advancing quickly, the opportunistic network makes users less secure. The attackers mine the data from a random node without noticing the source or destination. An optimal deep-PRoPHET is introduced for end-to-end communication using a short path and secure data transmission to secure valuable data. In this model, the kernel extreme learning machine (KELM) is used to classify nodes according to their trustiness. KELM uses the machine learning model to classify, and PRoPHET is the routing protocol used to optimize the proposed model using its unique techniques. The parameters like buffer occupancy, message live time and current hop nodes are optimized by adaptive artificial hummingbird optimization. In the result section, the proposed model is compared with existing models and proven to be superior among all compared existing methods. Parameters like average latency, delivery probability, and overhead ratio are taken from varying message generation intervals, number of nodes, and time-to-live (TTL). The proposed model acquires the values of delivery probability as 0.6628 by a varying number of nodes, 0.868 by varying buffer size, 0.6994 by varying TTL and 0.744 by varying message generation interval. The average latency of a proposed model is 183.9858 by varying TTL, 226.6054 by a varying number of nodes, 2659.74 by varying message generation interval and 93.5064 by varying buffer size. The proposed model acquires an overhead ratio of 13.0708 for varying buffer size, 12.316 for a varying number of nodes, 15.8028 by varying message generation interval and 12.3924 by varying TTL. The proposed model achieved good results among existing models.

For details refer to DOI: https://doi.org/10.1007/s11277-024-11298-7

ML BASED HYBRID COMPUTATIONAL INTELLIGENCE PROTOCOL TO IMPROVE ENERGY EFFICIENCY AND SECURITY IN OPPORTUNISTIC NETWORKS (OPPNETS)

Rahul Sachdeva, Amita Dev

Opportunistic Network (OppNet) is an enhanced network in the mobile ad hoc network family and has outstanding and updated qualities in the field of Network Technology. The main benefit of OppNet is its ability to store messages that need to be sent to intermediate nodes until the moment of successful communication without imposing a limited time. Developing routes with the best cluster head selection and security are difficult tasks in oppnet. This study uses an improved Secure Fuzzy Trust-Based C-Mean Clustering-based Machine Learning Model (IFTCC) to determine trustworthy nodes. At the same time, an Energy Efficient Harris-Hawks-Remora Routing Protocol (EEHHRR) is proposed to route the cluster head using the secure identify path detection. When selecting the cluster head, the most reliable and energy-efficient node is taken into account. The optimal cluster head among the nodes is chosen using the fuzzy c-means clustering technique. The protection of the intrusive node and the secure transport of data from the source to the destination are the goals of this approach. The best path is found by routing using the EEHHRR. The proposed model finds the safe path using a hybrid optimization technique known as the Harris Hawks and Remora Optimization Algorithm by tracking the node positions and computing the objective function. The proposed model is assessed and contrasted with prevailing methods. The results section shows that PDR, delay, power consumption, message loss, and overhead ratio are 98.8%, 0.02 s, 50.4j, 11,431, 31.15, and 15.14, respectively.

For details refer to DOI: https://doi.org/10.1007/s11277-024-11661-8

A DETAILED REVIEW OF 5G MIMO AND ARRAY ANTENNA DESIGN EVOLUTION WITH PERFORMANCE ENHANCEMENT FOR MMWAVE APPLICATIONS

Vaishali Kikan, Ashwni Kumar

In next-generation wireless communication technologies, 5G is witnessing significant attention because of its potential to revolutionize the industrial applications. Addressing the limitations of 4G, 5G technology, having IEEE standard IEEE 802.11ad and satisfying IMT-2000 requirements of ITU, began deployment in 2019. 5G supports low latency (8-12 msec), high bandwidth, high speed (20Gbps downstream & 10Gbps upstream), high efficiency and large population density. 3GPP updates the specifications regularly, and ITU-R has defined three application areas, namely Enhanced mobile broadband (eMBB), Ultra-reliable low latency communication (uRLLC), Massive machine type communication (mMTC). This article provides technological evolution from 1G to 6G focusing on key performance indices of short-term evolution (SEVO), medium-term evolution (MEVO), and long-term evolution (LEVO). It discusses the types of design of various antennas, particularly printed microstrip antennas. The compact mmWave antenna with multiple input multiple output (MIMO) configuration is used to compensate for the multipath fading effects. This article highlights the need of small cells and the beamforming technique to focus energy in crowded cell using deep learning in 5G. Further, performance enhancement techniques, miniaturization techniques and array configurations are also analyzed in this article. This article provides a detailed comparison of the various diversity parameters such as Mean Effective Gain (MEG), Isolation, Envelope Correlation Coefficient (ECC), Total Active Reflection Coefficient (TARC), Channel Capacity Loss (CCL), etc. An extensive study of different mm-Wave MIMO antenna design process, their performance enhancement techniques, miniaturization, array configurations, and their comparison with the help of diversity parameters is also presented in this study. Characterization of a 28GHz dome-shaped antenna is presented at the end of this article to support the performance enhancement analysis.

For details refer to: 10.1007/s11276-024-03862-7

CONFORMAL ULTRA-COMPACT NARROWBAND 60.0 GHZ FOUR-PORT MILLIMETER WAVE MIMO ANTENNA FOR WEARABLE SHORT-RANGE 5G APPLICATION

Manish Kumar, Ashwni Kumar, Vaishali Kikan, Gaurika Jaitly, Siddhi Bhardwaj, Neha, Takhshish Bano

This research reports a conformal ultra-compact millimeter-Wave microwave access narrowband four-port MIMO60.0GHz antenna designed for 60.0GHz future high-speed wireless applications. The proposed 60.0GHz MIMO60.0GHz antenna radiating electromagnetic energy occupies a minimal space of 16×16 mm2 with a rectangular patch connected to defected microstrip structure on one-plane of RogersRTDuroidTM5880 substrate with a thickness of 0.254mm and complete-ground on the opposite plane.

The proposed MIMO60.0GHz EM-wave antenna offers measured impedance bandwidth of 58.925GHz-60.66GHz with S11=-35.79dB at 59.945GHz. The proposed MIMO60.0GHz technology antenna offers a peak gain of 10.56dBi at 60.0GHz. The thin substrate is characterized for conformal bending at 15 ◦ , 30 ◦ , and 45 ◦ with no change in the center resonance frequency which is centered at 60.0GHz. The MIMO60.0GHz antenna also offers good diversity performance including ECC60.0GHz⩽ 0.50, DG60.0GHz≅ 10.0*dB*, TARC60.0GHz⩽ 0.0*dB*, CCL60.0GHz⩽0.40b/s/Hz and MEGport1/MEGport1≅0.0dB which values are under the standard-ideal values. The SAR values for single and four-port MIMO antenna corresponds to ⩽1.60W/Kg and all the above features of the proposed MIMO60.0GHz antenna make it suitable for wearable (conformal) wireless applications and future mobile users.

For details refer to: 10.1007/s11276-023-03610-3

AREA AND POWER MODELING FOR FPGA-BASED BARREL SHIFTER USING REGRESSION ALGORITHM

Harshita Prasad, Ashwni Kumar

Data shifting, addressed in this article is an essential operation of arithmetic processors and array processors used for graphics and video processing applications. This research article demonstrates the conception and construction of area and power estimation models for the field programmable gate array based barrel shifter. It is a digital circuit that can move a data-word by a predetermined number of bits in one clock cycle. The circuit is realized using a series of multiplexers (mux), where the output of one mux is connected to the next mux's input in a manner that is dependent on the shift distance. The aforementioned designs are modeled using the Very High Speed Integrated Circuit Hardware Description Language, and their behavior is verified using the VIVADO tool. Regression techniques are used in the MATLAB Curve Fit tool for developing the suggested models. The accuracy of proposed area and power models is demonstrated using VIVADO tool.

For details refer to: 10.1016/j.engappai.2023.107056

PERFORMANCE INVESTIGATION OF GE-BASED DIELECTRIC MODULATED JUNCTIONLESS TFET AS A LABEL-FREE BIOSENSOR

Swati, Jasdeep Kaur & Abdhesh Kumar Singh

The current state of affairs requires a highly sensitive, accurate, fast, and power-efficient biosensor. The proposed work investigates the performance of a Germanium-based dielectric-modulated junctionless charge plasma tunnel field-effect transistor (Ge-DMJ-CPTFET) as a label-free biosensor.

The nanogap cavity is formed by removing gate oxide material from underneath the source electrode. The target biomolecules are modeled inside the nanogap cavity. The biomolecules are identified using their hereditary properties, such as charge density and dielectric constant. The Dielectric Modulation technique and Charge-Plasma concept have been used to investigate the biomolecules immobilized in the nanogap cavity. Germanium exhibits high carrier mobility and superior tunneling characteristics compared to silicon, allowing for improved charge transport across the device channels. The low energy-band gap of Ge helps to reduce tunneling width and increase drain current. The performance of the proposed device is investigated in terms of band energy, electric field, and electric potential at different values of dielectric constant and charge densities of the biomolecules. Moreover, the Sensitivity of the proposed device is investigated for both neutral and charged biomolecules. Along with a label-free biosensor, Ge-DMJ-CPTFET is free from random dopant variations, low thermal budget, and is compatibility with silicon technology.
For details refer to: https://doi.org/10.1007/s00339-024-07291-3

ENHANCED TRANSPORT PARAMETERS OF TRANSITION METAL DICHALCOGENIDE-BASED DOUBLE-BARRIER MAGNETIC TUNNEL JUNCTION

Reshma Sinha, Jasdeep Kaur

This paper theoretically examines the impact of integrating 2D transition metal dichalcogenide (TMDCs) materials—MoS_2, $MoSe_2$, $MoTe_2$, WS_2, and WSe_2—with a conventional MgO dielectric to fabricate double-barrier penta-layer (DBPL) magnetic tunnel junction (MTJ) structures. The MTJ device proposed herein is distinguished by a DBPL configuration which incorporates the composite tunnel barrier (CTB) of MgO-MX_2-MgO sandwiched between the Fe ferromagnetic electrodes. Using density functional theory (DFT), we conducted a crystallographic analysis on all constituent materials to predict the properties necessary for device operation. Subsequent simulations leveraged an advanced nonequilibrium Green's function-based (NEGF) quantum transport simulator to quantify critical transport phenomena. Notable metrics such as tunneling magnetoresistance (TMR), differential TMR, and spin-transfer torque (STT), both in-plane and out-of-plane, were determined. Additionally, resistance and differential resistance profiles for parallel and antiparallel alignment states were thoroughly evaluated. Our findings elucidate the essential role of CTB composition in determining MTJ performance attributes, with particular dielectric pairings showing a significant enhancement in TMR ratios and an improved resistance differential without compromising the efficiency of STT. Interestingly, our proposed MTJ device shows a substantial increase in TMR values, ranging from 900% to 4300%, with very high sensitivity ranging from $7.33 \times 10^6\ T^{-1}$ to $3.36 \times 10^7\ T^{-1}$.
For details refer to: https://doi.org/10.1007/s11664-024-11267-7

NOISE PROCESSING AND DIAGNOSTICS OF A SPINTRONIC-BASED IOT SENSOR FOR MAGNETOCARDIOGRAPHY APPLICATION USING SPINTRONCARDIONET

Reshma Sinha, Jasdeep Kaur

Combining the Internet of Things (IoT) with spintronic advances presents a rare chance to address urgent healthcare problems made worse by the COVID-19 pandemic and an aging world population. In this article, an IoT-based solution that goes beyond conventional electrocardiography (ECG) capabilities for remote cardiac monitoring is presented. The solution makes use of sophisticated Magnetic Tunnel Junction (MTJ) sensors. The gadget uses magnetocardiography (MCG) to obtain electromagnetic signals from the heart by utilizing the sensitivity of spintronic technology. This allows the device to overcome the difficulties caused by low-frequency noise in processing MCG signals. The MCG signals obtained from pre-existing ECG recordings are processed and improved using a novel deep-learning algorithm. This model combines a stacked one-dimensional convolutional neural network (1D CNN) with a Deep, Simple Gated Unit. Most importantly, the model's classification layer correctly detects arrhythmia, allowing for prompt treatment of this serious ailment. The method's performance across several publicly available and clinically annotated datasets indicates its resilience and accuracy. These results demonstrate the device's potential to revolutionize remote cardiac care while also advancing medical spintronic. Additionally, they demonstrate the synergistic potential of fusing cutting-edge sensing technology with artificial intelligence (AI) to tackle modern healthcare issues. The presented results, which include an F1 score of 98%, an accuracy of 98%, a precision of 99%, and a recall of 99%, determine the validity and dependability of the suggested technique.
For details refer to: https://doi.org/10.1007/s11042-024-19378-3

DILELECTRIC POCKET ENGINEERED, GATE INDUCING DRAIN LEAKEGES (GIDL) AND ANALOG PERFORMANCE ANALYSIS OF DUAL METAL NANOWIRE FERROELECTRIC MOSFET (DPE-DM-NW-FE) FET AS AN INVERTER

Shalu Garg, Jasdeep Kaur, Anubha Goel, Subhasis Haldar, R. S. Gupta

This research article presents a simulation study on a dielectric pocket engineered dual metal nanowire ferroelectric (DPE-DM-NW-Fe FET) MOSFET. The aim is to mitigate the Gate-Induced Drain Leakage (GIDL) effect in the off-state condition and improve the subthreshold swing. GIDL is a type of SCE which is detrimental for the device as continuous gate leakage current. Severely hamper the performance of the device particularly in analog applications. To prevent this a novel structure is proposed in which two dielectric pockets are introduced adjacent to the source and drain to reduce the SCEs. GIDL occurs even when the gate voltage is nearly zero, but it becomes significant when the gate region is at a lower bias and the drain region is at a higher bias. The introduced dielectric pockets act as diffusion stoppers, forming insulating barriers to prevent off-state current.

Simulation studies were conducted to analyze off-state GIDL currents for different channel lengths (30 nm, 40 nm, and 50 nm). Various parameters such as electric field, electron concentration, electron velocity, and surface potential have been simulated and compared with a Single Metal Gate (SMG) cylindrical MOSFET. Critical performance parameters including drain current, transconductance (gm), output conductance (gd), input capacitance (CGG), cutoff frequency (fT), gain transconductance frequency product (GTFP), gain frequency product (GFP), maximum transfer power gain (MTPG), unilateral power gain (UPG), and early voltage (Vea) have been calculated. Additionally, the noise performances of the DPE-DM-NW-Fe FET have been examined, and its implementation as a CMOS inverter have been explored for determining noise margins. The lower noise margin makes the device suitable for high-frequency applications. The simulations have been conducted using the ATLAS-3D simulator.

For details refer to: 10.1007/s00542-024-05681-4

ACCURATE 2-D ANALYTICAL MODEL FOR CYLINDRICAL GATE-JUNCTIONLESS FERROELECTRIC-NANOWIRE (CG-JFE-NW) MOSFET WITH SCALED CHANNEL LENGTH

Shalu Garg, Jasdeep Kaur, Anubha Goel, Subhasis Haldar, R. S. Gupta

In this article, we propose a 2D analytical-model of a cylindrical gate-junctionless ferroelectric-nanowire (CG-JFe-NW) MOSFET for evaluating central potential, electric field, threshold voltage, mobility and current voltage characteristics. Central potential, threshold voltage, and current in the linear and saturation regions are derived by solving the 2D Poisson's equation employing the parabolic-potential- approximation (PPA) profile. The recommended model is appropriate for compact modelling as it includes the phenomenon of bulk conduction, surface conduction and ferroelectric negative capacitance in all the regions of the device operation. Ferroelectric properties are introduced by combining Silicon doped hafnium oxide (ferroelectric layer) with HfO_2 and SiO_2 (dielectric layers), and an extensive study has been performed to determine the effects of interfacial-layer thickness and variation of channel length on device performance. For all relevant device characteristics and for all the operational voltage ranges, it is demonstrated that the analytical model entirely corresponds with the numerical simulations. For simulations, the Atlas 3-D simulator has been taken into consideration.

For details refer to: 10.1088/1402-4896/ad39b9

AN IMPROVED 1.8V 4.05PPM/ ◦ C CURVATURE CORRECTED BANDGAP REFERENCE CIRCUIT

Anushree, Jasdeep Kaur

In this paper a curvature corrected bandgap reference circuit is presented which uses folded cascode operation amplifier using beta multiplier as a constant current source. It consists of PTAT current generation circuit and CTAT current generation circuit as two major subparts. The proposed design produces reference voltage of 701.78 mV with temperature coefficient of 4.05 ppm/°C for the temperature range of – 40 to 125 °C. The value of power consumed by the circuit is 86.135 µW at 1.8 V supply voltage. For proposed design the value of power supply rejection ratio is – 60.53 dB for frequency range of 100 Hz to 100 kHz. All simulation results are obtained in cadence virtuoso using SCL 180 nm CMOS technology.

For details refer to: https://doi.org/10.1007/s10470-023-02234-z

AN APPROACH FOR DESIGNING LEAKAGE COMPENSATED VOLTAGE REFERENCE CIRCUIT

Anushree, Jasdeep Kaur

In this paper, the design of CMOS-based and recyclic folded cascode (RFC)-based voltage reference circuits is presented. Further inherent leakage compensation technique using diode connected MOSFET is introduced, which results in the compensation of high-temperature leakage current and a reduction in consumed power. Moreover, current mirror-induced mismatch and supply dependency reduces. Furthermore, temperature range and power supply rejection ratio (PSRR) improves. Later, comparison between the two configurations, i.e. with and without leakage compensation, has been presented. The minimum value of the achieved temperature coefficient on applying leakage compensation is 4.2 ppm/°C for the proposed RFC op-amp-based voltage reference circuit with improved temperature range by 40°C. The obtained value of PSRR is −88.2 dB at 10 Hz, −66.8 dB for 1 KHz and −61.6 dB for 1 MHz frequency, with the line sensitivity of 0.031%/V and the variation of 1.69 mV for an entire operating temperature range. All the simulation results are obtained at 0.7 V supply voltage in 180 nm SCL technology.

For details refer to: https://doi.org/10.1080/00207217.2024.2312564

EMBRACING THE POWER OF ENSEMBLE FORECASTING: A NOVEL HYBRID APPROACH FOR ADVANCED PREDICTIVE MODELLING

Isha Malhotra, Nidhi Goel

Amidst the persistent threat of epidemics, effectively managing their complexities requires accurate forecasting to anticipate their trajectory, thus enabling the preparation and implementation of effective mitigation strategies. With a special emphasis on COVID-19, the present work focuses on the Omicron variant, recognizing its significance in the global context of infectious diseases. The proposed research evaluates the effectiveness of both univariate and multivariate frameworks utilizing statistical and deep learning approaches to forecast the spread of the epidemic. Forecasting robustness is boosted by effectively correlating linear and non-linear components with the original series. To improve the performance, correlation is facilitated using correlation-driven weights within the statistically enforced deep learning model (WD-ensemble framework). The modeling process utilizes 493 data points and multivariate time-series records, including infected cases, vaccinated cases, and stringency index. The training dataset spans from November 1, 2021, to January 17, 2023, while the testing dataset covers the period from January 18, 2023, to March 8, 2023. The proposed WD-ensemble framework, incorporating stochasticity, outperforms all other state-of-the-art models, yielding highly reliable forecasts with remarkably low RMSE of 907.54, MAPE of 0.0008, and MAE of 670.78. It demonstrates a reduction in error percentages compared to the top-performing existing model, with decreases of 30.0267% in RMSE, 20% in MAPE, and 24.9411% in MAE. A pivotal revelation in this research is the robust negative correlation (-0.86) between vaccinated and confirmed cases as compared to the stringency index, implying that widespread vaccination could warrant the relaxation of stringent measures, including business and school closures.

For details refer to: https://doi.org/10.1016/j.ipm.2024.103954

INTELLIGENT STRATEGIES FOR MICROGRID PROTECTION: A COMPREHENSIVE REVIEW

Nirma Peter, Pankaj Gupta, Nidhi Goel

The power system is increasingly integrating more and more renewable energy sources to meet rising power demand and address environmental concerns related to greenhouse gas emissions. However, these sources are in the form of local energy and are embedded into the local low-voltage distribution grid through inverters. The development of microgrids transforms the power system into a bidirectional infrastructure, enabling the distribution grid to both import and export power within the distribution grid.This affects the performance of conventional overcurrent protection, which traditionally manages unidirectional current flow.

The integration of these sources presents several protection challenges, including variations in short-circuit currents under different operating conditions, limitations in conventional protection methods, and the need for effective relay coordination. These challenges led to the emergence of intelligent protection strategies capable of processing and analyzing large volumes of data, facilitating real-time decision-making and accurate fault detection. A bibliometric study analyzes research trends in intelligent protection strategies for microgrids. This study reviews various intelligent protection schemes implemented in AC, DC, and AC/DC hybrid microgrids, categorizing them based on their decision-making modules, outlining their limitations, and emphasizing potential solutions. It provides insights into the protective features, performance evaluation, and applicability of these intelligent methods across different microgrid types. Limited literature is available that specifically reviews various intelligent protection strategies for microgrids. This paper provides insights into the transformative role of intelligent technologies in microgrid protection.
For details refer to: https://doi.org/10.1016/j.apenergy.2024.124901

COMPREHENSIVE REVIEW OF SINGLE IMAGE DEFOGGING TECHNIQUES: ENHANCEMENT, PRIOR, AND LEARNING BASED APPROACHES

Pooja Pandey, Rashmi Gupta, Nidhi Goel

In the field of image processing, practical applications such as object detection, tracking, and surveillance face significant challenges, particularly in adverse weather conditions like fog. Foggy weather conditions severely reduce object visibility, thereby impeding object detection and tracking processes. To address this issue, various image defogging techniques have been proposed by researchers. The prime motive of this paper is to present a detailed analysis and summary of state-of-the-art single image defogging techniques developed over the past decade. Defogging techniques have been evaluated using both qualitative and quantitative approaches to illustrate their feasibility and effectiveness. This comprehensive review aims to provide researchers with valuable insights into existing techniques so that they can proceed in a particular direction according to their interests and applications.
For details refer to: https://doi.org/10.1007/s10462-024-11034-4

NOVEL FRACTAL PATTERN BASED FEATURES FOR EEG-BASED EMOTION IDENTIFICATION

Garima, Nidhi Goel, Neeru Rathee

Comprehending the manifestation of emotional states in EEG signals is a well-established field of research spanning neuropsychology and biomedical signal processing. Two main approaches exist for classifying emotions based on EEG data: (1) extracting features and employing machine learning algorithms, and (2) deep learning.

Machine learning faces the major challenge of poor accuracy due to low inter-class variability and low intra-class similarity and deep learning is challenged by the high computational cost. The authors have addressed the above challenges by devising a novel fractal based EEG feature extraction method so as to achieve better performance using machine learning thus avoiding high computational complexity (similar to deep learning). Fractal patterns being capable of providing a measure of self similarity at different scales, have been used to capture EEG signal's intricate dynamics. These patterns being resistant to noise and artifacts, provide a better reflection of the underlying organization and complexity of brain activity caused due to different emotions. The above listed inherent capabilities make fractal pattern suitable for proving valuable insights into cognitive processes and neurological disorders. So, the authors have explored fractal pattern for local feature generation from Tunable-Q Wavelet Transform (TQWT) features. Subsequently, a minimum redundancy and maximum relevance (mRMR) selector is applied to select the most informative features. These selected features are then fed to established classification algorithms for emotion recognition. The proposed framework is evaluated on two publicly available datasets, DEAP and DREAMER, achieving impressive accuracy rates of 95.43% and 99.14%, respectively. A comparative analysis with the existing state-of-the-art methods further reveals that the fractal pattern with RBF-SVM performs better on DEAP dataset for four-class classification and on DREAMER dataset for three-class classification.

For details refer to: https://doi.org/10.1016/j.bspc.2024.106505

INTEGRATING EXPERT GUIDANCE WITH GRADUAL MOMENT APPROXIMATION (GMAP)-ENHANCED TRANSFER LEARNING FOR IMPROVED PANCREATIC CANCER CLASSIFICATION

Jasmine Chhikara, Nidhi Goel, Neeru Rathee

Despite significant research efforts, pancreatic cancer remains a formidable foe. To address the critical need for improved diagnostics, this study presents a novel approach that integrates expert guidance with computer-aided imaging for fine needle aspiration (FNA). A meticulously curated computed tomography (CT) dataset of ground truth images, focusing on key subregions of the pancreas, was established in collaboration with medical professionals. The images provided the training ground for a novel diagnostic model equipped with the gradual moment approximation (GMAp) optimization algorithm, designed to enhance the precision of cancer detection. By efficiently transferring knowledge from pre-trained models, the proposed model achieved remarkable accuracy (98.16%) in classifying CT images across distinct cancerous pancreatic subregions (head, body, and tail) and healthy pancreas. Extensive evaluations against diverse pre-trained models and benchmark medical databases: medical segmentation decathlon, clinical proteomic tumor analysis consortium pancreatic ductal adenocarcinoma, and pancreas-computed tomography proved the model's robustness and superior F1-scores compared to existing approaches.

The experiment demonstrates that the deep learning-based 4-class classification outperforms state-of-the-art machine learning-based method by 3.66% in terms of accuracy. This efficiency, coupled with rigorous testing, paves the way for seamless integration into clinical workflows, potentially enabling earlier and more accurate pancreatic cancer diagnoses.
For details refer to: https://doi.org/10.1007/s00521-024-10521-7

ENHANCEMENT OF SINGLE FOGGY IMAGE USING FEATURE BASED FUSION TECHNIQUE

Pooja Pandey, Rashmi Gupta, Nidhi Goel

Foggy and hazy weather conditions are very common natural phenomenon which reduces the visibility of acquired outdoor pictures. Poor visibility creates innumerable problems in various facets of life viz. in tracking, surveillance and in many more fields. In this paper, an efficient feature based fusion technique has been used to enhance the single foggy image at transmission level. Fusion at this level retains most significant features of foggy image and using this fused single input at transmission level, output defog image is calculated. Proposed methodology overcomes the shortcoming of existing Dark Channel Prior and Bright Channel Prior methods. Output of proposed method shows promising result for all types of datasets varying in fog density as well as in size. The foremost major advantage of this method is that it does not require any pre-processing or post processing and thus, very simple to implement.
For details refer to: https://doi.org/10.1007/s11042-024-20181-3

PROSPECT OF LARGE LANGUAGE MODELS AND NATURAL LANGUAGE PROCESSING FOR LUNG CANCER DIAGNOSIS: A SYSTEMATIC REVIEW

Arushi Garg, Smridhi Gupta, Soumya Vats, Palak Handa, Nidhi Goel

Lung cancer, a leading cause of global mortality, demands a combat for its effective prevention, early diagnosis, and advanced treatment methods. Traditional diagnostic methods face limitations in accuracy and efficiency, necessitating innovative solutions. Large Language Models (LLMs) and Natural Language Processing (NLP) offer promising avenues for overcoming these challenges by providing comprehensive insights into medical data and personalizing treatment plans. This systematic review explores the transformative potential of LLMs and NLP in automating lung cancer diagnosis. It evaluates their applications, particularly in medical imaging and the interpretation of complex medical data, and assesses achievements and associated challenges.

Emphasizing the critical role of Artificial Intelligence (AI) in medical imaging, the review highlights advancements in lung cancer screening and deep learning approaches. Furthermore, it underscores the importance of ongoing advancements in diagnostic methods and encourages further exploration in this field.
For details refer to: https://doi.org/10.1111/exsy.13697

COMPREHENSIVE EVALUATION OF A NEW AUTOMATIC SCORING SYSTEM FOR CLEANLINESS ASSESSMENT IN VIDEO CAPSULE ENDOSCOPY

Palak Handa, Nidhi Goel, Sreedevi Indu, Deepak Gunjan

A reliable, quick-to-assess, and automatic scoring system for cleanliness assessment in video capsule endoscopy (VCE) is presently not available. The present study proposes an approach to automatically assess the cleanliness in VCE frames as per the latest scoring system, that is, Korea-Canada (KODA). First, a new multi-label frame dataset containing medical scores of 28 VCE videos was generated through the proposed mobile-based application called Artificial Intelligence-KODA (AI-KODA) score. The scores were saved automatically in real-time through the application. The generated dataset was transformed into three datasets based on the scores, and each of the dataset was then randomly split into train:validate:test ratio of 60:20:20. Second, a comprehensive evaluation, interpretation, and benchmarking of the three classification tasks were performed with the help of eight transfer learning algorithms on NVIDIA RTX A5000 workstation. Thorough analysis indicates that AI-KODA utilized with AI is reliable, quick-to-access, and free from observer bias. It promotes automatic scoring system for cleanliness assessment in VCE. The meta-data is available here (link).
For details refer to: https://doi.org/10.1002/ima.23097

TRANSFER LEARNING-BASED CLASSIFICATION MODEL FOR THE COMPUTED TOMOGRAPHY SCAN PULMONARY IMAGES

Vidhi Bishnoi, Nidhi Goel

In recent years, transfer learning has emerged as the most effective method for detecting and classifying lung cancer. Early-stage lung cancer diagnosis using multiple slices of computed tomography scan lung images is challenging. The manual diagnosis of such images is tedious, time-consuming, and biased. Several automated diagnosis systems have been widely used to process computed tomography scan lung images. However, existing diagnostic systems are dependent on annotated datasets. To address the stated problems, a robust automated diagnosis solution has been proposed to classify computed tomography scan lung images without relying on annotations. The proposed model utilizes a transfer learning-based architecture to classify segmented lung images. Segmentation of CT scan lung images is performed using K- means clustering with parameter tuning followed by morphological operations.

The number of clusters has been chosen based on the value of the silhouette score. The best silhouette score of 0.66 was obtained during analysis for k=2 clusters. The proposed model achieved a test accuracy; 0.926, a precision; 0.932, recall and F1 score; 0.926, a kappa score; 0.848, and an AUC of 0.904 on the LIDC dataset. For the NLST dataset, it achieved test results; 0.970 accuracy, precision, recall, 0.956 F1 score, 0.934 kappa value, and 0.978 AUC. In addition, the proposed method outperforms state-of-art models with an accuracy of 1-3%, recall of 2-3%, a precision of 2-3%, and an F1 score of 2-4% for the classification of lung cancer. These results justify that the proposed model improves the performance of diagnosis of lung images. Overall performance improvement, robustness in handling various sizes and shapes of lung images, and use of the silhouette score to choose the number of clusters for segmentation make the proposed approach distinct from the existing techniques.
For details refer to: https://doi.org/10.1007/s11042-024-19098-8

AI-KODA SCORE APPLICATION FOR CLEANLINESS ASSESSMENT IN VIDEO CAPSULE ENDOSCOPY FRAMES

Palak Handa, Nidhi Goel, Sreedevi Indu & Deepak Gunjan

Background
Currently, there is no automated method for assessing cleanliness in video capsule endoscopy (VCE). Our objectives were to automate the process of evaluating and collecting medical scores of VCE frames according to the existing KOrea-CanaDA (KODA) scoring system by developing an easy-to-use mobile application called artificial intelligence-KODA (AI-KODA) score, as well as to determine the inter-rater and intra-rater reliability of the KODA score among three readers for prospective AI applications, and check the efficacy of the application.
Method
From the 28 patient capsule videos considered, 1539 sequential frames were selected at five-minute intervals, and 634 random frames were selected at random intervals during small bowel transit. The frames were processed and shifted to AI-KODA. Three readers (gastroenterology fellows), who had been trained in reading VCE, rated 2173 frames in duplicate four weeks apart after completing the training module on AI-KODA. The scores were saved automatically in real time. Reliability was assessed for each video using estimate of intra-class correlation coefficients (ICCs). Then, the AI dataset was developed using the frames and their respective scores, and it was subjected to automatic classification of the scores via the random forest and the k-nearest neighbors classifiers.
Results
For sequential frames, ICCs for inter-rater variability were ‘excellent’ to ‘good’ among the three readers, while ICCs for intra-rater variability were ‘good’ to ‘moderate’. For random frames, ICCs for inter-rater and intra-rater variability were ‘excellent’ among the three readers.

The overall accuracy achieved was up to 61% for the random forest classifier and 62.38% for the k-nearest neighbors classifier.

Conclusions

AI-KODA automates the process of scoring VCE frames based on the existing KODA score. It saves time in cleanliness assessment and is user-friendly for research and clinical use. Comprehensive benchmarking of the AI dataset is in process.

For details refer to: https://doi.org/10.1080/13645706.2024.2390879

A MULTI-LABEL DATASET AND ITS EVALUATION FOR AUTOMATED SCORING SYSTEM FOR CLEANLINESS ASSESSMENT IN VIDEO CAPSULE ENDOSCOPY

Palak Handa, Nidhi Goel, S. Indu, Deepak Gunjan

An automated scoring system for cleanliness assessment during video capsule endoscopy (VCE) is presently lacking. The present study focused on developing an approach to automatically assess the cleanliness in VCE frames as per the latest scoring i.e., Korea–Canada (KODA). Initially, an easy-to-use mobile application called artificial intelligence-KODA (AI- KODA) score was developed to collect a multi-label image dataset of twenty-eight patient capsule videos. Three readers (gastroenterology fellows), who had been trained in reading VCE, rated this dataset in a duplicate manner. The labels were saved automatically in real-time. Inter-rater and intra-rater reliability were checked. The developed dataset was then randomly split into train:validate:test ratio of 70:20:10 and 60:20:20. It was followed by a comprehensive benchmarking and evaluation of three multi-label classification tasks using ten machine learning and two deep learning algorithms. Reliability estimation was found to be overall good among the three readers. Overall, random forest classifier achieved the best evaluation metrics, followed by Adaboost, KNeighbours, and Gaussian naive bayes in the machine learning-based classification tasks. Deep learning algorithms outperformed the machine learning-based classification tasks for only VM labels. Thorough analysis indicates that the proposed approach has the potential to save time in cleanliness assessment and is user-friendly for research and clinical use. Further research is required for the improvement of intra-rater reliability of KODA, and the development of automated multi-task classification in this field.

For details refer to: https://doi.org/10.1007/s13246-024-01441-w

SOFTWARE ADVANCEMENTS IN AUTOMATIC EPILEPSY DIAGNOSIS AND SEIZURE DETECTION: 10-YEAR REVIEW

Palak Handa, Lavanya, Nidhi Goel, Neeta Garg

Epilepsy is a chronic neurological disorder that may be diagnosed and monitored using routine diagnostic tests like Electroencephalography (EEG). However, manual introspection and analysis of EEG signals is presently difficult and repetitive task even for experienced neuro-technologists with high false-positive rates and inter- and intra-rater reliability. Software advancements using Artificial Intelligence (AI) algorithms have the potential to early detect and predict abnormal patterns observed in EEG signals. The present review focuses on systematically reporting software advancements and their implementation using hardware systems in automatic epilepsy diagnosis and seizure detection for the past 10 years. Traditional, hybrid, and end-to-end AI-based pipelines and associated EEG datasets have been discussed. The review summarizes and compares reported articles, datasets, and patents through various subjective and objective parameters in this field. Latest advancements demonstrate that AI-based pipelines can reduce the introspection time by at least 50% without compromising the diagnostic accuracy or abnormal event detection. A significant rise in hardware implementation of software-based pipelines, end-to-end deep learning architectures for real-time analysis, and granted patents has been noticed since 2011. More than twenty-eight datasets have been developed to automatically diagnose epileptic EEG signals from 2001 to 2023. Extensive analysis using explainability tools, cross-dataset generalizations, reproducibility analysis, and ablation experiments can further improve the existing AI-based pipelines in this field. There is a need for the development of standardized protocols for data collection and its AI pipeline for a robust, inter- and intra-rater reliability-free, and real-time automatic epilepsy diagnosis.

For details refer to: https://doi.org/10.1007/s10462-024-10799-y

THERMAL IMAGE ENHANCEMENT FOR ADVERSE WEATHER SCENARIOS: A WAVELET TRANSFORM AND HISTOGRAM CLIPPING APPROACH

Tirupathamma Mudavath, Vandana Niranjan

Thermal imaging is crucial in surveillance, transportation safety, defense, search and rescue, industrial maintenance, manufacturing quality control, and firefighting for enhanced situational awareness. Yet, its effectiveness diminishes in adverse weather like fog, haze, rain, and poor lighting. However, its efficacy is often compromised in challenging environments characterized by adverse weather conditions such as fog, haze, rain, and poor lighting. This paper proposes an image enhancement framework using Wavelet Transform to improve thermal imaging in challenging conditions. It decomposes images into frequency components, selectively enhancing low and high-frequency details.

A kurtosis-based histogram clipping algorithm enhances contrast and visibility in low-frequency components. Synthesizing components using inverse discrete wavelet transform produces the final image. The proposed methodology is evaluated using publicly available datasets, including OSU thermal and AAU rain-snow datasets, to evaluate its performance in various challenging scenarios with quantitative metrics like Entropy, Absolute Mean Brightness Error (AMBE), Peak Signal Noise Ratio (PSNR), and Structural Similarity Index (SSIM) are employed for a comprehensive analysis of the proposed Wavelet Transform-based approach. The results demonstrate image quality and visibility improvements, positioning the proposed framework as a promising solution for enhancing thermal imaging in challenging environments and extending its applicability in critical real-world scenarios.
For details refer to: https://doi.org/10.1007/s11760-024-03298-8

MODELING AND SIMULATION CHARACTERISTICS OF A HIGHLY-SENSITIVE STACK-ENGINEERED JUNCTIONLESS ACCUMULATION NANOWIRE FET FOR PH_3 GAS DETECTOR

Neeraj, Shobha Sharma, Anubha Goel, Rewari Sonam, S. S. Deswal, R. S. Gupta

In this manuscript, a Stack Engineered Junctionless Accumulation Nanowire FET (SE-JAM-NW FET) has been proposed for low - power and high sensitivity phosphine (PH_3) gas detection applications. In comparison to a standard nanowire FET, the SE-JAM-NW FET is used at nanoscale dimensions because of its inherent benefits, including low cost, improved portability, low Off- state current and increased On-state current with low - power consumption. To implement the SE-JAM-NW FET as a phosphine gas sensor, four catalytic metals, Platinum (Pt), Rhodium (Rh), Iridium (Ir) & Palladium (Pd) have been employed as gate electrodes. For designing gas sensor, various electric parameters like potential, electron concentration, recombination rate and electron velocity are evaluated for PH_3 gas detection. To forecast the sensor's response, analog characteristics like changes in drain current, transconductance & output conductance are being simulated for different catalytic metal work functions (200 meV, 150 meV, 100 meV and 50 meV) at the gate electrode. The variation in On-state current-to-Off-state current ratio (IOn/IOff), On-state current (IOn) & subthreshold leakage current (IOff) for sensing the gas molecules has been used to quantify the sensitivity. The effects of silicon pillar-based radius variation and channel length variation on the sensitivity-based parameters are also investigated. Each catalytic metal exhibits improved sensitivity with increased channel length and decreased radius. The outcomes of the ATLAS 3-D device simulator's numerical simulation closely match with those of the derived analytical model.
For details refer to: 10.1149/2162-8777/ad26a2

IMPACT OF INTERFACE TRAP CHARGES ON SILICON CARBIDE (4H-SIC) BASED GATE – STACK, DUAL METAL, SURROUNDING GATE, FET (4H-SIC- GSDM-SGFET) FOR ANALOG AND NOISE PERFORMANCE ANALYSIS FOR 5 G/LTE APPLICATIONS

Neeraj, Shobha Sharma, Anubha Goel, Sonam Rewari, S. S. Deswal and R. S. Gupta

This article examines the impact of various interface trap charges on silicon carbide-based gate—stack, dual metal, surrounding gate, FET (4H-SiC-GSDM-SGFET). It has been contrasted for performance with silicon carbide (4H-SiC)-based dual metal, surrounding gate, FET (4H-SiC-DM- SGFET). For both devices, output characteristics including transconductance (gm), output conductance (gd), drain current (Ids), gate capacitance (Cgg), cutoff frequency (fT) and threshold voltage (Vth) have been examined. Surface potential and electron concentration were also inspected using a contour plot for both the device structures. A gate-stack with a high k- dielectric, Lanthanum oxide (La_2O_3) along with gate dielectric layer Aluminum oxide (Al_2O_3) was used for proposed structure implementation. Additionally, we investigated how trap charges affect noise figure (NF) and noise conductance (NC). Also, a CMOS inverter has been developed and its output characteristics have been compared for both the device architectures. ATLAS 3-D device simulator has been employed to conduct the simulations

For details refer to: 10.1149/2162-8777/ad6502

A NOVEL ARCHITECTURE OF HIGH PERFORMANCE FULLY DIFFERENTIAL TWO STAGE RFC OTA DESIGNED USING DFVF AND HYBRID CASCODE COMPENSATION TECHNIQUES

Annu Dabas, Shweta Kumari, Maneesha Gupta, Richa Yadav

In this work, a novel fully differential two stage class AB Recycling Folded Cascode Operational Transconductance Amplifier (RFC OTA) using Differential Flipped Voltage Follower (DFVF) has been proposed. The DFVF and Dynamic Threshold Metal Oxide Semiconductor (DTMOS) transistors have been used as differential input stage of the proposed RFC OTA. These techniques provide enhancement in gain and bandwidth of the proposed OTA. To further improve the performance of proposed circuit, positive feedback at current mirror load along with Hybrid Cascode compensation have been implemented. A common source (CS) amplifier has been used between gate and source terminals of differential input stage which further boosts the transconductance. The proposed RFC OTA is designed and simulated using 180 nm CMOS technology with load capacitance of 10 pF. It provides an excellent dc gain of 112.61 dB and gain bandwidth product (GBW) of 25.88 MHz along with 88.140 phase margin. The proposed circuit dissipates 124.66 μW of power at + 0.5V supply voltage. The Monte Carlo analysis against device mismatch has also been performed to prove robustness of the proposed circuit.

For details refer to: https://doi.org/10.1016/j.vlsi.2024.102296

PERFORMANCE ASSESSMENT AND COMPARISON OF LIGHTWEIGHT D2D-IOT COMMUNICATION PROTOCOLS OVER RESOURCE CONSTRAINT ENVIRONMENT

Manasi Mishra & S. R. N. Reddy

The Internet of Things (IoT) based smart strategies are often resource constrained with respect to energy, computation and memory. Outdated communication protocols are inappropriate for IoT ecosystem because of large overhead, lack of Quality of Service (QoS) and increased complexity. As billions of devices are required to be deployed over diverse applications, the IoT communication system acts as a prominent aspect and so the selection of suitable IoT communication protocol is highly essential. Also, there is a greater need of analysing the protocol behaviour under diverse network conditions. Hence to select a suitable protocol by addressing the limitations, this research paper mainly focuses on comparing lightweight application layer protocols, including Message Queuing Telemetry Transport (MQTT), Constrained Application Protocol (CoAP) and MQTT for sensor Network (MQTTSN). Evaluating the performance of protocol libraries in real environment is highly significant because it helps to discover potential interoperability and compatibility challenges. Also, it can reveal the protocol's ability in handling scalability and its support in dealing a number of devices efficiently. A testbed named "ProtoLab" has been created for evaluating the performances of CoAP, MQTT and MQTTSN protocols under variable network condition. Using the testbed, the client and server can exchange the data packets under the variable network condition created with the help of network emulator. The data packets can be received and exported using the wireshark application to create a dataset for analysis. Different parameters like round trip time, duplication, round trip reliability, server response time, reliability towards the client to server and client overhead are analysed by configuring loss, corruption, reordering and network delay in the network emulator using wide area network emulator (WANEM) to evaluate the performance of IoT communication protocols. Variable network conditions are considered and analysed using real-time ProtoLab testbed by varying the parameters. The results and observations analyzed through this research can support IoT application developers in making informed decisions while selecting communication protocols for different applications. On analysing the parameters under diverse network conditions, the MQTTSN protocol performs comparatively better in terms of resource efficient delivery in constrained environment. Meanwhile, the MQTT protocol is analysed to be better when concerned with reliability.

For details refer to: https://doi.org/10.1007/s11042-024-18132-z

DESIGN OF SMART AUTOMATED COOKER_A SURVEY AND FEASIBILITY STUDY

Kavita Sharma, S. R. N. Reddy

Cooking poses challenges for the elderly, individuals with health issues or disabilities, busy professionals, students, and children. A survey of 50 participants highlighted the innovative potential of a smart IoT-based automatic cooker to improve quality of the life. This paper presents the design and feasibility study of this customized and cost-effective device. The cooker automates ingredient addition, washing, and cooking via mobile apps, touch inputs, or voice commands. It supports local and remote control, allowing users to select or create recipes and cook items like rice and pulses. It automatically handles washing, ingredient addition, and cooking based on preset parameters and record details locally and on the cloud. User safety is ensured with user authentication. Furthermore, temperature and gas sensors prevent overheating and fire hazards. Feasibility testing is done in a simulated environment using Proteus that confirmed the design's practicality and effectiveness. The proposed system focuses on power consumption, enclosures, durability, cost, scalability, upgradability, and alerts for overheating, fire, and unauthorized access.

For details refer to: https://doi.org/10.1007/s11042-024-19764-x

PLANT RECOMMENDATION SYSTEM USING SMART IRRIGATION INTEGRATED WITH IOT AND MACHINE/DEEP LEARNING

Shivangi Tyagi, Rishika Anand, Aditi Sabharwal & S.R.N. Reddy

Agriculture plays a pivotal role in the economy of most countries, serving as a primary source of livelihood and sustenance. In the case of India, it occupies a substantial portion of the nation's land. This article proposes the integration of IoT (Internet of Things) and an automated irrigation system with ML/DL (Machine Learning and Deep Learning) to revolutionize agriculture. The implementation of crop monitoring through sensors not only eases the burden on farmers but also enhances crop productivity. The system, at its core, monitors crucial field parameters such as soil moisture, temperature, and humidity. Given the increasing importance of efficient water management in agriculture, this study outlines an automated irrigation system that leverages cloud computing and IoT to curtail water consumption. Its primary objective is to gather and consolidate data from diverse sources, including data generated by sensors and IoT devices. This centralized data storage approach facilitates seamless data integration from various locations and devices. Through the application of algorithms and dataset analysis, the study determines that the cultivation of "Spider" plants is more favorable when compared to other plant species. Notably, the Random Forest classifier emerged as the most accurate, achieving an impressive 94.77% accuracy rate in this project. In essence, this research endeavors to propel agriculture into a technology-driven and sustainable future, optimizing water usage and improving crop yield.

For details refer to: https://doi.org/10.1080/00103624.2024.2367035

A HOLISTIC APPROACH TO EARLY CONGENITAL HEART DISEASE DETECTION IN RURAL NEONATES: BRIDGING THE GAP IN POSTNATAL CARE

Jyoti Gupta & K. R. Seeja

Artificial intelligence technologies such as machine learning and deep learning employ techniques to anticipate results more effectively without human involvement. Since AI models are viewed as opaque models, their application in healthcare is still restricted. Explainable artificial intelligence (XAI) has been designed to increase the use of artificial intelligence (AI) algorithms in the healthcare sector by increasing trust in the model's predictions and explaining how they are developed. The aim of this article is to critically review, compare, and summarize existing research and to find new research possibilities of XAI for applications in healthcare. This study is conducted by finding articles related to XAI in biological and healthcare domains from the PubMed, Science Direct, and Web of Science databases using the PRISMA method. A comparative study of the state-of-the-art XAI techniques to evaluate its applications in healthcare has also been done using an experimental demonstration on the Diabetes dataset. XAI techniques, namely LIME, SHAP, PDP, and decision tree, were used to explain how various input attributes contributed to the outcome of the model. This study found that the explanations provided by these models are not easily understandable for different users of the model, like doctors and patients, and need expertise. This study found that the potential of XAI in the medical domain is high as it increases trust in the AI model. This survey will motivate the researchers to build more XAI techniques that provide user-friendly explanations, especially for the less explored areas of medical data, such as biomedical signals and biomedical text.

For details refer to: https://doi.org/10.1007/s11831-024-10103-9

OBJECT DETECTION ON REAL-TIME VIDEO WITH FPN AND MODIFIED MASK RCNN BASED ON INCEPTION-RESNETV2

Anu Yadav, Ela Kumar

Instance segmentation of Real-time video is a crucial step in the object identification and classification process. Object detection is the task of finding different types of information about the object in a video by masking and bounding a rectangular box on the object's position in the image. Deep learning advances in the field of object identification by utilizing its excellent feature learning ability. Numerous researchers have employed various deep-learning methods to perform object detection with the goal of improving the precision of feature extraction. Due to the poor extraction features of the video frame, the higher and lower-level features of an object from the video frame are not extracted properly. Hence, the Feature Pyramid Network (FPN) integrated Modified Mask RCNN based on Inception-ResNetV2 is employed to extract the higher and lower level features from the video in order to solve this problem.

The automatic selective approach of the regions for the detection of an object is made by using the Regional Proposal Network, and the selected region is aligned using Region of Interest. From the aligned image, the fully convoluted layer is used for boxing and class detection of the object. Then, the convoluted layers are used for masking the detected object. In order to evaluate object detection on real-time video using Modified Mask RCNN, the performance metrics such as Accuracy, Precision, and Recall attained by the proposed model for the CoCo dataset are 0.98, 0.93, 0.94, which results in better values than the existing approaches including RCNN, SWINV2-G, Mask RCNN, SWINV2-L, and Fast RCNN. As a result, the developed model accurately and rapidly differentiates the object from the real-time video.

For details refer to: https://doi.org/10.1007/s11277-024-11539-9

A DEEP LEARNING BASED DYNAMIC BANDWIDTH ALLOCATION METHOD FOR XG-PON BASED MOBILE FRONTHAUL FOR CRAN

Garima , Vivekanand Jha, Rakesh Kumar Singh

In the context of 5G and beyond era, the use of Time Division Multiplexed Passive Optical Network (TDM-PON) for mobile fronthaul (MFH) in centralized/cloud radio access network (CRAN) has proven to be an optimal solution for addressing low-latency requirements. While existing literature has predominantly focused on optimizing mobile fronthaul latency rather than end-to-end latency, this paper introduces an end-to-end latency model for TDM-PON, specifically within a 10-gigabit Passive Optical Network (XG-PON) based MFH for CRAN. The paper then proposes an Intelligent Dynamic Bandwidth Allocation (DBA) scheme to minimize end-to-end latency of the network. The proposed scheme predicts the buffer occupancy reports using deep learning techniques at optical network units (ONUs). Thereafter, optical line terminal (OLT) schedules the available bandwidth using conventional DBA schemes (Group-GIANT i.e., Ggiant, Optimized Round Robin, Dynamic Service Interval). Primarily, the proposed DBA scheme transforms conventional DBA schemes (Ggiant, Optimized Round Robin, Dynamic Service Interval) into Intelligent versions (Intelligent Ggiant, Intelligent ORR, Intelligent DSI), showcasing a reduction of 28.63%, 45.86%, and 48.60% in end-to-end latency in the XG-PON-based MFH for CRAN. Further, the analysis of obtained results has confirmed the supremacy of the Intelligent DSI DBA scheme over the Intelligent Ggiant and the Intelligent ORR DBA scheme.

For details refer to: https://doi.org/10.1016/j.comnet.2024.110344

VAEWGAN-NCO IN IMAGE DEBLURRING FRAMEWORK USING VARIATIONAL AUTOENCODERS AND WASSERSTEIN GENERATIVE ADVERSARIAL NETWORK

Arti Ranjan, M. Ravinder

This article proposes a novel "Deep Salient Image Deblurring (DSID) Framework" for kernel-free image deblurring that combines saliency detection and variational autoencoders and Wasserstein generative adversarial network (VAEWGAN). The first phase is saliency-guided extraction, which is a pre-processing technique. The next phase is classification, which is done by VAEWGAN. It maps the blurred image into deblurred image. The performance metrics, like PSNR, SSIM and NC, image enhancement factor (IEF), and root mean square error (RMSE), are analysed. The proposed method attains of 35.66%, 41.22%, and 27.66% and higher normalized cross-correlation of 22.15%, 18.97% and 14.29% compared with the existing systems, like tuning-free plug-and-play hyper-spectral image deconvolution with deep priors (B3DNN-ADMM), depth estimation along image restoration utilizing deep learning from defocused images (DFD-2HDED.NE), and INFWIDE: image with feature space Wiener deconvolution network for non-blind image deblurring (INFWIDE-ID).
For details refer to: https://doi.org/10.1007/s11760-024-03085-5

INTERPRETABLE MACHINE LEARNING FOR DERMATOLOGICAL DISEASE DETECTION: BRIDGING THE GAP BETWEEN ACCURACY AND EXPLAINABILITY

Yusra Nasir, Karuna Kadian, Arun Sharma, Vimal Dwivedi

Research on disease detection by leveraging machine learning techniques has been under significant focus. The use of machine learning techniques is important to detect critical diseases promptly and provide the appropriate treatment. Disease detection is a vital and sensitive task and while machine learning models may provide a robust solution, they can come across as complex and unintuitive. Therefore, it is important to gauge a better understanding of the predictions and trust the results. This paper takes up the crucial task of skin disease detection and introduces a hybrid machine learning model combining SVM and XGBoost for the detection task. The proposed model outperformed the existing machine learning models — Support Vector Machine (SVM), decision tree, and XGBoost with an accuracy of 99.26%. The increased accuracy is essential for detecting skin disease due to the similarity in the symptoms which make it challenging to differentiate between the different conditions. In order to foster trust and gain insights into the results we turn to the promising field of Explainable Artificial Intelligence (XAI). We explore two such frameworks for local as well as global explanations for these machine learning models namely, SHapley Additive exPlanations (SHAP) and Local Interpretable Model-agnostic Explanations (LIME).
For details refer to: https://doi.org/10.1016/j.compbiomed.2024.108919

CIRCULATION OF LEGITIMATE INFORMATION OVER VANETS USING THRESHOLD SIGNATURE SCHEME

Vijay Kumar Yadav, Pushpa, Khushi Dabas, Shobhita Khatri & Vanshika Sehrawat

Vehicular Ad hoc Networks (VANETs) play a significant role in human life, where the vehicle user connects their vehicles with VANETs and gains several benefits from them, such as traffic-related information, congestion, accidents, etc. Apart from several advantages of VANETs, it comes with several privacy issues. For instance, many malicious vehicles can forward illegitimate information over the VANETs. To overcome this problem, several authentication schemes have been proposed, such as traditional digital signatures, ring signatures, identity-based signatures, group signatures, etc. The problem with these schemes is that it has only one signer. If this signer becomes malicious, it may circulate false information over the VANETs, which makes VANETs untrusted; hence, vehicle users hesitate to use the network. To overcome this problem, this work proposes a threshold signature scheme using the Schnorr signature scheme. This scheme creates a signature using a set of signers and then circulates information over the VANETs. The security of this scheme depends on the elliptic curve discrete logarithm problem. Implementation details and results show that the scheme requires only a few cryptographic operations and completes all the tasks, such as signature generation and verification, within 1.6 milliseconds, even at the security parameter 2024. The scheme performance was also compared with the existing scheme, and it performed around 1.8 times better than the existing schemes, ensuring the proposed scheme is a viable option for VANETs.

For details refer to: https://doi.org/10.1007/s10586-024-04304-x

QEFS: A NOVEL PLANT DISEASE PREDICTION APPROACH USING QUANTUM-INSPIRED EVOLUTIONARY FEATURE SELECTION

Khushi Anand, Bhawna Jain, Himanshu Mittal, Vijay Kumar Yadav

Plant disease prediction is crucial for global food security, prompting the development of novel detection techniques. Initially, Convolution Neural Networks (CNNs) were extensively employed in this domain for their image recognition and object detection capabilities. Recently, with the evolution of Quantum Computing (QC), Quantum Convolutional Neural Networks (QCNNs) have demonstrated improved classification and prediction performance in classical problems, such as medical image analysis and drug discovery. QCNNs excel in classification by leveraging effective features generated through their layers. Features extracted from QCNNs utilize quantum parallelism to explore various feature combinations simultaneously, enhancing the network's ability to capture intricate patterns and relationships in classical image datasets.

However, the high-dimensional nature of these quantum-derived features necessitates effective Feature Selection (FS) to address the curse of dimensionality, improve model interpretability, and ensure computational efficiency in downstream tasks.The study presents Quantum-Inspired Evolutionary Feature Selection (QEFS), a unique method combining effective quantum feature extraction along with the FS approach employing an evolutionary algorithm to tackle this challenge. A hybrid evolutionary optimizer is formulated by integrating key attributes from fundamental optimizing algorithms, combining the strengths of basic optimizers to yield an enhanced hybrid algorithm. In this methodology, features are initially extracted using a QCNN model. Subsequently, these features undergo an FS process using the hybrid FS approach to determine the optimal feature count. The selected features are then fed into five Machine Learning (ML) classifiers for classification. To validate the effectiveness of this approach, the study leverages two distinct plant datasets—normal plants and medicinal plants. The primary objective of the research is binary as well as multi-class classification, specifically differentiating between healthy and diseased plant images. This methodological innovation aims to overcome current limitations in QCNN applications through effective FS using the evolutionary optimization technique.
For details refer to: https://doi.org/10.1007/s10489-024-05990-1

IA-HLD: AN IMPROVED ALEXNET FOR HAIRLINE FRACTURE DETECTION IN ORTHOPEDIC IMAGES

Bhawna Jain, Diksha Malik, Ganiti Jagota, Gyanvi & Ishita Chandra

Bone fractures are a substantial health concern affecting approximately 2.7 million individuals annually across six European countries: France, Germany, Italy, Spain, Sweden, and the UK. If left untreated, this issue carries significant health risks, including fatality. It is crucial to accurately identify the types of fractures, especially subtle hairline fractures to mitigate long-term consequences. These fractures are characterized by small breaks where the bone fragments are aligned, and there is no visible displacement. Unfortunately, detecting hairline fractures is a significant challenge in the medical field. This is mainly attributed to the intricate nature of these fractures adding complexity, posing difficulties for both human and machine detection. Additionally, there is a lack of easily accessible datasets focused on hairline fractures. This paper introduces the iA-HLD model, a novel and enhanced approach for detecting hairline fractures. Through architectural modifications, this model exhibits superior capabilities in identifying hairline fractures across all types of human bones using deep learning and stands as the pioneering solution of its kind. A comprehensive comparative analysis is conducted, assessing the performance of the proposed model against established models, including ResNet-50, AlexNet, and convolutional neural network. Evaluation metrics, including accuracy, precision, recall, and F1-score, are used to compare the models. iA-HLD achieved an accuracy rate of 97.6%, highlighting its superior capabilities.

In addition, it scored 98% in precision, recall, and F1-score, which surpasses all other models. These results show its improved capabilities as well as its potential for use in real-world applications across many fields. The research is a significant stride in advancing hairline fracture detection and addresses a critical gap in current medical diagnostic methods.
For details refer to: https://doi.org/10.1007/s00521-024-10348-2

DENSE NET WITH SHARK MUD RING OPTIMIZATION FOR SEVERITY DETECTION OF TUBERCULOSIS USING SPUTUM IMAGE

Jagrati Singh, Ruth Ramya, Vijay M.

Nowadays the world is enduring in the direction of automatic severity assessment and patient categorization considering tuberculosis (TB). Automated categorization is beneficial for developing countries that are struggling to minimize fatality rate amidst persons having TB which is considered to be a transmittable disease. The TB categorization technique is developed with sputum images. The sputum images are permitted to the pre-processing step wherein an adaptive bilateral filter is utilized for removing the noise. The bacilli segmentation is performed using U-Net to segment affected regions. The texture and statistical features are mined through segmented regions. The extracted images are fed to DenseNet for the detection of the severity level of TB. The developed Shark Mud Ring Optimization (SMRO) is used to train DenseNet. The developed SMRO is a fusion of White shark optimization (WSO) and Mud Ring optimization (MRO). The method also helps to detect the bacillus containing the images of sputum which subsequently eases the technician's job to detect the TB. The SMRO-based DenseNet outperformed producing accuracy of 94.7%, PPV of 89.4%, TNR of 90.6%, NPV of 88% and TPR of 93.3%.
For details refer to: https://doi.org/10.1016/j.bspc.2023.105929

PERFORMANCE BEHAVIOUR OF DOUBLE LAYER CONICAL POROUS HYBRID JOURNAL BEARING OPERATED WITH PSEUDOPLASTIC LUBRICANT

Anil Singh, Satish C. Sharma and Nathi Ram Chauhan

This study performs a numerical simulation of a double layer conical porous hybrid journal bearing (DLCPB) by considering the synergistic effects of a double layer porous matrix and pseudoplastic lubricant behaviour. The non-Newtonian behaviour of the lubricant has been studied using the pseudoplastic lubricant behaviour in order to generate more realistic design data. Besides this, the synergistic effects of double layer porous matrix and non-Newtonian lubricant behaviour have been numerically studied. Further, porous journal bearings with a single layer of porous matrix demonstrate reduced stability and load capacity due to lubricant seepage through the bearing wall. Several researchers advocated the use of double layer porous journal bearings (DLPB) instead of single layer porous journal bearings (SLPB) to overcome this issue. This study examines the performance of a DLCPB with respect to the interactive effects of the flow behaviour index, semi cone angle, and permeability parameter. To solve the modified Reynolds equation for a DLCPB, the finite element approach is used. The results of this study suggest that the DLCPB enhances the performance characteristics in comparison to the single layer conical porous hybrid journal bearing. In addition, the stability threshold speed margin is enhanced by the application of a pseudoplastic lubricant.
For details refer to:https://doi.org/10.1177/13506501241272764

SYNTHESIS AND CHARACTERIZATION OF CELLULOSE GREWIA OPTIVA YARN AND WOVEN MAT USING AN ALKALI SOLUTION

Kanika Gupta, Nathi Ram Chauhan

Purpose

The production of commodities from renewable organic material has gained enormous interest due to the rising public understanding of conscious development. Natural fibers are accessible in environment, and their parameters depend on their physical traits and chemically engineered makeup. Grewia optiva (GO) comes under the category of bast fibers, also known as Bhimal. This study aims to realize the consequences of alkali treatment on the characterization of natural fibers, their developed yarn and then the woven mat.

Design/methodology/approach

Raw fiber was treated with 20% alkali solution. After treatment, it was evaluated for changes in the general laboratory system. This treatment is known as mercerization, through which the parameters of cellulose fibers can be enhanced. After this process, the content of cellulose increases due to the removal of the hydroxyl group. The removal of microfibrils, hemicellulose and the introduction of hydrogen bonds increase the interactive capacity of fiber. The job was divided into different sections, including acquiring fiber, developing yarn and creating a mat.

Findings

The quality of the surface of the fiber was enhanced after the treatment. Its diameter was reduced to 54.72 microns. In the developed woven mat, it was densified using water treatment and attained grams per square meter (GSM) of 389.7.

Originality/value

The usage of mercerization softens the fiber to twist into yarn, which is finally woven into a mat. Treatment of fabric or mat makes it denser to impart better strength. A woven mat of natural fibers provides maximum strength to the composites.

For details refer to: https://doi.org/10.1108/IJCST-01-2024-0024

MULTI-RESPONSE OPTIMIZATION OF INPUT AND OUTPUT RESPONSES OF MULTIPASS FSP OF AA7050 WITH (SIC + TIB2) NANOPARTICLES BY RESPONSE SURFACE METHODOLOGY

Bharat Singh Chittoriya, Arvind Jayant, and Rakesh Kumar

In this work, multi-response optimization of output and input responses of multipass friction stir processing (MPFSP) of AA7050 with (SiC + TiB2) nanoparticles by response surface methodology based on the center composite design and metallurgical characterization were analyzed, and the optimum parameters of the MPFSP were discussed. At high tool rotational speed (TRS) of 1100 rpm with 50% TiB2 and 100% SiC nanoparticles, maximum joint efficiency (137.80%) was observed due to uniformly dispersed SiC and TiB2 within the matrix, serving as practical obstacles to dislocation motion, hindering plastic deformation, and facilitating enhanced mechanical properties. MPFS and nanoparticles broke the coarse grain structure of the base metal and produced a fine and homogenous grain structure in the stir zone. Increasing the concentration of reinforcement particles and FSP passes (1 to 4) inhibited grain boundary migration and significantly reduced the high-angle grain boundary and grain size. The optimized value of input parameters TRS, TiB2 nanoparticles, and SiC nanoparticles was observed as 1068 rpm, 56%, and 97%, while the optimized value of output response tensile strength, % strain, and hardness value was found as 569.16 MPa, 20.79, and 148.32 HV respectively. The p-value for all three models remained below 0.05, indicating a confidence level exceeding 95% in the constructed models, rendering them suitable for design exploration. The hardness value range of MPFSP/(SiC + TiB2) lies between 130 HV and 190 HV. The minimum hardness value of 131.03 HV was observed at 0% TiB2 and 50% SiC reinforcement particles with TRS of 1100 rpm, while the highest microhardness (187.02 HV) was perceived at 1000 rpm.

For details refer to: DOI: https://doi.org/10.1177/09544089231221068

SYNTHESIS OF ZRO_2 COATED BNNTS TO IMPROVE WETTABILITY, MORPHOLOGICAL AND THERMAL CHARACTERISTICS

Mamta Kumari, Ashok Kumar Jha, Subhash Singh

The presented work explores detail information about surface modification of BNNTs with ZrO_2 through isothermal hydrolysis process for reducing its hydrophobic property and enhancing the wettability as BNNTs possess hydrophobicity & poor wettability in its raw form as it agglomerates during fabrication of composites, ultimately prohibits usage of BNNTs as a prime reinforced material and for other utilization. HRTEM, EDX, E.M confirmed thin coating layer of ZrO_2 whereas X-ray diffraction and FE-SEM determined the morphological structure of BNNTs in its raw form comparing with properties of BNNTs@ZrO_2. Contact angle test displays increased wettability of synthesised BNNTs where Zeta Potential provides upgraded stability and dispersibility of coated BNNTs in aqueous medium. Confirmation of coating, improved surface architecture and chemical properties of coated BNNTs than non-treated BNNTs is observed via FTIR. BNNTs@ ZrO_2 showing thermally stable and constant throughout temperature beyond 800 °C through TGA. Present study describes the features of BNNTs and BNNTs@ZrO_2 enriching morphological and thermal characteristics followed by confirmation of coating layer through isothermal hydrolysis process, improvement in wettability and hydrophobicity for further future approach towards reinforcement in MMCs, in a nut shell very effectively applicable in aerospace and automobile industrial utilization.

For details refer to: https://doi.org/10.1016/j.ceramint.2024.05.218

COMPREHENSIVE STUDY ON CATALYTIC POTENTIAL OF TI_3C_2TX BASED CATALYZER FOR DYE SENSITIZED SOLAR CELLS APPLICATION

Girija Nandan Arka, Shashi Bhushan Prasad and Subhash Singh

Recently Dye-sensitized solar cells (DSSC) have gained significant research limelight for having exceptional photovoltaic potential. However, DSSC became an underdog solar cell due to the use of an expensive transparent conductive layer (FTO/ITO) along with the use of rare earth element Pt to concoct counter electrode (CE). Thus, an attempt has been made to concoct a Ti_3C_2-TX MXene-based CE to replace both the transparent conductive layer and CE. Herein, relatively larger with less defective Ti_3C_2 flakes were produced by the minimally intensive layer delamination method, and physical architecture was investigated by X-ray diffraction (XRD) mapping, Field-emission scanning electron microscope (FE-SEM) and Dynamic light scattering (DLS), respectively.MXene flakes were drop cast on a glass substrate by dispersing it in ethanol, isopropyl alcohol, and deionized water, respectively, and found the least sheet resistance, 14.824 Ω/sq by 4-point probe test, owing to superior adsorption force with the glass substrate.

Ethanol solvent facilitates optimum interlamellar spacing to promote fast diffusion and transportation. Further, the study was expanded by introducing it to numerous sintering temperatures to find the best result. The result revealed exceptional sheet resistance of 0.08 Ω/sq for the 120℃ sintered sample, which was encouraged by removing water intercalant and occupying H+. Further, the potential of MXene-based counter electrode's catalytic activity has been studied through electrochemical impedance spectroscopy, Tafel polarization, and Cyclic voltammogram under iodide and triiodide-based electrolytes. The electrochemical study revealed 120℃ sintered sample superior to 140℃ sintered but comparable to Pt CE. 120℃ sintered Ti_3C_2-based CE performed exceptional 6.27% power conversion efficiency. Thus, this novel study communicates that Ti_3C_2-TX is a potential replacement for transparent conductive oxide layer and Pt, frequently used in Dye-sensitized solar cell applications.

For details refer to: https://doi.org/10.1088/1361-6641/ad3e25

A REVIEW ON POLYLACTIC ACID-BASED BLENDS/COMPOSITES AND THE ROLE OF COMPATIBILIZERS IN BIOMEDICAL ENGINEERING APPLICATIONS

Alok Srivastava, Pooja Bhati, Shweta Singh, Mohit Agrawal, Nisha Kumari, Priya Vashisth, Pankaj Chauhan, Naresh Bhatnagar

Poly(lactic acid) (PLA) is one of the most promising biopolymers extensively used in food, packaging, medical and pharmaceutical industries. It is due to favorable physicochemical properties, in-situ hydrolytic degradation and well-established processing parameters. However, in medical engineering applications, PLA shows some drawbacks like low cell adhesion, biological inertness, slow degradation rate and high acid inflammation. These shortcomings of pure PLA could be addressed by blending it with other bioresorbable materials and compatibilizers. This review provides comprehensive information on different PLA composites in the field of tissue engineering, implants, injury management and drug delivery systems. The PLA-based composites are divided into four parts: PLA/polymer, PLA/metal, PLA/ceramic, and PLA/nanoparticles. It also investigates various synthesis process, role of different compatibilizers, in vitro studies and their in vivo applications.

For details refer to: https://doi.org/10.1002/pen.26626

EVALUATION AND ANALYSIS OF ELASTIC AND MECHANICAL CHARACTERISTICS OF HYBRID COMPOSITE INCORPORATING BANANA FIBER, KENAF FIBER, AND NANO-CACO3

Tanvi Saxena , V. K. Chawla

The use of nano-fillers as reinforcement in natural fibers-based hybrid composites has gained prominence in multiple sectors in recent years because of their virtuous mechanical and physical characteristics. The impeccable properties of nano-fillers like their high aspect ratio and larger surface area have made them to be used in areas for instance, sectors like aviation, automotive, and biotechnology fields. This study focuses on examining how various weight percentages of nano-calcium carbonate (NCaCO3) fillers (2%, 5%, 7%) impact the elastic properties of innovative hybrid composites blended with banana and kenaf fibers, combined with epoxy. The elastic characteristics of the suggested composite, including longitudinal elastic modulus (LEM), transverse elastic modulus (TEM), longitudinal Poisson's ratio (LPR), and longitudinal shear modulus (LSM), are analyzed through micromechanical models such as the Mori–Tanaka (M–TA) model, generalized self-consistent (GS-C) model, and modified Halpin–Tsai (M-HT) model. The composite consisting of a solitary banana fiber sheet, a solitary NCaCO3 mix epoxy sheet, and another solitary kenaf fiber sheet is modeled in ANSYS APDL simulation software. The composite's layers are organized in a specific order: starting with banana fiber at 90° orientations, followed by a layer of NCaCO3 and epoxy at 0° orientations, and concluding with kenaf fiber at 90° orientations. The ANSYS software is employed to analyze the total sum deformation and strength of the suggested composite. The outcomes obtained from this research are contrasted and confirmed through comparison with existing literature. The inclusion of 7 wt% of NCaCO3 in the suggested hybrid composite is found to have the highest elasticity and ductility in comparison with 2 wt% and 5 wt% of NCaCO3. The composite containing 7 wt% NCaCO3 demonstrates the greatest load-bearing capability. Additionally, while calculating the elastic characteristics of the proposed composite, both the modified Halpin–Tsai (M-HT) model and the generalized elf-consistent model (GS-C) outperform the Mori–Tanaka model (M–TA). Furthermore, the hybrid impact is computed for the suggested composite to analyze the tensile strain rates at which failure occurs for banana and kenaf fibers within the composite hybrid structure. The computed hybrid value of 0.5 indicates that the failure rate of a non-hybridized composite is 50% more than the hybridized composite. This signifies that the hybrid composites have high load-bearing strength, high elasticity, and stiffness.

For details refer to: https://doi.org/10.1007/s13369-024-08967-x

CUSTOMERS' INTENTION TO USE VIRTUAL REALITY IN TOURISM: A COMPREHENSIVE ANALYSIS OF INFLUENCING FACTORS

Neena Sinha, Sanjay Dhingra, Ritu Sehrawat, Varnika Jain, Himanshu

Purpose

The emergence of virtual reality (VR) has the potential to revolutionize various industries, including tourism, as it delivers a simulated environment that closely emulates real-life experiences. Therefore, this study aims to explore how the factors, i.e. enjoyment, emotional involvement, flow state, perceived privacy risk, physical risk and cost, influence the customers' intention to use VR for tourism.

Design/methodology/approach

This study integrates the technology acceptance model, hedonic consumption theory with other factors, including cognitive response, authenticity, perceived privacy risk, perceived physical risk, perceived cost and perceived presence. Partial least squares structural equation modelling approach was used to test the proposed research model.

Findings

The finding based on the sample of 252 respondents revealed that authenticity is the most influential factor impacting behavior intention followed by perceived cost, attitude, cognitive response and enjoyment. Also, the study supported the moderating impact of personal innovativeness between attitude and behavioral intention to use VR for tourism.

Practical implications

The findings of the study offers practical implications for service providers, site managers, destination marketers, tourist organizations and policymaker to develop more effective strategies for offering VR services for tourism.

Originality/value

This study enriches the current understanding of VR adoption in context of tourism with empirical evidences.

For details refer to: https://doi.org/10.1108/TR-07-2023-0488

VALIDATION AND CONFIRMATION OF THE EQUANIMITY SCALE-16 IN INDIA AND ITS RELATIONSHIP WITH WELL-BEING

Shivangi Verma & Naval Garg

Objectives

The present study explored the psychometric properties of the Equanimity Scale-16 (ES-16) in the Indian population. It also investigated the parallel connections between equanimity and spiritual well-being, recognizing equanimity as one of the qualities of highly spiritual beings.

Method

Three independent studies, with diverse sets of participants, were conducted using structured and established questionnaires. The first study evaluated the factorial structure of the ES-16 scale through exploratory (EFA) and confirmatory factor analysis (CFA) using a sample of 648 Indian adults. The second study evaluated the reliability of the ES-16 with the help of Cronbach's alpha and composite reliability values based on a sample of 379 respondents. The convergent validity and discriminant validity were examined using average variance explained (AVE) values. The construct validity was examined through correlation analysis of the ES-16 scale with psychological distress, as well as a gratitude scale, given the traditional association of equanimity with spiritual well-being. The third study explored test–retest reliability of the scale based on a sample of 151 participants.

Results

The EFA yielded a 2-factor solution like the original ES-16 scale. The 2 factors—experiential acceptance and non-reactivity—could explain 61.12% of the total variance. The CFA confirmed the adequate factorial structure of the ES-16 scale. The acceptable Cronbach's alpha and composite reliability values (greater than 0.70) confirmed the reliability of the ES-16 scale. The convergent validity and discriminant validity were also confirmed in the second study. The results also reported a statistically significant positive association between equanimity and spiritual well-being.

Conclusions

The present study concluded that both factors of equanimity are necessary to experience equanimity, and absence of one renders the other difficult. It confirmed the psychometric properties of the ES-16 in the Indian population. The results hold considerable promise for advancing research in the field of mindfulness and well-being, as well as guiding the development of interventions aimed at promoting equanimity and fostering positive mental health outcomes in the Indian context.

For details refer to: https://doi.org/10.1007/s12671-024-02318-5

DETAILS OF COMMENDABLE PATENT AWARDS

DETAILS OF COMMENDABLE PATENT AWARDS

A CLOUD BASED INTERNET OF THINGS (IOT) ENABLED BATTERY MANAGEMENT SYSTEM

INVENTOR: DR. A. K. MOHAPATRA, DR. AMITA DEV, IPSITA PATTNAIK

क्रम सं SL No :011215250

INTELLECTUAL PROPERTY INDIA

सत्यमेव जयते

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पेटेंट प्रमाण पत्र |
(पेटेंट नियमावली का नियम 74)

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पेटेंट सं. / Patent No. : 551000

आवेदन सं. / Application No. : 202311071323

फाइल करने की तारीख / Date of Filing : 19/10/2023

पेटेंटी / Patentee : Indira Gandhi Delhi Technical University for Women (IGDTUW)

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *A CLOUD-BASED INTERNET OF THINGS (IOT) ENABLED BATTERY MANAGEMENT SYSTEM* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख अक्टूबर 2023 के उन्नीसवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *A CLOUD-BASED INTERNET OF THINGS (IOT) ENABLED BATTERY MANAGEMENT SYSTEM* as disclosed in the above mentioned application for the term of 20 years from the 19th day of October 2023 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 25/09/2024
Date of Grant : 25/09/2024

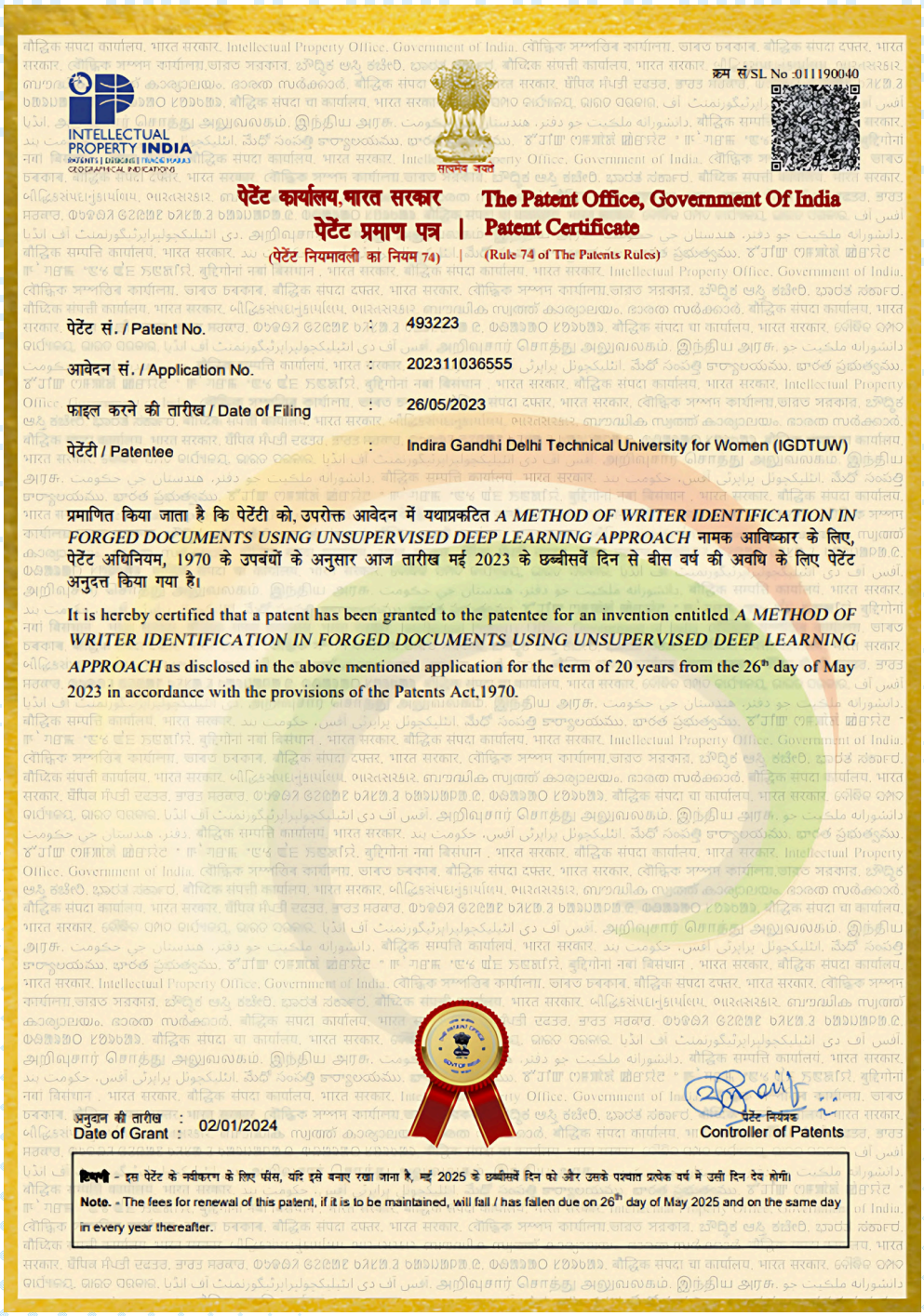
पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, अक्टूबर 2025 के उन्नीसवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 19th day of October 2025 and on the same day in every year thereafter.

A METHOD OF WRITER IDENTIFICATION IN FORGED DOCUMENTS USING UNSUPERVISED DEEP LEARNING APPROACH

INVENTOR: DR. ARUN SHARMA, DR. AMITA DEV, PRACHI TYAGI, KHUSHBOO AGARWAL, RITU RANI



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पेटेंट प्रमाण पत्र |
(पेटेंट नियमावली का नियम 74)

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पेटेंट सं. / Patent No.	:	493223
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फाइल करने की तारीख / Date of Filing	:	26/05/2023
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women (IGDTUW)

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *A METHOD OF WRITER IDENTIFICATION IN FORGED DOCUMENTS USING UNSUPERVISED DEEP LEARNING APPROACH* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख मई 2023 के छब्बीसवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *A METHOD OF WRITER IDENTIFICATION IN FORGED DOCUMENTS USING UNSUPERVISED DEEP LEARNING APPROACH* as disclosed in the above mentioned application for the term of 20 years from the 26th day of May 2023 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 02/01/2024
Date of Grant :

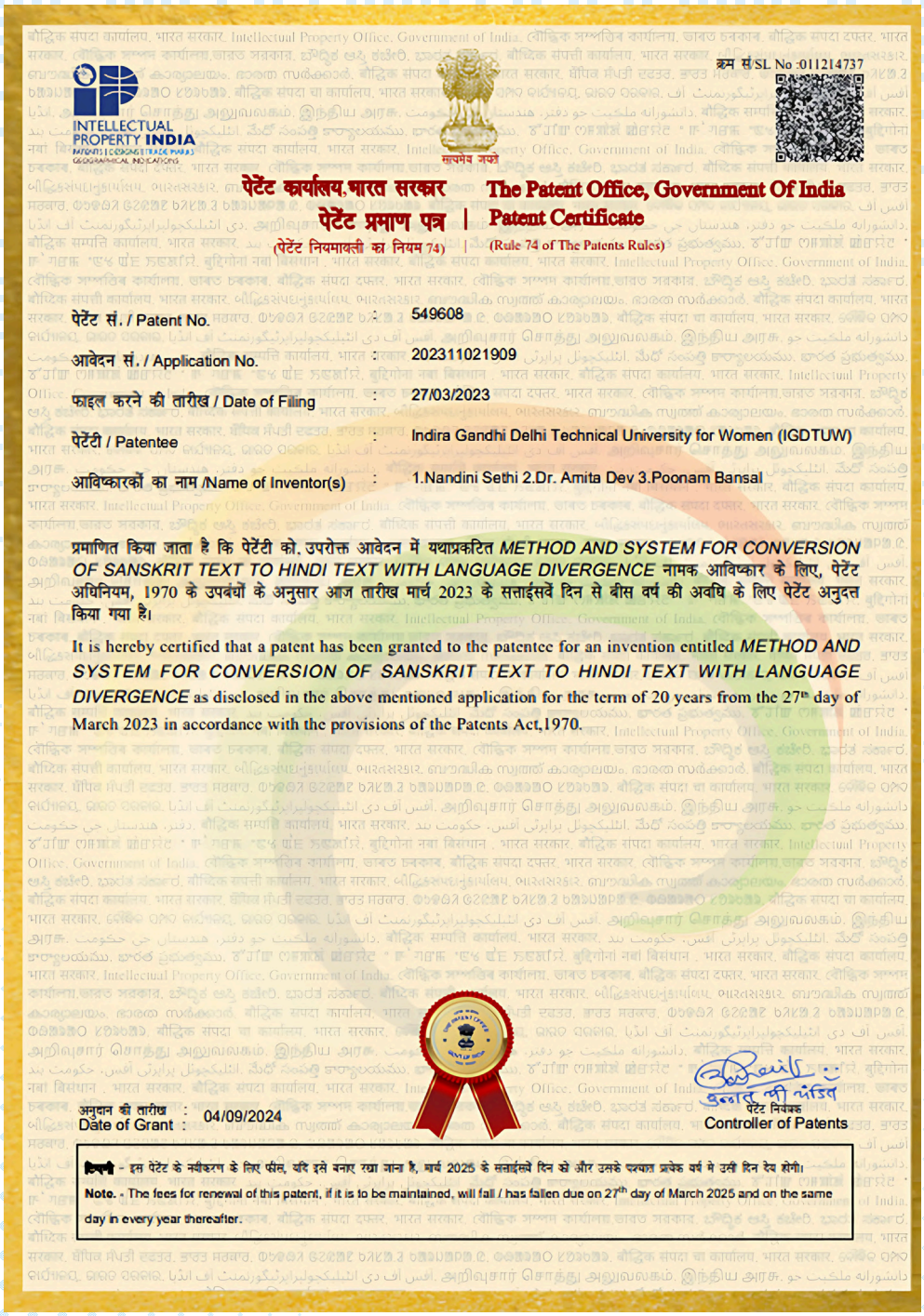
पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, मई 2025 के छब्बीसवें दिन को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 26th day of May 2025 and on the same day in every year thereafter.

METHOD AND SYSTEM FOR CONVERSION OF SANSKRIT TEXT TO HINDI TEXT WITH LANGUAGE DIVERGENCE

INVENTOR: DR. POONAM BANSAL, DR. AMITA DEV, NANDINI SETHI



INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS | GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

क्रम सं/SL No :011214737

पेटेंट कार्यालय,भारत सरकार
पेटेंट प्रमाण पत्र
(पेटेंट नियमावली का नियम 74)

The Patent Office, Government Of India
Patent Certificate
(Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	549608
आवेदन सं. / Application No.	:	202311021909
फाइल करने की तारीख / Date of Filing	:	27/03/2023
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women (IGDTUW)
आविष्कारकों का नाम /Name of Inventor(s)	:	1.Nandini Sethi 2.Dr. Amita Dev 3.Poonam Bansal

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *METHOD AND SYSTEM FOR CONVERSION OF SANSKRIT TEXT TO HINDI TEXT WITH LANGUAGE DIVERGENCE* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख मार्च 2023 के सत्ताईसवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *METHOD AND SYSTEM FOR CONVERSION OF SANSKRIT TEXT TO HINDI TEXT WITH LANGUAGE DIVERGENCE* as disclosed in the above mentioned application for the term of 20 years from the 27th day of March 2023 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 04/09/2024
Date of Grant :

पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, मार्च 2025 के सत्ताईसवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 27th day of March 2025 and on the same day in every year thereafter.

A METHOD AND SYSTEM FOR EMOTION RECOGNITION FROM VERBAL UTTERANCES

INVENTOR: DR. POONAM BANSAL, DR. AMITA DEV, NANDINI SETHI

बौद्धिक संपदा कार्यालय, भारत सरकार, Intellectual Property Office, Government of India, बौद्धिक सम्पत्ति कार्यालय, भारत सरकार, बौद्धिक संपदा दफ्तर, भारत सरकार

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

क्रम सं/SL No :011206102

पेटेंट कार्यालय,भारत सरकार
पेटेंट प्रमाण पत्र |
(पेटेंट नियमावली का नियम 74)

The Patent Office, Government Of India
Patent Certificate
(Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	529359
आवेदन सं. / Application No.	:	202311021908
फाइल करने की तारीख / Date of Filing	:	27/03/2023
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women (IGDTUW)

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *A METHOD AND SYSTEM FOR EMOTION RECOGNITION FROM VERBAL UTTERANCES* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख मार्च 2023 के सत्ताईसवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *A METHOD AND SYSTEM FOR EMOTION RECOGNITION FROM VERBAL UTTERANCES* as disclosed in the above mentioned application for the term of 20 years from the 27th day of March 2023 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 20/03/2024
Date of Grant :

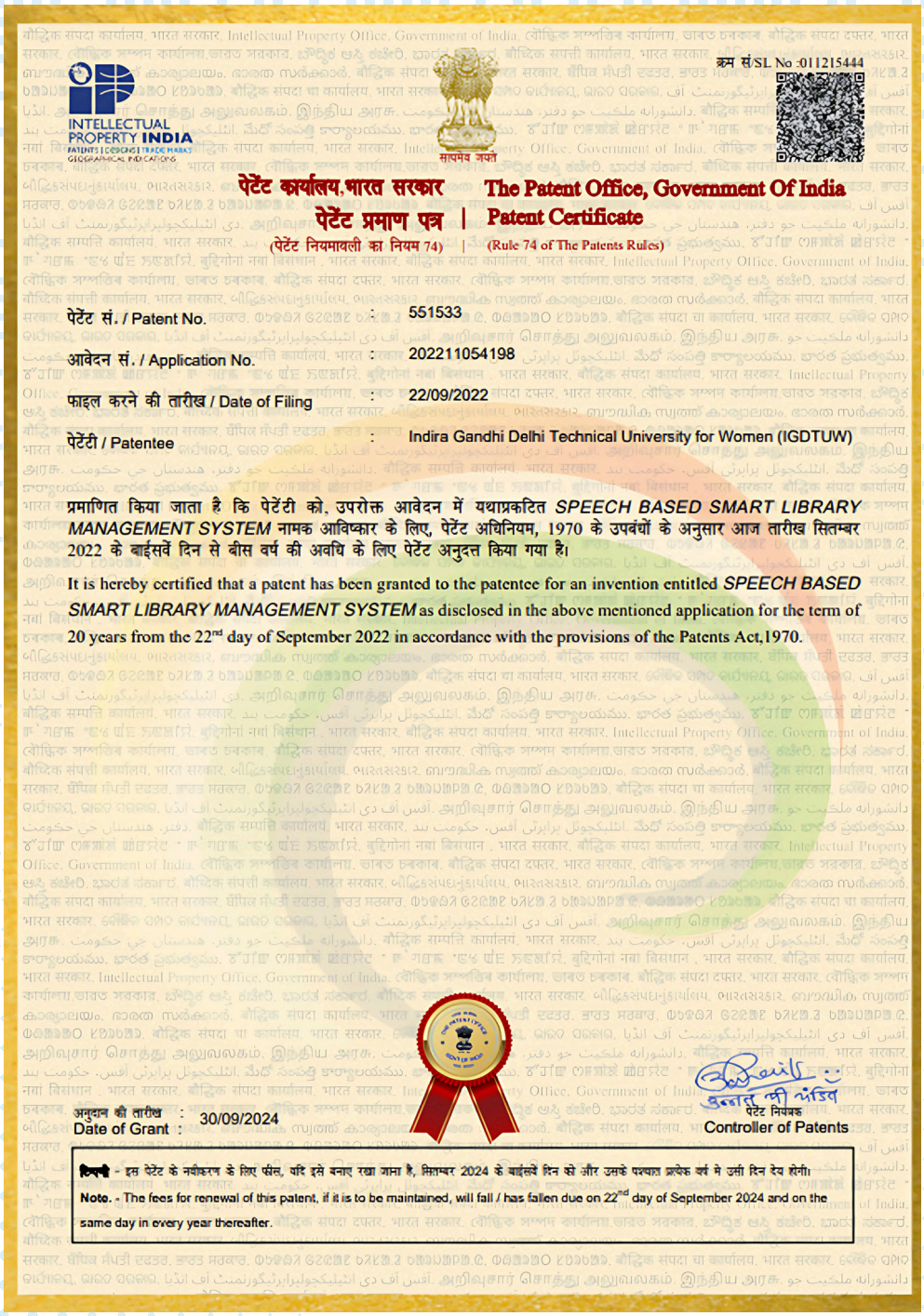
पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, मार्च 2025 के सत्ताईसवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 27th day of March 2025 and on the same day in every year thereafter.

SPEECH BASED SMART LIBRARY MANAGEMENT SYSTEM

INVENTOR: DR. POONAM BANSAL, DR. AMITA DEV



INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

क्रम सं/SL No :011215444

पेटेंट कार्यालय,भारत सरकार
पेटेंट प्रमाण पत्र |
(पेटेंट नियमावली का नियम 74)

The Patent Office, Government Of India
Patent Certificate
(Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No. : 551533

आवेदन सं. / Application No. : 202211054198

फाइल करने की तारीख / Date of Filing : 22/09/2022

पेटेंटी / Patentee : Indira Gandhi Delhi Technical University for Women (IGDTUW)

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *SPEECH BASED SMART LIBRARY MANAGEMENT SYSTEM* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख सितम्बर 2022 के बाईसवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *SPEECH BASED SMART LIBRARY MANAGEMENT SYSTEM* as disclosed in the above mentioned application for the term of 20 years from the 22nd day of September 2022 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 30/09/2024
Date of Grant :

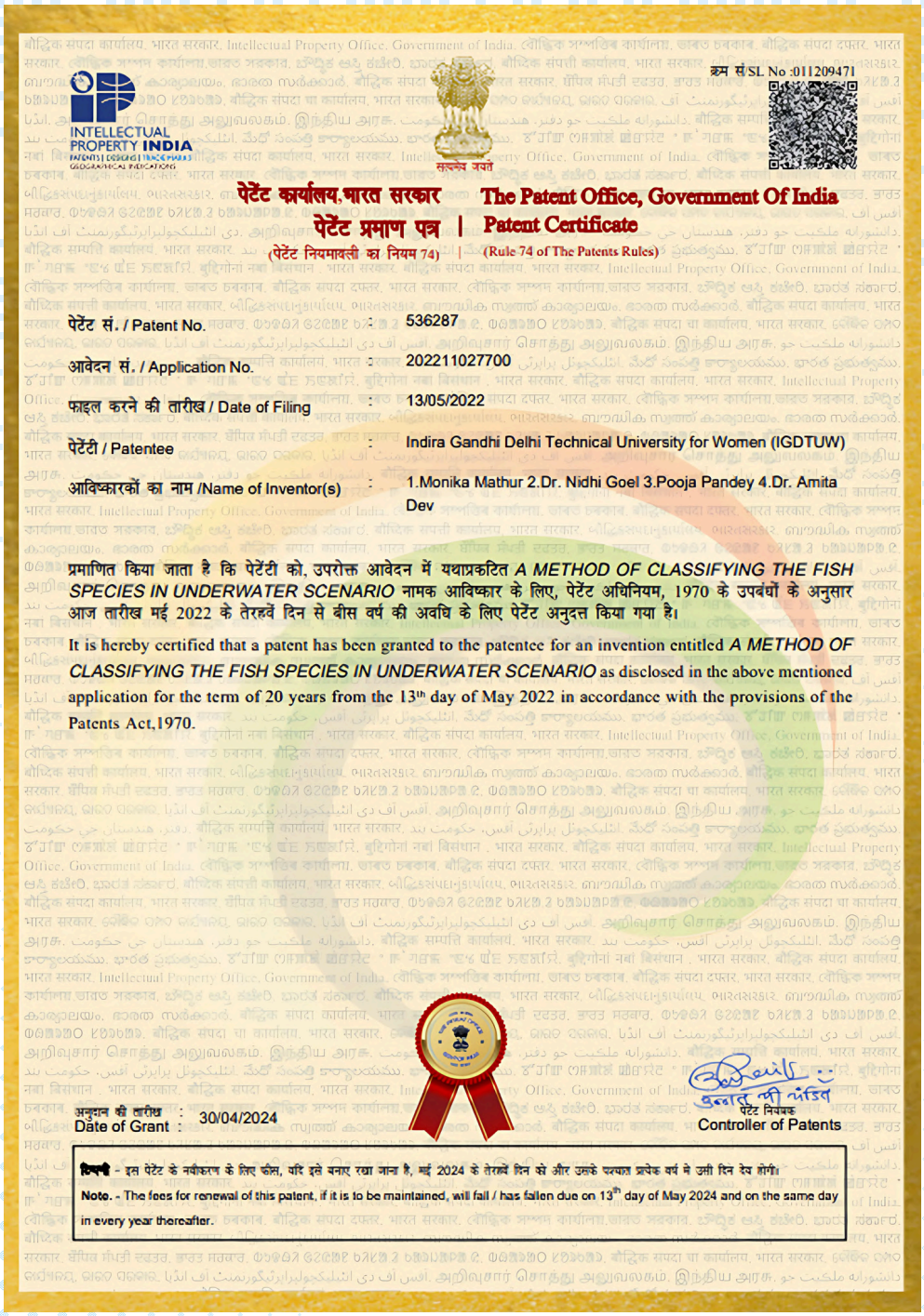
उन्नत जी पंडित
पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, सितम्बर 2024 के बाईसवें दिन को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 22nd day of September 2024 and on the same day in every year thereafter.

A METHOD OF CLASSIFYING THE FISH SPECIES IN UNDERWATER SCENARIO

INVENTOR: DR. NIDHI GOEL, DR. AMITA DEV, DR. POOJA PANDEY, DR. MONIKA MATHUR



INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS | GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

क्रम सं/SL No :011209471

पेटेंट कार्यालय,भारत सरकार | **The Patent Office, Government Of India**

पेटेंट प्रमाण पत्र | **Patent Certificate**

(पेटेंट नियमावली का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	536287
आवेदन सं. / Application No.	:	202211027700
फाइल करने की तारीख / Date of Filing	:	13/05/2022
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women (IGDTUW)
आविष्कारकों का नाम /Name of Inventor(s)	:	1.Monika Mathur 2.Dr. Nidhi Goel 3.Pooja Pandey 4.Dr. Amita Dev

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *A METHOD OF CLASSIFYING THE FISH SPECIES IN UNDERWATER SCENARIO* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख मई 2022 के तेरहवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *A METHOD OF CLASSIFYING THE FISH SPECIES IN UNDERWATER SCENARIO* as disclosed in the above mentioned application for the term of 20 years from the 13th day of May 2022 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 30/04/2024
Date of Grant :

पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, मई 2024 के तेरहवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 13th day of May 2024 and on the same day in every year thereafter.

A VISION ENHANCEMENT METHOD FOR UNDERWATER IMAGES

INVENTOR: DR. NIDHI GOEL, DR. AMITA DEV, DR. MONIKA MATHUR

INTELLECTUAL PROPERTY INDIA

क्रम सं/SL No :011209459

सत्यमेव जयते

पेटेंट कार्यालय,भारत सरकार | The Patent Office, Government Of India

पेटेंट प्रमाण पत्र | Patent Certificate

(पेटेंट नियमावली का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	536265
आवेदन सं. / Application No.	:	202211034689
फाइल करने की तारीख / Date of Filing	:	17/06/2022
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women (IGDTUW)
आविष्कारकों का नाम /Name of Inventor(s)	:	1.Monika Mathur 2.Dr. Nidhi Goel 3.Dr. Amita Dev

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *A VISION ENHANCEMENT METHOD FOR UNDERWATER IMAGES* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख जून 2022 के सत्रहवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *A VISION ENHANCEMENT METHOD FOR UNDERWATER IMAGES* as disclosed in the above mentioned application for the term of 20 years from the 17th day of June 2022 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 30/04/2024
Date of Grant :

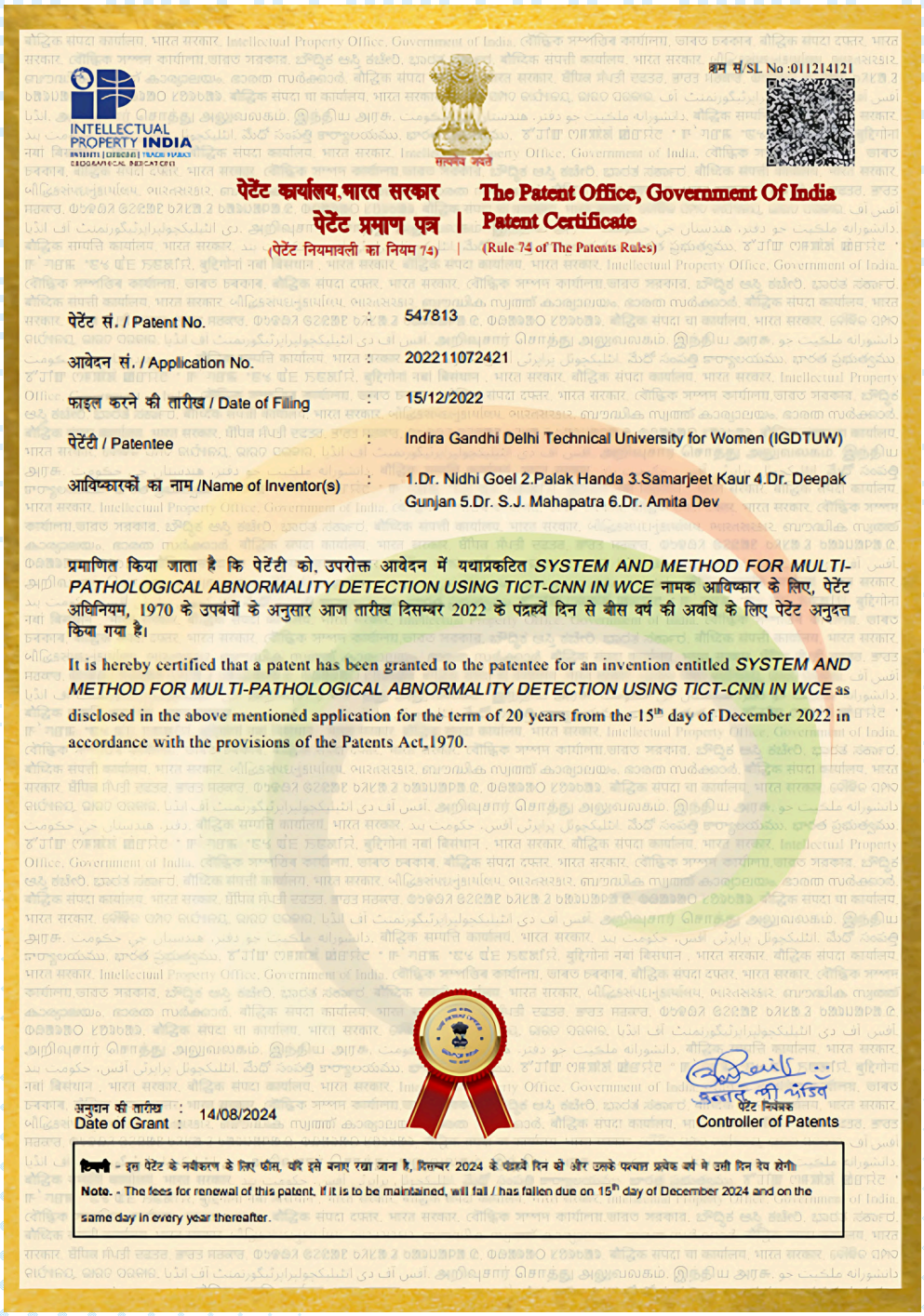
पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, जून 2024 के सत्रहवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 17th day of June 2024 and on the same day in every year thereafter.

SYSTEM AND METHOD FOR MULTI-PATHOLOGICAL ABNORMALITY DETECTION USING TICT-CNN IN WCE

INVENTOR: DR. NIDHI GOEL, DR. AMITA DEV, PALAK HANDA



INTELLECTUAL PROPERTY INDIA

क्रम सं/SL No :011214121

सत्यमेव जयते

पेटेंट कार्यालय,भारत सरकार | The Patent Office, Government Of India

पेटेंट प्रमाण पत्र | Patent Certificate

(पेटेंट नियमावली का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	547813
आवेदन सं. / Application No.	:	202211072421
फाइल करने की तारीख / Date of Filing	:	15/12/2022
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women (IGDTUW)
आविष्कारकों का नाम /Name of Inventor(s)	:	1.Dr. Nidhi Goel 2.Palak Handa 3.Samarjeet Kaur 4.Dr. Deepak Gunjan 5.Dr. S.J. Mahapatra 6.Dr. Amita Dev

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *SYSTEM AND METHOD FOR MULTI-PATHOLOGICAL ABNORMALITY DETECTION USING TICT-CNN IN WCE* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख दिसम्बर 2022 के पंद्रहवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *SYSTEM AND METHOD FOR MULTI-PATHOLOGICAL ABNORMALITY DETECTION USING TICT-CNN IN WCE* as disclosed in the above mentioned application for the term of 20 years from the 15th day of December 2022 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 14/08/2024
Date of Grant :

पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, दिसम्बर 2024 के पंद्रहवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 15th day of December 2024 and on the same day in every year thereafter.

A SYSTEM AND METHOD TO SCORE CAPSULE ENDOSCOPY FRAMES USING KODA [KOREA-CANADA] SCORING METHOD

INVENTOR: DR. NIDHI GOEL, DR. AMITA DEV, PALAK HANDA

INTELLECTUAL PROPERTY INDIA

क्रम सं/SL No :011198190

सत्यमेव जयते

पेटेंट कार्यालय भारत सरकार | **The Patent Office, Government Of India**

पेटेंट प्रमाण पत्र | **Patent Certificate**

(पेटेंट नियमावली का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	511453
आवेदन सं. / Application No.	:	202311037947
फाइल करने की तारीख / Date of Filing	:	02/06/2023
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women (IGDTUW)
आविष्कारकों का नाम /Name of Inventor(s)	:	1.Palak Handa 2.Dr. Nidhi Goel 3.Dr. Deepak Gunjan 4.Dr. Amita Dev

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *A SYSTEM AND METHOD TO SCORE CAPSULE ENDOSCOPY FRAMES USING KODA [KOREAN-CANADA] SCORING METHOD* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख जून 2023 के दूसरे दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *A SYSTEM AND METHOD TO SCORE CAPSULE ENDOSCOPY FRAMES USING KODA [KOREAN-CANADA] SCORING METHOD* as disclosed in the above mentioned application for the term of 20 years from the 2nd day of June 2023 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 16/02/2024
Date of Grant :

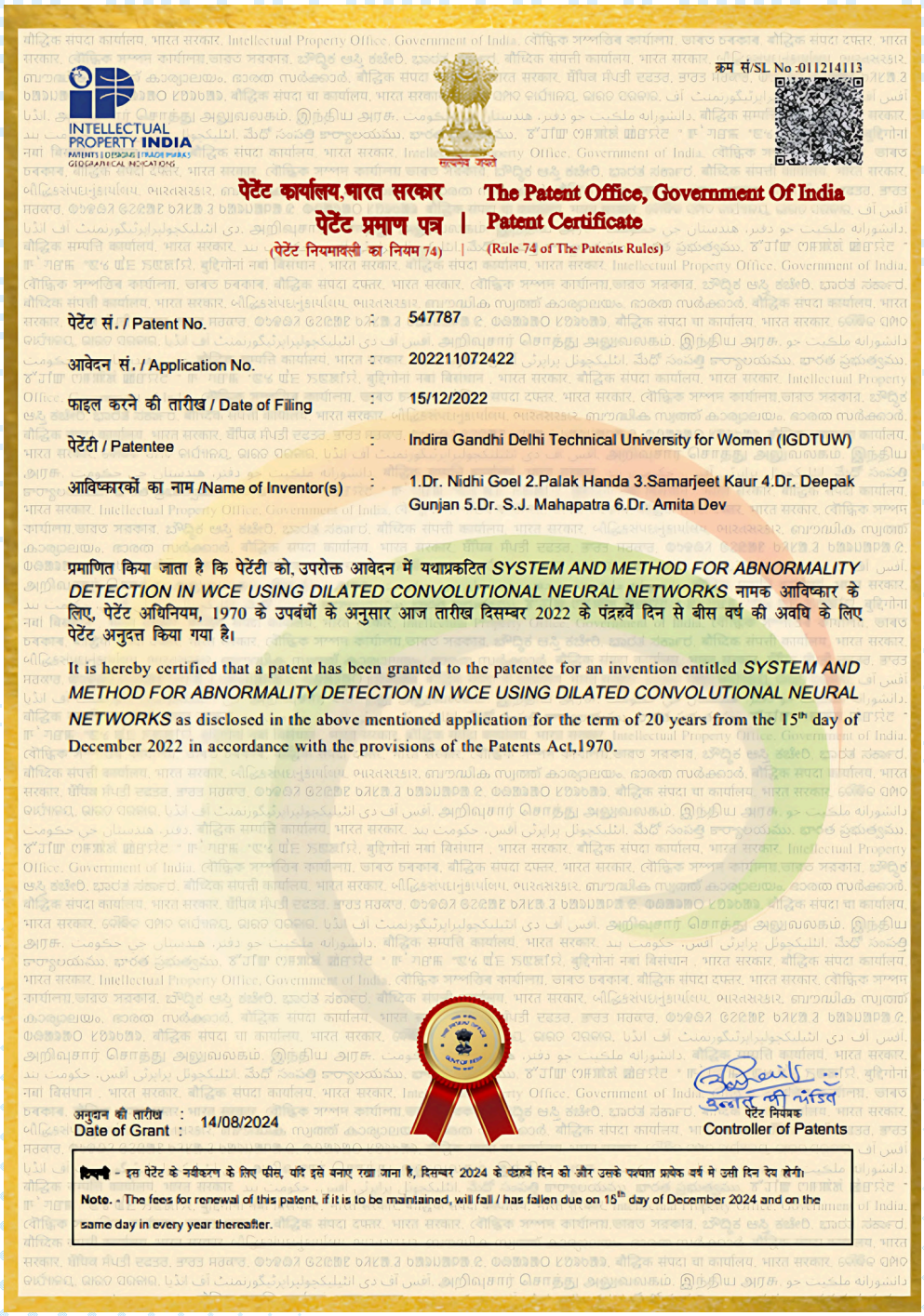
पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, जून 2025 के दूसरे दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 2nd day of June 2025 and on the same day in every year thereafter.

SYSTEM AND METHOD FOR ABNORMALITY DETECTION IN WCE USING DILATED CONVOLUTIONAL NEURAL NETWORKS

INVENTOR: DR. NIDHI GOEL, DR. AMITA DEV, PALAK HANDA



INTELLECTUAL PROPERTY INDIA
PATENT | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

क्रम सं/SL No :011214113

पेटेंट कार्यालय,भारत सरकार — The Patent Office, Government Of India

पेटेंट प्रमाण पत्र | Patent Certificate

(पेटेंट नियमावली का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	547787
आवेदन सं. / Application No.	:	202211072422
फाइल करने की तारीख / Date of Filing	:	15/12/2022
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women (IGDTUW)
आविष्कारकों का नाम /Name of Inventor(s)	:	1.Dr. Nidhi Goel 2.Palak Handa 3.Samarjeet Kaur 4.Dr. Deepak Gunjan 5.Dr. S.J. Mahapatra 6.Dr. Amita Dev

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *SYSTEM AND METHOD FOR ABNORMALITY DETECTION IN WCE USING DILATED CONVOLUTIONAL NEURAL NETWORKS* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख दिसम्बर 2022 के पंद्रहवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *SYSTEM AND METHOD FOR ABNORMALITY DETECTION IN WCE USING DILATED CONVOLUTIONAL NEURAL NETWORKS* as disclosed in the above mentioned application for the term of 20 years from the 15th day of December 2022 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 14/08/2024
Date of Grant :

पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, दिसम्बर 2024 के 15वें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 15th day of December 2024 and on the same day in every year thereafter.

A METHOD OF DETECTING PAIN FROM FACIAL EXPRESSIONS USING DOMAIN ADAPTATION TECHNIQUE

INVENTOR: DR. NIDHI GOEL, DR. AMITA DEV

INTELLECTUAL PROPERTY INDIA

क्रम सं/SL No :011215221

सत्यमेव जयते

पेटेंट कार्यालय,भारत सरकार | The Patent Office, Government Of India

पेटेंट प्रमाण पत्र | Patent Certificate

(पेटेंट नियमावली का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	550922
आवेदन सं. / Application No.	:	202211072945
फाइल करने की तारीख / Date of Filing	:	16/12/2022
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women (IGDTUW)
आविष्कारकों का नाम /Name of Inventor(s)	:	1.Dr. Nidhi Goel 2.Dr. Neeru Rathee 3.Mr. Sagar 4.Mr. Ashutosh 5.Dr. Amita Dev

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *A METHOD OF DETECTING PAIN FROM FACIAL EXPRESSIONS USING DOMAIN ADAPTATION TECHNIQUE* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख दिसम्बर 2022 के सोलहवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *A METHOD OF DETECTING PAIN FROM FACIAL EXPRESSIONS USING DOMAIN ADAPTATION TECHNIQUE* as disclosed in the above mentioned application for the term of 20 years from the 16th day of December 2022 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 24/09/2024
Date of Grant :

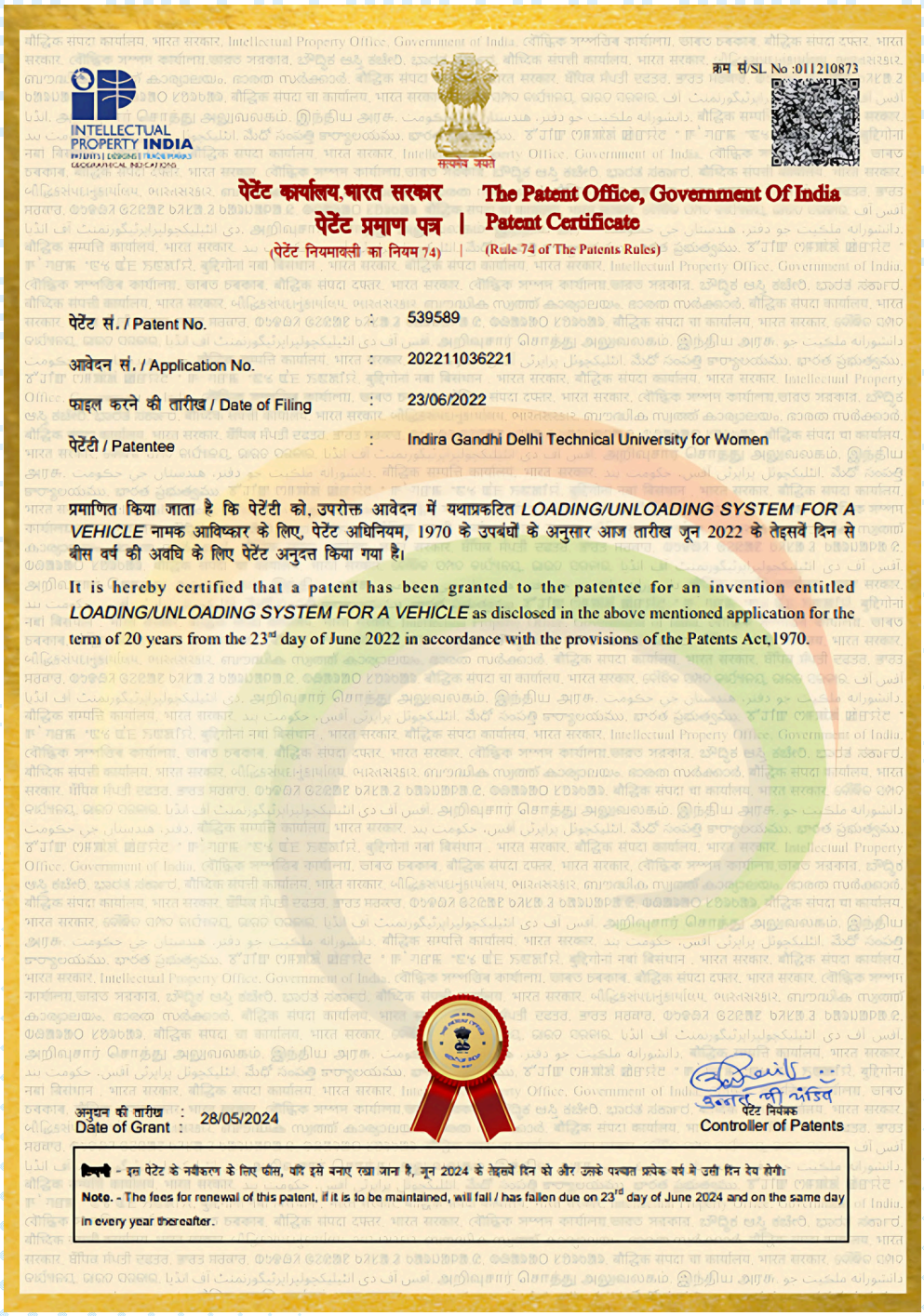
पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, दिसम्बर 2024 के सोलहवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 16th day of December 2024 and on the same day in every year thereafter.

LOADING/UNLOADING SYSTEM FOR A VEHICLE

INVENTOR: DR. VIVEAK KUMAR CHAWLA, DR. AMITA DEV, DR. VIJAY KUMAR ARORA, SONAL MEHTA, SHREYA VAJPAYEE, TANYA PAUL, CHARU



INTELLECTUAL PROPERTY INDIA

क्रम सं/SL No :011210873

सत्यमेव जयते

पेटेंट कार्यालय,भारत सरकार | The Patent Office, Government Of India

पेटेंट प्रमाण पत्र | Patent Certificate

(पेटेंट नियमावली का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No. : 539589

आवेदन सं. / Application No. : 202211036221

फाइल करने की तारीख / Date of Filing : 23/06/2022

पेटेंटी / Patentee : Indira Gandhi Delhi Technical University for Women

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *LOADING/UNLOADING SYSTEM FOR A VEHICLE* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख जून 2022 के तेइसवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *LOADING/UNLOADING SYSTEM FOR A VEHICLE* as disclosed in the above mentioned application for the term of 20 years from the 23rd day of June 2022 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 28/05/2024
Date of Grant :

पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, जून 2024 के तेइसवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 23rd day of June 2024 and on the same day in every year thereafter.

ADJUSTABLE PEDAL ASSEMBLY FOR VEHICLES

INVENTOR: DR. VIVEAK KUMAR CHAWLA, DR. R.K. SINGH, DR. AMITA DEV, KHUSHI RAJPUT, RINKI GUPTA, RITIKA AGGARWAL

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

क्रम सं/SL No :011215425

पेटेंट कार्यालय,भारत सरकार
पेटेंट प्रमाण पत्र |
(पेटेंट नियमावली का नियम 74)

The Patent Office, Government Of India
Patent Certificate
(Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No. : 551496

आवेदन सं. / Application No. : 202211008514

फाइल करने की तारीख / Date of Filing : 18/02/2022

पेटेंटी / Patentee : Indira Gandhi Delhi Technical University for Women

आविष्कारकों का नाम /Name of Inventor(s) : 1.Prof. Dr. Amita Dev 2.Prof. Dr. R.K. Singh 3.Dr. Viveak Kumar Chawla 4.Khushi Rajput 5.Rinki Gupta 6.Ritika Aggarwal

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *ADJUSTABLE PEDAL ASSEMBLY FOR VEHICLES* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख फरवरी 2022 के अठारहवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *ADJUSTABLE PEDAL ASSEMBLY FOR VEHICLES* as disclosed in the above mentioned application for the term of 20 years from the 18th day of February 2022 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 30/09/2024
Date of Grant :

पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, फरवरी 2024 के अठारहवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 18th day of February 2024 and on the same day in every year thereafter.

ADJUSTABLE STEERING SYSTEM FOR FOUR WHEELER VEHICLES

INVENTOR: DR. VIVEAK KUMAR CHAWLA, DR. AMITA DEV, VAISHNAVI ROUT, RINKI GUPTA, PRIYA GARG, AMBIKA MATHUR

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS | GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

क्रम सं/SL No :011213950

पेटेंट कार्यालय,भारत सरकार
पेटेंट प्रमाण पत्र |
(पेटेंट नियमावली का नियम 74)

The Patent Office, Government Of India
Patent Certificate
(Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	547352
आवेदन सं. / Application No.	:	202311054422
फाइल करने की तारीख / Date of Filing	:	13/08/2023
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women
आविष्कारकों का नाम /Name of Inventor(s)	:	1.Dr. Amita Dev 2.Dr. Viveak Kumar Chawla 3.Vaishnavi Rout 4.Rinki Gupta 5.Priya Garg 6.Ambika Mathur

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *ADJUSTABLE STEERING SYSTEM FOR FOUR-WHEELER VEHICLES* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख अगस्त 2023 के तेरहवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *ADJUSTABLE STEERING SYSTEM FOR FOUR-WHEELER VEHICLES* as disclosed in the above mentioned application for the term of 20 years from the 13th day of August 2023 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 08/08/2024
Date of Grant :

उनात् की गोंडल
पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, अगस्त 2025 के तेरहवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।
Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 13th day of August 2025 and on the same day in every year thereafter.

THERMAL- POWER BASED ELECTRICITY GENERATION SYSTEM

INVENTOR: DR. VIVEAK KUMAR CHAWLA, DR. BRIJESH KUMAR, DR. AMITA DEV, VAISHNAVI ROUT, RINKI GUPTA

INTELLECTUAL PROPERTY INDIA

क्रम सं/SL No :011211671

सत्यमेव जयते

पेटेंट कार्यालय,भारत सरकार | **The Patent Office, Government Of India**

पेटेंट प्रमाण पत्र | **Patent Certificate**

(पेटेंट नियमावली का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	541518
आवेदन सं. / Application No.	:	202311042177
फाइल करने की तारीख / Date of Filing	:	23/06/2023
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women
आविष्कारकों का नाम /Name of Inventor(s)	:	1.Dr. Amita Dev 2.Dr. Brijesh Kumar 3.Dr. Viveak Kumar Chawla 4.Rinki Gupta 5.Vaishnavi Rout

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *THERMAL POWER-BASED ELECTRICITY GENERATION SYSTEM* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख जून 2023 के तेइसवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *THERMAL POWER-BASED ELECTRICITY GENERATION SYSTEM* as disclosed in the above mentioned application for the term of 20 years from the 23rd day of June 2023 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 12/06/2024
Date of Grant :

पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, जून 2025 के तेइसवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 23rd day of June 2025 and on the same day in every year thereafter.

AN APPARATUS TO HARNESS THE ENGINE POWER BY MODIFIED CONSTANT MESHING

INVENTOR: DR. VIVEAK KUMAR CHAWLA, DR. AMITA DEV, VAISHNAVI ROUT, KHUSHI RAJPUT, EKTA YADAV, PRIYA GARG

INTELLECTUAL PROPERTY INDIA

सत्यमेव जयते

क्रम सं/SL No :011190167

पेटेंट कार्यालय,भारत सरकार — The Patent Office, Government Of India

पेटेंट प्रमाण पत्र | Patent Certificate

(पेटेंट नियमावली का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No. : 493489

आवेदन सं. / Application No. : 202311014339

फाइल करने की तारीख / Date of Filing : 03/03/2023

पेटेंटी / Patentee : Indira Gandhi Delhi Technical University for Women (IGDTUW)

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *AN APPARATUS TO HARNESS THE ENGINE POWER BY MODIFIED CONSTANT MESHING* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख मार्च 2023 के तीसरे दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *AN APPARATUS TO HARNESS THE ENGINE POWER BY MODIFIED CONSTANT MESHING* as disclosed in the above mentioned application for the term of 20 years from the 3rd day of March 2023 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 03/01/2024
Date of Grant :

पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, मार्च 2025 के तीसरे दिन को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 3rd day of March 2025 and on the same day in every year thereafter.

A GEARBOX DEVICE TO HARNESS THE ENGINE POWER THROUGH CONSTANT MESHING IN AUTOMOBILES

INVENTOR: DR. VIVEAK KUMAR CHAWLA, DR. AMITA DEV, VAISHNAVI ROUT, KHUSHI RAJPUT, EKTA YADAV, PRIYA GARG

INTELLECTUAL PROPERTY INDIA

क्रम सं/SL No :011190545

पेटेंट कार्यालय,भारत सरकार
पेटेंट प्रमाण पत्र |
(पेटेंट नियमावली का नियम 74)

The Patent Office, Government Of India
Patent Certificate
(Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	494337
आवेदन सं. / Application No.	:	202311014091
फाइल करने की तारीख / Date of Filing	:	02/03/2023
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women (IGDTUW)

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *A GEARBOX DEVICE TO HARNESS THE ENGINE POWER THROUGH CONSTANT MESHING IN AUTOMOBILES* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख मार्च 2023 के दूसरे दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *A GEARBOX DEVICE TO HARNESS THE ENGINE POWER THROUGH CONSTANT MESHING IN AUTOMOBILES* as disclosed in the above mentioned application for the term of 20 years from the 2nd day of March 2023 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 04/01/2024
Date of Grant :

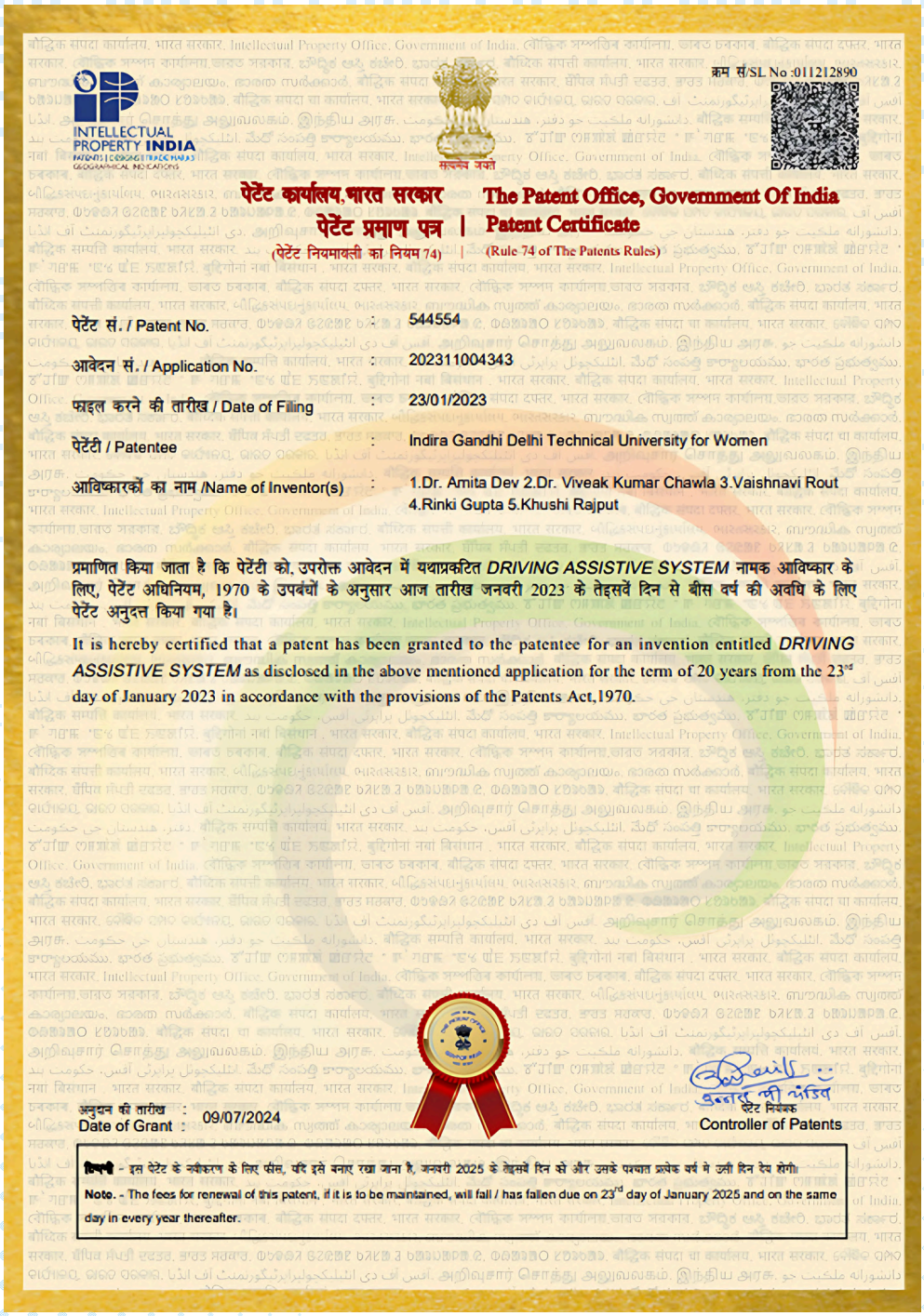
पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, मार्च 2025 के दूसरे दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 2nd day of March 2025 and on the same day in every year thereafter.

DRIVING ASSISTIVE SYSTEM

INVENTOR: DR. VIVEAK KUMAR CHAWLA, DR. AMITA DEV, VAISHNAVI ROUT, KHUSHI RAJPUT, PRIYA GARG



INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS | GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

क्रम सं/SL No :011212890

पेटेंट कार्यालय,भारत सरकार
पेटेंट प्रमाण पत्र |
(पेटेंट नियमावली का नियम 74)

The Patent Office, Government Of India
Patent Certificate
(Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	544554
आवेदन सं. / Application No.	:	202311004343
फाइल करने की तारीख / Date of Filing	:	23/01/2023
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women
आविष्कारकों का नाम /Name of Inventor(s)	:	1.Dr. Amita Dev 2.Dr. Viveak Kumar Chawla 3.Vaishnavi Rout 4.Rinki Gupta 5.Khushi Rajput

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *DRIVING ASSISTIVE SYSTEM* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख जनवरी 2023 के तेइसवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *DRIVING ASSISTIVE SYSTEM* as disclosed in the above mentioned application for the term of 20 years from the 23rd day of January 2023 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 09/07/2024
Date of Grant :

उनार जी जांडिल
पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, जनवरी 2025 के तेइसवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 23rd day of January 2025 and on the same day in every year thereafter.

WETTABILITY ENHANCED MGO ENCAPSULATED HYDROXYAPATITE AND PREPARATION METHOD THEREOF

INVENTOR: DR. SUBHASH SINGH, DR. AMITA DEV

INTELLECTUAL PROPERTY INDIA

क्रम सं/SL No :011215181

सत्यमेव जयते

पेटेंट कार्यालय,भारत सरकार | The Patent Office, Government Of India

पेटेंट प्रमाण पत्र | Patent Certificate

(पेटेंट नियमावली का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No. : 550792

आवेदन सं. / Application No. : 202311076493

फाइल करने की तारीख / Date of Filing : 09/11/2023

पेटेंटी / Patentee : Indira Gandhi Delhi Technical University for Women (IGDTUW)

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *WETTABILITY ENHANCED MGO ENCAPSULATED HYDROXYAPATITE AND PREPARATION METHOD THEREOF* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख नवम्बर 2023 के नौवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *WETTABILITY ENHANCED MGO ENCAPSULATED HYDROXYAPATITE AND PREPARATION METHOD THEREOF* as disclosed in the above mentioned application for the term of 20 years from the 9th day of November 2023 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 23/09/2024
Date of Grant :

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टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, नवम्बर 2025 के नौवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 9th day of November 2025 and on the same day in every year thereafter.

WETTABILITY ENHANCED MGO ENCAPSULATED HYDROXYAPATITE AND PREPARATION METHOD THEREOF

INVENTOR: DR. SUBHASH SINGH, DR. AMITA DEV

INTELLECTUAL PROPERTY INDIA

सत्यमेव जयते

क्रम सं/SL No :011215181

पेटेंट कार्यालय,भारत सरकार | **The Patent Office, Government Of India**

पेटेंट प्रमाण पत्र | **Patent Certificate**

(पेटेंट नियमावली का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	550792
आवेदन सं. / Application No.	:	202311076493
फाइल करने की तारीख / Date of Filing	:	09/11/2023
पेटेंटी / Patentee	:	Indira Gandhi Delhi Technical University for Women (IGDTUW)

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *WETTABILITY ENHANCED MGO ENCAPSULATED HYDROXYAPATITE AND PREPARATION METHOD THEREOF* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख नवम्बर 2023 के नौवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

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अनुदान की तारीख : 23/09/2024
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टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, नवम्बर 2025 के नौवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 9th day of November 2025 and on the same day in every year thereafter.

DETAILS OF UG/PG INCENTIVE AWARDS

BIOGRAPHIES OF UG/PG INCENTIVE AWARDEES

Ms. Abha Rawat

MS. ABHA RAWAT is currently a Software Development Engineer I at JP Morgan Chase & Co. She graduated from Indira Gandhi Delhi Technical University for Women with B.Tech Computer Science & Engineering in 2023. Her research interest include machine learning, deep learning and health informatics.

Ms. Anjali Singh

MS. ANJALI SINGH is a B.Tech Computer Science & Engineering graduate from Indira Gandhi Delhi Technical University for Women in 2023. She currently serves as a Software Development Engineer I at JP Morgan Chase & Co, specializing in cloud technologies and backend development. Her research interests include machine learning, deep learning, quantum mechanics and health informatics.

Ms. Mitali Laroia

MS. MITALI LAROIA graduated in 2023 with a B.Tech degree in Computer Science & Engineering from Indira Gandhi Delhi Technical University for Womn. She has experience in the domain of backend engineering and DevOps. She is presently employed as Software Development Engineer I at JP Morgan Chase & Co. Her research interest include machine learning, deep learning and health informatics.

BIOGRAPHIES OF UG/PG INCENTIVE AWARDEES

Ms. Tanvi Bisht

MS. TANVI BISHT is an aspiring computer scientist with a keen interest in artificial intelligence, machine learning, and cryptography. She is currently pursuing a Bachelor of Technology in Computer Science and Engineering (Artificial Intelligence) at Indira Gandhi Delhi Technical University for Women (IGDTUW), where she has maintained an outstanding academic record with a GPA of 9.70. Tanvi has gained hands-on research experience through her internship at the Defence Research and Development Organisation (DRDO), where she explored cryptanalysis techniques and applied deep learning models to analyze stream ciphers. She is also an upcoming Summer Intern at LinkedIn, where she looks forward to contributing her technical expertise and expanding her industry experience. Her research work has been published in SN Computer Science and was recognized with the Best Paper Award at the International Conference on Artificial Intelligence and Applications (ICAIA) 2024. She has also been part of the American Express Campus Discovery Program and has received prestigious scholarships, including the Mrs. Phool Devi Scholarship and the Prime Minister's Scholarship Scheme. Beyond academics, Tanvi has led multiple projects, including VigilNets, a web application for fire incident monitoring, and Trending Tweets Predictor, a machine learning model for analyzing trending hashtags. She actively contributes to the AWS Cloud Club IGDTUW and serves as the Creative Head of Techno literati IGDTUW. With expertise in Python, Java, SQL, and various web development frameworks, Tanvi is passionate about leveraging technology for impactul solutions. Her leadership skills, technical acumen, and research experience make her a promising talent in the field of AI and cybersecurity.

BIOGRAPHIES OF UG/PG INCENTIVE AWARDEES

Ms. Muskan Singh

MS. MUSKAN SINGH is an aspiring computer scientist and AI researcher currently pursuing a Bachelor of Technology in Computer Science and AI at Indira Gandhi Delhi Technical University for Women (IGDTUW), where she has maintained an impressive SGPA of 9.52. With a strong foundation in machine learning, deep learning, cybersecurity, and software engineering, she has cultivated expertise in Python, Java, SQL, R, and frameworks like PyTorch, Scikit-learn, and Flask. Muskan has gained hands-on experience through multiple research internships. She worked as a student intern at IGDTUW's Center of Excellence in AI, where she contributed to Twitter trend prediction research using machine learning models such as Random Forest and Naïve Bayes. Additionally, during her summer research internship at DRDO, she worked on benchmarking the robustness of image classification models under corruption and perturbations for object detection applications. Her projects reflect a diverse skill set, ranging from automated bidding pipelines and financial planning tools to NLP-based sentiment analysis for restaurant reviews. She has also contributed to impactful research, having presented three research papers at esteemed conferences like ICICC and AIST, covering topics such as Twitter trend analysis and fine-tuning FLAN-T5 for non-toxic text summarization. Recognized for her excellence, Muskan has received prestigious awards, including the Google Generation Scholarship 2024, the Reliance Foundation UG Scholarship 2023, and Best Paper & Best Presenter awards at multiple international conferences. She was also part of the top 12 teams in AMEX Makeathon 2024, a nationwide hackathon. Beyond academics, she is dedicated to social impact as a volunteer at Warriors Without Cause NGO, where she leads education and awareness drives in slum areas. She also serves as a technical coordinator at AWS Cloud Club IGDTUW and an event organizer for IGDTUW MUN. This summer, Muskan will be joining Salesforce as a Summer Intern, furthering her experience in cuţng-edge soŌware development and AI applicaϴons.

BIOGRAPHIES OF UG/PG INCENTIVE AWARDEES

Ms. Ruchi Bhatt

MS. RUCHI BHATT received her B.Tech. (Computer Science & Engineering) degree from Manav Rachna University, Faridabad, Haryana, India, in 2016, has earned her M.Tech in Artificial Intelligence and Data Science from Indira Gandhi Delhi Technical University for Women, Delhi, India in July' 2024. Since Aug' 2024, she has been working as an Assistant Professor in the Department of Information Technology and Engineering at Maharaja Agrasen Institute of Technology, Delhi, India. Her specializations include Artificial Intelligence, NLP, and Network Security.

Ms. Ritika Pahwa

MS. RITIKA PAHWA is currently working as a Software Development Engineer, utilizing modern technologies such as Go to design and build efficient, customer-centric backend solutions. She has over nine months of full-time experience in the industry, complemented by a six-month internship and a three-month tenure as a contributor to the Google Summer of Code (GSoC) program. She graduated from Indira Gandhi Delhi Technical University for Women (IGDTUW) in 2024 with a Bachelor of Technology in Computer Science and Engineering. Ritika loves tinkering around with open-source code bases and understanding their nuances. She has authored "Knowledge distillation-based approach for object detection in thermal images during adverse weather conditions" after diving deeper into Meta's open-source framework Detectron2. The paper was published in a Springer journal in 2024. Ritika is passionate about mobile development and optimizations, as well as algorithms and generative AI. In addition to her academic and professional pursuits, she enjoys playing chess, documenting her journey through blogs, and is an avid reader.

BIOGRAPHIES OF UG/PG INCENTIVE AWARDEES

MS. SHRUTI

MS. SHRUTI is a GET in TATA MOTORS. She completed her Bachelor of Technology in Computer Science and Engineering from Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi, in 2024. During her academic career, Shruti's research focused on the Knowledge Distillation of Detectron2, exploring techniques to enhance the efficiency and performance of this object detection framework. Furthermore, Shruti conducted research on "IoT based child security monitoring system at home". This research demonstrated her engagement with the practical applications and implications of emerging technologies in industrial settings. Shruti's background in computer science, coupled with her research experience in knowledge distillation and the Industrial Internet of Things, showcases her strong technical foundation.

MS. SAUMYA

MS. SAUMYA is a Software Engineer at Google. She completed her Bachelor of Technology in Computer Science and Engineering from Indira Gandhi Delhi Technical University for Women (IGDTUW), Delhi, in 2024. During her academic career, Saumya's research focused on the Knowledge Distillation of Detectron2, exploring techniques to enhance the efficiency and performance of this object detection framework. Furthermore, Saumya conducted research on the Benefits and Challenges of using the Industrial Internet of Things (IIoT). This research was published, demonstrating her engagement with the practical applications and implications of emerging technologies in industrial settings. Saumya's background in computer science, coupled with her research experience in knowledge distillation and the Industrial Internet of Things, showcases her strong technical foundation and her contributions to technological research. Her current role as a Software Engineer at Google further solidifies her expertise in the field.

ABSTRACTS

DETECTING THE UNDETECTABLE: GAN-BASED STRATEGIES FOR NETWORK INTRUSION DETECTION

Ruchi Bhatt & Gaurav Indra

This study addresses the challenge of enhancing network security by proposing a novel intrusion detection system using Generative Adversarial Networks. Traditional intrusion detection system often fail to keep up with rapidly evolving cyber threats. Our approach integrates Generative Adversarial Networks to dynamically learn and adapt to both genuine and adversarial network traffic patterns. Using the KDD Cup 1999 dataset for validation, we design a sophisticated Generative Adversarial Network architecture with a generator and discriminator to improve the resilience of intrusion detection system. Our experimental results demonstrate the model's effectiveness, evaluated through metrics such as F1 score, accuracy, precision, and recall. This research advances the state-of-the-art in cybersecurity by showcasing the potential of Generative Adversarial Networks to fortify intrusion detection system against evolving threats, underscoring the necessity for adaptive defense mechanisms in modern network security.

For details refer to:https://doi.org/10.1007/s41870-024-02172-7

KNOWLEDGE DISTILLATION-BASED APPROACH FOR OBJECT DETECTION IN THERMAL IMAGES DURING ADVERSE WEATHER CONDITIONS

Ritika Pahwa, Shruti Yadav, Saumya & Ravinder Megavath

In today's technology landscape, systems must adapt to diverse conditions to be practically useful. Thermal imaging's intersection with adverse weather presents a challenge for existing heavy networks designed for RGB images. This research addresses this gap by using knowledge distillation to optimise networks for thermal imaging in challenging weather. Current networks struggle with interpreting thermal images effectively in adverse conditions like fog or rain. Through knowledge distillation, our work aims to enhance these networks, ensuring compatibility and efficiency with thermal imaging. This effort holds promise for enhancing object detection in thermal images during adverse weather, benefiting surveillance systems, improving safety in self-driving vehicles under harsh conditions, and aiding search and rescue operations with limited visibility. This research doesn't just refine networks; it empowers technology to excel in adverse conditions, promising practical applications that enhance safety, efficiency, and reliability across various technological domains

For details refer to:https://doi.org/10.1007/s41870-024-02107-2

DETERMINING TWITTER TRENDING HASHTAGS AND SENTIMENTS ASSOCIATED VIA MACHINE LEARNING APPROACHES

Tanvi Bisht, Muskan Singh & Shweta Singhal

Social media platforms such as Twitter serve as a powerful tool for real-time information dissemination and worldwide communication, shaping public opinions and providing a platform for diverse voices to be heard. The current study proposes methods to identify trending hashtags on Twitter over a six-month period (June to October 2021) and analyze the sentiment dynamics linked to these hashtags. In order to carry out trend analysis three classification algorithms—Naive Bayes, Gradient Boosting Decision Tree, and Random Forest—were evaluated. The results indicate that the Random Forest model outperformed the other two algorithms in accurately identifying trending hashtags. In addition to this, a comprehensive sentiment analysis was conducted using both rule-based and lexicon-based approaches. The VADER sentiment analysis was utilized as the foundation for the Support Vector Machine classifier which achieved an accuracy of 91.84%, while the TextBlob library provided additional sentiment insights. The majority of research results, leaned towards neutrality, indicating challenges in capturing sentiment complexities present in Twitter conversations. The findings highlight the effectiveness of machine learning approaches, while also recognizing the potential for deep learning techniques to enhance sentiment analysis in future research.

For details refer to:https://doi.org/10.1007/s42979-024-03387-y

AUTISM SPECTRUM DISORDER SCREENING ON HOME VIDEOS USING DEEP LEARNING

Anjali Singh, Abha Rawat, Mitali Laroia, Seeja K. R.

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by difficulty in social interactions, communication, and repetitive behaviors. Protocols like ADOS (Autism Diagnostic Observation Schedule) and ADI-R (Autism Diagnostic Interview Revised) are used by experts to assess the subject's behavior which is time-consuming. Over the decade, researchers have studied the application of various Machine Learning techniques for ASD diagnosis through facial feature analysis, eye movement tracking, questionnaire analysis, functional magnetic resonance imaging (fMRI) analysis, etc. However, these techniques are not helpful for the parent or guardian of the child to perform an initial screening. This research proposes a novel deep learning model to diagnose ASD using general videos of the subject performing some tasks with the parent/guardian. Since there is no publicly available dataset on ASD videos, a dataset is created by collecting the videos of autistic children performing some activities with parents/guardians from YouTube from different demographic locations.

These videos are then converted to skeletal key points to extract the child's engagement and social interaction in a given task. The proposed CNN-LSTM model is trained on 80% of the collected videos and then tested on the remaining 20%. The experiment results on various combinations of pre-trained CNN models and LSTM/BiLSTM show that the proposed model can be used as an initial autism screening tool. Among the different combinations, the MobileNet and Bi-LSTM combo achieved the best test accuracy of 84.95% with 89% precision, recall and F1-score.

For details refer to: https://doi.org/10.5815/ijigsp.2024.04.08

A DEEP LEARNING-BASED NEURAL STYLE TRANSFER OPTIMIZATION APPROACH

Priyanshi Sethi, Rhythm Bhardwaj, Nonita Sharma, Deepak Kumar Sharma

Neural style transfer is used as an optimization technique that combines two different images – a content image and a style reference image – to produce an output image that retains the appearance of the content image but has been modified to match the actual style of the style reference image. This is achieved by fine-tuning the output image to match the style reference images and the statistics for both content and style in the content image. These statistics are extracted from the images using a convolutional network. Primitive models such as WCT were improved upon by models such as PhotoWCT, whose spatial and temporal limitations were improved upon by Deep Photo Style Transfer. Eventually, wavelet transforms were introduced to perform photorealistic style transfer. A wavelet-corrected transfer based on whitening and colouring transforms, i.e., WCT2, was proposed that allowed the preservation of core content and eliminated the need for any post-processing steps and constraints. A model called Domain-Aware Universal Style Transfer also came into the picture. It supported both artistic and photorealistic style transfer. This study provides an overview of the neural style transfer technique. The recent advancements and improvements in the field, including the development of multi-scale and adaptive methods and the integration of semantic segmentation, are discussed and elaborated upon. Experiments have been conducted to determine the roles of encoder-decoder architecture and Haar wavelet functions. The optimum levels at which these can be leveraged for effective style transfer are ascertained. The study also highlights the contrast between VGG-16 and VGG-19 structures and analyzes various performance parameters to establish which works more efficiently for particular use cases. On comparing quantitative metrics across Gatys, AdaIN, and WCT, a gradual upgrade was seen across the models, as AdaIN was performing 99.92 percent better than the primitive Gatys model in terms of processing time. Over 1000 iterations, we found that VGG-16 and VGG-19 have comparable style loss metrics, but there is a difference of 73.1 percent in content loss. VGG-19, however, is displaying a better overall performance since it can keep both content and style losses at bay.

For details refer to:https://doi.org/10.3233/IDA-230765

ENHANCED IMAGE FORGERY DETECTION USING A HYBRID APPROACH: INTEGRATION OF ELA, CNN, AND XGBOOST

Priyanshi Sethi, Rhythm Bhardwaj, Nonita Sharma, Deepak Kumar Sharma

Neural style transfer is used as an optimization technique that combines two different images – a content image and a style reference image – to produce an output image that retains the appearance of the content image but has been modified to match the actual style of the style reference image. This is achieved by fine-tuning the output image to match the style reference images and the statistics for both content and style in the content image. These statistics are extracted from the images using a convolutional network. Primitive models such as WCT were improved upon by models such as PhotoWCT, whose spatial and temporal limitations were improved upon by Deep Photo Style Transfer. Eventually, wavelet transforms were introduced to perform photorealistic style transfer. A wavelet-corrected transfer based on whitening and colouring transforms, i.e., WCT2, was proposed that allowed the preservation of core content and eliminated the need for any post-processing steps and constraints. A model called Domain-Aware Universal Style Transfer also came into the picture. It supported both artistic and photorealistic style transfer. This study provides an overview of the neural style transfer technique. The recent advancements and improvements in the field, including the development of multi-scale and adaptive methods and the integration of semantic segmentation, are discussed and elaborated upon. Experiments have been conducted to determine the roles of encoder-decoder architecture and Haar wavelet functions. The optimum levels at which these can be leveraged for effective style transfer are ascertained. The study also highlights the contrast between VGG-16 and VGG-19 structures and analyzes various performance parameters to establish which works more efficiently for particular use cases. On comparing quantitative metrics across Gatys, AdaIN, and WCT, a gradual upgrade was seen across the models, as AdaIN was performing 99.92 percent better than the primitive Gatys model in terms of processing time. Over 1000 iterations, we found that VGG-16 and VGG-19 have comparable style loss metrics, but there is a difference of 73.1 percent in content loss. VGG-19, however, is displaying a better overall performance since it can keep both content and style losses at bay.

For details refer to: https://doi.org/10.3233/IDA-230765

ENHANCED IMAGE FORGERY DETECTION USING A HYBRID APPROACH: INTEGRATION OF ELA, CNN, AND XGBOOST

Sukhmani Kaur, Nityaa Sinha, Priyasha Jain, Shruti Koli, Arun Sharma, and Anjali Lathwal

In light of the escalating prevalence of digital image forgery facilitated by advanced editing tools and widespread sharing on online platforms, the demand for effective forgery detection techniques has surged. This research introduces an approach to digital image forgery detection, employing a multi-stage architecture involving ELA (Error Level Analysis), CNN (Convolutional Neural Networks), and XGBoost. The ELA technique is initially applied to identify tampered areas within an image, followed by CNN for feature extraction. The feature vectors are then fed into an XGBoost classifier, categorizing images as either authentic or forged. This multi-stage process works towards enhancing the detection accuracy and efficiency of forged image detection. The proposed algorithm achieved notable accuracy levels of 90.83%, 96.82%, and 82.82% on the CASIA v1, CASIA v2, and MISD datasets respectively.

For details refer to: https://doi.org/10.23940/ijpe.24.06.p4.367378

GLIMPSES OF 3RD RESEARCH EXCELLENCE AWARDS

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