December 2023

Vol No. 12

अनुसंधान

(KIET Research Magazine)

Dr. Ramji Lal
General Manager
Analytical Research and Development,
Mankind Research Centre
Gurugram, Haryana, India

Research and Development
KIET Group of Institution
Delhi-NCR, Ghaziabad, Uttar Pradesh, India-201206

KIET – A GLANCE

Overview

KIET Group of Institutions (KIET) was established in 1998 at Ghaziabad (Delhi-NCR) with an annual intake of 180 students. It is an AICTE-approved Institution affiliated to Dr. A.P.J Abdul Kalam Technical University (AKTU), Lucknow (formerly UPTU). KIET offers UG & PG courses in four disciplines i.e., Engineering, MBA, MCA & Pharmacy. With the glorious legacy of 25 years, the Institute now has 6800+ students and is empowered with 350+ highly qualified full-time faculty to nurture our students. Institute credentials and Centers of Excellence can be viewed @ our website www.kiet.edu.

The Institute has NAAC accreditation status with an 'A+' Grade and all its eligible programs are NBA accredited. The effort of the institute in imparting technical education has been recognized in terms of achieving 88th rank in the Pharmacy discipline, Rank Band (151-200) for Engineering and Innovation (51-100) Rank band in the National Institutional Ranking Framework (NIRF) - India Ranking 2023 released by Ministry of Education, GOI. The Institute has to its credit QS-I GAUGE 'Diamond' rating and Scientific and Industrial Research Organization (SIRO) recognition by the Department of Scientific and Industrial Research (DSIR) etc. The Institute also has a Technology Business Incubator (TBI) set up in association with NSTEDB, DST, Govt. of India to promote Innovation and Entrepreneurship in the Institute and the adjoining areas. Since its inception 125 incubate companies have established their venture in KIET-TBI. Presently 36 nos. incubate are operational.

With a rich alumni base of 19000+ students spread in all the nooks and corners of the world, the KIET Group of Institutions is moving efficiently towards its vision of shaping young minds with skill-oriented & value-based education as these alumni serve the dual purpose of mentoring the present students, as well as opening new doors for them.

Assistant Dean, Promotion & Implementation of Sustainable Development in Research

Dr. Minakshi Karwal

Associate Prof. (AS)

Assistant Dean, Student Research Promotion in KIET

Dr. Shubham Shukla

Associate Prof. (ECE)

Assistant Dean, Research Quality Assurance

Dr. Himanshu Chaudhary

Assistant Prof. (ECE)

Assistant Dean, Industrial & Academia Research Collaboration & Promotion

Dr. Brijesh Singh

Associate Prof. (EN)

Assistant Dean, Intellectual Property Right (IPR)

Dr. Richa Goel

Associate Prof. (KSOP)

Member Secretary (Intellectual Property Right Committee)

Ms. Surbhi Kamboj

Assistant Prof. (KSOP)

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Prof. & Addl. HoD (AS)

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Dr. Kunal Bisht, Assistant Prof., Civil Engineering

Dr. Harsh Khatter, Assistant Prof., Computer Science

Dr. Varun Gupta, Assistant Prof., Electrical and Electronics Engineering

Dr. Minakshi Tyagi, Assistant Prof., School of Management

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Message from the Face of Cover Page

Dear Readers,

Being featured in KIET's monthly research magazine "Anusandhan" has been a wonderful honor. I would like to sincerely thank the KIET students and instructors for their tireless work in making this research-focused magazine a reality every time it is released. I am happy to learn that the creation of a research environment is the core emphasis of the KIET Institute after reading the summary on the KIET website.

The focus on making a transformative impact is consistent with the institute's mission to support a vibrant and inventive environment for research. Research requires perseverance; many researchers spend many sleepless nights carrying out tests and recording findings. It is expected of one to start research early in one's career in the cutthroat world of academia. The rapid advancements in technology, culture, and society have brought about profound changes in the field of education. Changes in educational paradigms force educators to reevaluate how students feel about learning, which affects their aptitude for learning and engagement level.

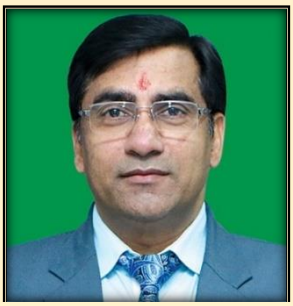
An attempt is being made to combine research and study in this area with the goal of analyzing students' learning attitudes in the context of topic knowledge and success orientation. The study of the sciences provides the potential for a brighter tomorrow as we stand on the brink of a fast-changing planet due to climatic, environmental, and biological dangers.

My sincere congrats go out to KIET Research Magazine for their fantastic work in showcasing and advancing research in the scholarly community. There's always something new to learn and investigate, and I look forward to seeing even more amazing student research projects and discoveries in the years to come.

Best wishes for continued success in the future are sent along with heartfelt congratulations.

Dr. Ramji Lal
General Manager
Analytical Research and Development
Mankind Research Centre
Gurugram, Haryana, India

Message from Chief Patron



Dear Esteemed Readers,

KIET Group of Institutions has always strived to be a beacon of knowledge, innovation, and progress in our ever-evolving world. Our commitment to excellence and dedication to fostering a culture of learning, discovery, and growth has remained unwavering. This magazine serves as a testament to our mission, and it is a privilege to share our stories, insights, and achievements with you.

In recent years, India has witnessed remarkable strides in various fields of research. Our nation's scientific and academic communities are working tirelessly to address some of the most pressing global challenges, from healthcare and environmental sustainability to cutting-edge technology and space exploration. These endeavors have not only propelled India onto the international research stage but also brought our scientists, scholars, and innovators well-deserved recognition.

The objective of this research magazine is to curate a collection of articles that encapsulate the diversity and dynamism of India's research landscape. Readers will have the opportunity to delve into the latest breakthroughs in fields such as artificial intelligence, renewable energy, biotechnology, space research, and many more. It is our commitment to bring you the most up-to-date, well-researched, and thought-provoking content that captures the spirit of innovation that defines research in India today.

In closing, I invite you to engage with us, to share your thoughts, feedback, and suggestions. This magazine is not just ours; it belongs to the community of knowledge seekers, innovators, and change-makers. I encourage you to share your thoughts and continue supporting the pursuit of knowledge and innovation. It is your enthusiasm and curiosity that propel our mission forward.

I also want to extend my heartfelt gratitude to all our contributors, editors, and the diligent team that works tirelessly behind the scenes to bring this magazine to life. Their dedication ensures that our message of progress and learning reaches you, our cherished readers.

Dr. Anil Ahlawat

Director In Charge

KIET Group of Institutions

Delhi-NCR, Ghaziabad

Message from Patron

Dear All,

It gives me great pleasure, in my capacity as Joint Director at the KIET Group of Institutions, to introduce this research magazine that focuses on the work that is being done at our institute and its future perspectives on knowledge and innovation. Our goal is to expand the horizons of both knowledge and innovation, and we have confidence that our researchers will unfold every stone and reach new heights.

By encouraging teamwork and open communication, we will be able to make progress in these areas. Our researchers will collaborate with industrial partners, government organizations, and other academic institutions to develop innovative technologies and solutions, share their findings, and disseminate their findings.

Our studies will result in scientific discoveries and technological advancements that are beneficial to society, and we intend to share these with anybody who could make use of them.

In closing, please accept my warmest regards for our researchers and partners. We are grateful for all the hard work and dedication you have shown in making our Institute a pioneer in research. Together, we can accomplish incredible things.

Dr. Manoj Goel

Joint Director KIET

KIET Group of Institutions

Delhi-NCR, Ghaziabad

Message from Editor-In-Chief

Dear Colleagues and Friends,

As Dean of Research and Development KIET, I am honoured to share the latest research and development activities with you. Our dedicated team of researchers, students, and faculties continue to progress significantly in various fields, from basic science to applied technology.

One of our major achievements this year has been the development of a new treatment for a rare genetic disorder. Our team discovered a novel therapeutic approach that has shown promising results in preclinical trials. We are now working to bring this treatment to the clinic and help patients suffering from this debilitating condition. It is a true example of how our research is not just limited to the lab but also can potentially make a real-world impact.

Another area where we have made significant progress is in the field of renewable energy. Our researchers have developed a new type of solar cell that has the potential to increase the efficiency and cost-effectiveness of solar energy significantly. This technology has already attracted the attention of several major companies, and we are currently transferring it to the industry for further development. It not only helps in protecting the environment but also in creating new job opportunities and economic growth. In addition to these specific achievements, KIET has progressed in several other areas. Our researchers have published numerous articles in top-tier journals, presented their work at international conferences, and received numerous grants and awards. It can showcase the quality of our research and our team's dedication and hard work. In addition to our ongoing research activities, we have also launched several new initiatives to support and promote research at our institute. We have also created a new seed funding program to support innovative and high-risk research projects that have the potential to make a significant impact. These initiatives help our researchers not just conduct research but also in developing their skills and knowledge.

I would also like to take this opportunity to express my gratitude to our researchers, scientists, engineers, and staff, who have worked tirelessly to make our institute a leader in research and development. Their dedication, passion, and hard work have been instrumental in our achievements, progress, and initiatives. I also want to thank our funding partners, collaborators, and supporters for their ongoing support and contribution.

Lastly, I would like to extend my best wishes and blessings to all of you, your families, and your friends. May the upcoming year be prosperous, happy, and in good health. With our collective efforts, we will be able to continue making a positive impact on the world through our research and development activities.

Dr. Vibhav Kumar Sachan

Dean (Research and Development)

KIET Group of Institutions

Delhi-NCR, Ghaziabad

Foreword

Academic research and development related to the scientific investigation and experimentation undertaken by colleges, universities, and other higher education institutions aim to further enhance knowledge in a subject. Natural sciences, social sciences, and humanities are subjects in which academic academics can engage in research. Academic research and development aim to add to the corpus of knowledge and educate the next generation of scholars. Today, academic research collaboration may bring scholars from many institutions, fields, and nations to collaborate towards a single aim. Collaboration can take numerous forms, including co-authoring research articles, submitting joint funding applications, and conducting interdisciplinary research initiatives. Collaboration may give researchers access to new resources, such as specialized equipment or data sets, and the opportunity to share knowledge and get fresh views on a research subject. Collaboration also boosts the impact and exposure of research by enabling academics to reach new audiences and get acknowledgement for their work. In this sequence, research magazines play a significant role in academic research and development by providing a forum for scholars to disseminate their results to a larger audience. These periodicals focus on specialized disciplines of study, such as fundamental engineering, computer science, mathematics, and physics, and publish articles authored by subject matter experts. Technical journals may be an essential source of knowledge for researchers, presenting them with the most recent advancements and trends in their area. These publications can also act as a method for researchers to gain feedback from their peers. These periodicals are also excellent resources for students and scholars interested in recent advancements in their respective fields of study.

According to the above-mentioned factors, the publication "KIET Research Magazine" is being produced. It is envisaged that after reading this Magazine, a student or researcher will be aware of current research in his/her relevant subject and be able to identify a suitable partner if necessary. Most of the Magazine's material is drawn from KIET's research and development efforts.

The publication has endeavoured to provide as many study results as feasible while prioritizing reporting clarity. This publication is to report on KIET's research and endeavours, therefore increasing the global exposure of KIET's work. We are grateful to our colleagues for allowing us to present the mentioned research activity and their results in this publication. As appropriate, the names of each of these fellows are included in various sections of the Magazine.

We are deeply grateful to the Institute's Management, Director, Joint Director, Dean R&D, Heads, and all the associates for their support, blessings, and cooperation in publishing this multidisciplinary research magazine “अनुसंधान” .

Dr. Brijesh Singh

Editor
KIET Group of Institutions
Delhi-NCR, Ghaziabad

Foreword

"Sharing knowledge is a charity of knowledge that constitutes the ways of a beautiful life" — Ehsan Sehgal

To enhance the beauty of the research domain, the KIET research magazine plays a vital role through the knowledge sharing of different domains, which may enhance the quality of research at inter and intra-departmental scales in the KIET Group of institutions. The awareness and acknowledgment in the outer niche may enhance the collaborative research among the various disciplines like environment, sustainability, energy, chemistry, modelling, mechanical, management, pharmacy, etc. This initiation is also likely to give positive outcomes in collaborative research publications, joint project submissions, joint work on patents, technical bulletins, etc. The holistic growth in the social, economic, and ecological pillars of society may be achieved through sharing of the scientific research and incorporation of the same through research institutes. It gives me immense pleasure to introduce this supplement dedicated to research upgrowth. As filling such gaps may lead to a paradigm shift in research networking and upliftment in the research domain.

We heartily thank our management, the Director, the Joint Director, the Dean of R&D, and the entire KIET family for their unconditional guidance and support.

Dr. Minakshi Karwal
Associate Editor
KIET Group of Institutions
Delhi-NCR, Ghaziabad

"Research is something that everyone can do, and everyone ought to do. It is simply collecting information and thinking systematically about it" - Raewyn Connell

The KIET research magazine contributes significantly to inspiring young researchers to augment knowledge and innovation. The magazine also disseminates awareness about technical innovation in the field of science, technology, and management to faculty and students.

The highlights of the notable research activities conducted by our institute over the past month are included in this magazine issue. This would help the research activities to get a better reach and new dimensions in terms of collaborative publications, research articles, project proposal submissions, patent filing, etc.

To achieve the goal of the KIET Institute to observe the year 2023 as an innovation and start-up year, we are confident that KIET Research Magazine will continue to contribute significantly to the inner and outer specialization for greater scientific research and innovation.

We would like to extend our deepest gratitude to the Research and Development Team of the KIET Group of Institutions for their tireless work in ensuring the success of all research initiatives.

We are extremely grateful to the leadership of the KIET Group of Institutions, the Director, the Joint Director, the Dean of R&D, and the entire KIET family for their generous support and leadership over the years.

Dr. Himanshu Chaudhary
Associate Editor
KIET Group of Institutions
Delhi-NCR, Ghaziabad

Overview of the Research and Development

Rapid growth in scientific knowledge is an indication of the quest for discovery and has a substantial impact on economic and societal development. Science, technology, and innovation are often initiated in an Institution's research environment. Research and developmental activities create and disseminate new knowledge in different fields, promote innovation, and motivate better learning and teaching among faculty members and students at our Institute, as these are often incorporated into the courses. Research is the foundation of knowledge that brings new energy builds state-of-the-art facilities, promotes research publications, develops collaborations, and becomes part of an active community that shares common objectives. Moreover, there is good evidence that research supports and improves teaching and helps to build excellence in this dimension as well. Research can have salutary effects on faculty members, on the nature of their teaching, and the undergraduate and postgraduate students.

Evidence is accumulating that students do benefit in significant ways from having researchers as instructors if, the institution balances resources spent, and rewards assigned between research and teaching. This positive view, which has been consistently detected in recent studies, sees the benefits of 'research-led teaching.' In this approach, the experience of the researcher is integrated into teaching.

Vision

To achieve excellence in research and create an outstanding climate of support for researchers, broadly enabling research advances to meet National and International needs.

Mission

- To motivate faculty members to concentrate on research-related activities, in addition to teaching, to publish research articles in reputed journals.
- To pursue efforts to write books and monographs for publication by – International and National publishers of repute.
- To evince interest among the faculty members so that they take efforts to establish collaborative research projects with their counterparts in reputed National and International Universities.
- To encourage faculty members to submit proposals and secure funded research projects from various funding agencies in India and Abroad.
- To undertake consultancy projects sponsored by the Government as well as Private, Industrial, and other organizations.

Contact
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Glimpses of Month

5th International Conference on Advances in AI for Biomedical Instrumentation, Electronics and Computing (ICABEC – 2023)

The Department of Electronics and Communication Engineering at KIET Group of Institutions is delighted to announce the successful conclusion of the 5th International Conference on Advances in AI for Biomedical Instrumentation, Electronics, and Computing (ICABEC-2023) held on December 22nd and 23rd, 2023. This prestigious event, indexed in Scopus and approved by CRC Press (Taylor & Francis Group), received generous support from esteemed sponsors, including the Ministry of Electronics and Information Technology (MeitY), Government of India, IFFCO New Delhi, MathWorks, Pine Training Academy, and ACE Academy. With a remarkable turnout, the conference highlighted its global influence

by accepting 109 papers from over three hundred submissions. Distinguished personalities from renowned institutions graced the occasion, enhancing its significance. The Guest of Honor included Dr. Karoon Agrawal (MBBS, MS, MCh, Director, National Heart Institute, New Delhi) and Prof. (Dr.) Abhishek Tomar (G. B. Pant Agriculture & Technological University, Uttarakhand), Dr. Shahid Malik (Assistant Professor, IIT Delhi), while Prof. J. P. Pandey (Vice Chancellor, AKTU, Lucknow) presided as the Chief Guest. Their presence, alongside KIET's leadership, including Director-in-charge Dr. Anil Ahlawat, Joint Director Dr. Manoj Goel, and Additional Director Dr. Shailesh Tiwari, provided invaluable insights and leadership, enriching the conference's proceedings.

INNOTECH - 2023

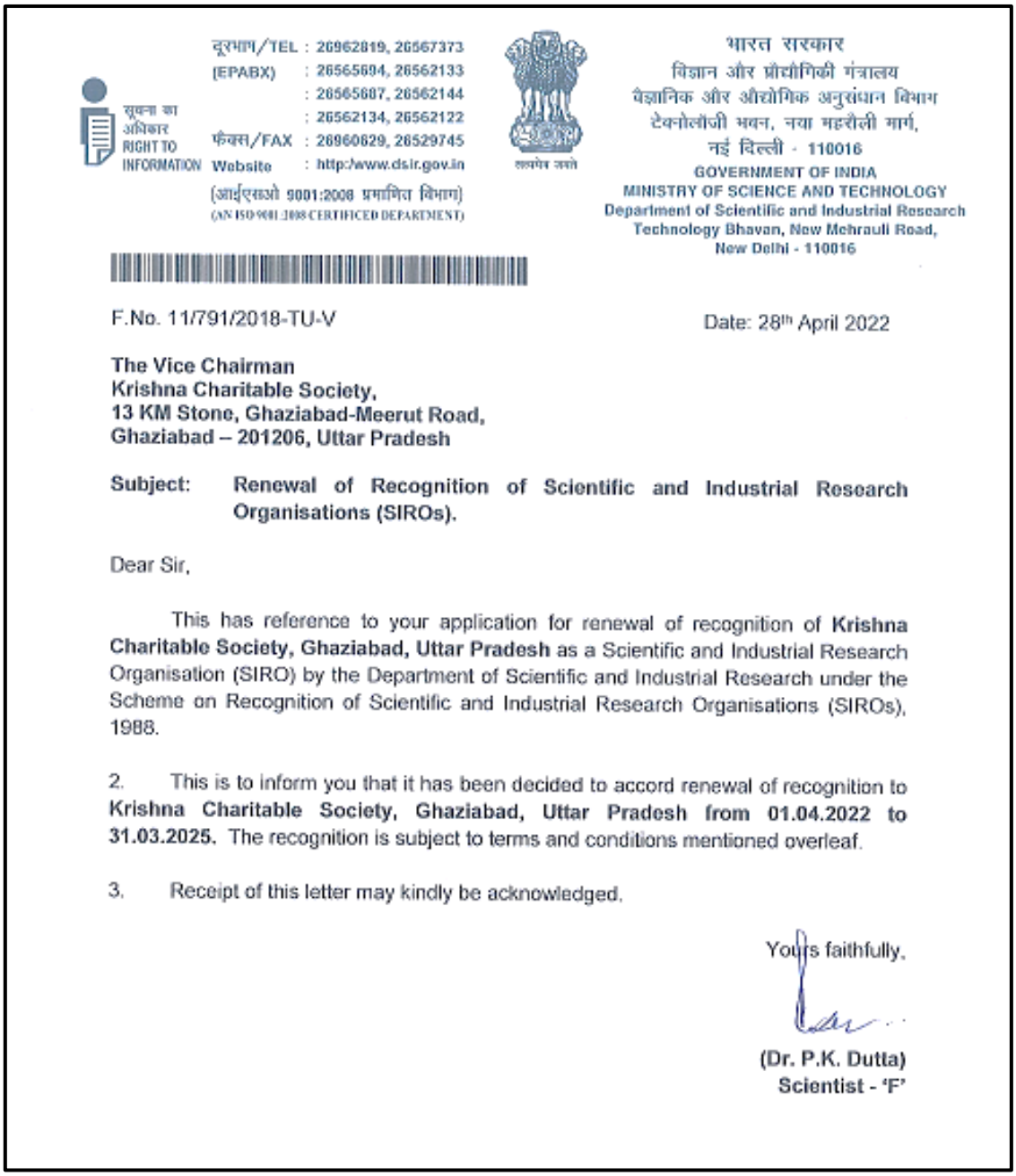
The grand finale of InnoTech'23, the epitome of technical genius, wrapped up its grand finale on December 8, 2023, at KIET, and it was truly a spectacular event! We were honored to have the esteemed Shri Narendra Bhooshan, I.A.S., Principal Secretary, Department of Science & Technology, Govt. of Uttar Pradesh, as our Chief Guest including Shri Atul Garg, MLA Ghaziabad and Chairman Governing Council, KIET Group of Institutions, Shri Sarish Aggarwal, Chairman-KIET and Shri Sunil P. Gupta, General Secretary, Governing Council, KIET Group of Institutions, Shri G.D Jain, Treasurer, Governing Council, KIET Group of Institutions, Hon'ble Director and Joint Director of KIET Group of Institutions. Moreover, countless industrial dignitaries joined the celebration, making it an unforgettable gathering of innovation enthusiasts.

Inter-Departmental InnoTech was organized from December 01, 2023, to December 05, 2023. A whopping seventy-six teams from KIET and five teams from other leading institutions took Centre stage in the project category. The energy was electric as forty outstanding teams displayed their brilliance across diverse poster categories. InnoTech'23 centred its focus on Sustainable Social Impact Solutions. The theme aimed to inspire projects that could make a tangible difference in achieving the Sustainable Development Goals (SDGs), aligning with the event's commitment to societal betterment. At the event, a gathering of investors convened at TBI-KIET to hear startup pitches for potential investments as part of the Twaran-1.0 program, an acceleration program. Chief Guest Shri Narendra Bhooshan enthusiastically urged investors to consider investing in the Uttar Pradesh Startup Ecosystem. Additionally, twenty commercialized products from various startups were showcased during the event.

Statistics of KIET Research and Development Activities

Rankings & Accreditations

- **NAAC - Grade 'A+' (Cycle 2 Assessment) - Accredited for 5 years till 03 Jan 2027.**
- **NIRF 2023 (Pharmacy – Rank 88 & Engineering - Rank Band (151-200).**
- **NIRF 2023 Innovation Rank Band (51-100).**
- **QS-IGAUGE - 'Diamond' College Rating (till Feb 2024) & 'Institution of Happiness' Award.**
- **Innovation Hub, AKTU – Hon'ble VC AKTU Appointed KIET as Nodal Regional Centre**
- **NBA Accreditation - All eligible programs are NBA accredited.**
- **KIET Group of Institutions, Delhi-NCR, Ghaziabad (UP) recognized by the Scientific and Industrial Research Organization (SIROs) under Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, Government of India. (Till 31 Mar 2025)**



सूचना का अधिकार RIGHT TO INFORMATION

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(आईएसओ 9001:2008 प्रमाणित विभाग)
(AN ISO 9001:2008 CERTIFICED DEPARTMENT)

सत्यमेव जयते

भारत सरकार
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वैज्ञानिक और औद्योगिक अनुसंधान विभाग
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GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
Department of Scientific and Industrial Research
Technology Bhavan, New Mehrauli Road,
New Delhi - 110016

F.No. 11/791/2018-TU-V

Date: 28th April 2022

The Vice Chairman
Krishna Charitable Society,
13 KM Stone, Ghaziabad-Meerut Road,
Ghaziabad – 201206, Uttar Pradesh

Subject: **Renewal of Recognition of Scientific and Industrial Research Organisations (SIROs).**

Dear Sir,

This has reference to your application for renewal of recognition of **Krishna Charitable Society, Ghaziabad, Uttar Pradesh** as a Scientific and Industrial Research Organisation (SIRO) by the Department of Scientific and Industrial Research under the Scheme on Recognition of Scientific and Industrial Research Organisations (SIROs), 1988.

2. This is to inform you that it has been decided to accord renewal of recognition to **Krishna Charitable Society, Ghaziabad, Uttar Pradesh from 01.04.2022 to 31.03.2025.** The recognition is subject to terms and conditions mentioned overleaf.

3. Receipt of this letter may kindly be acknowledged.

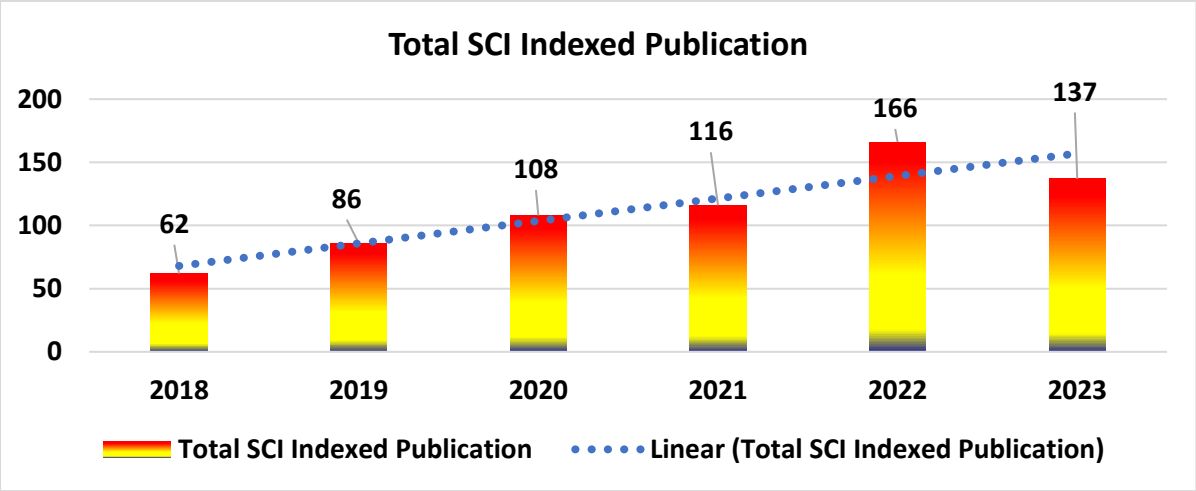
Yours faithfully,

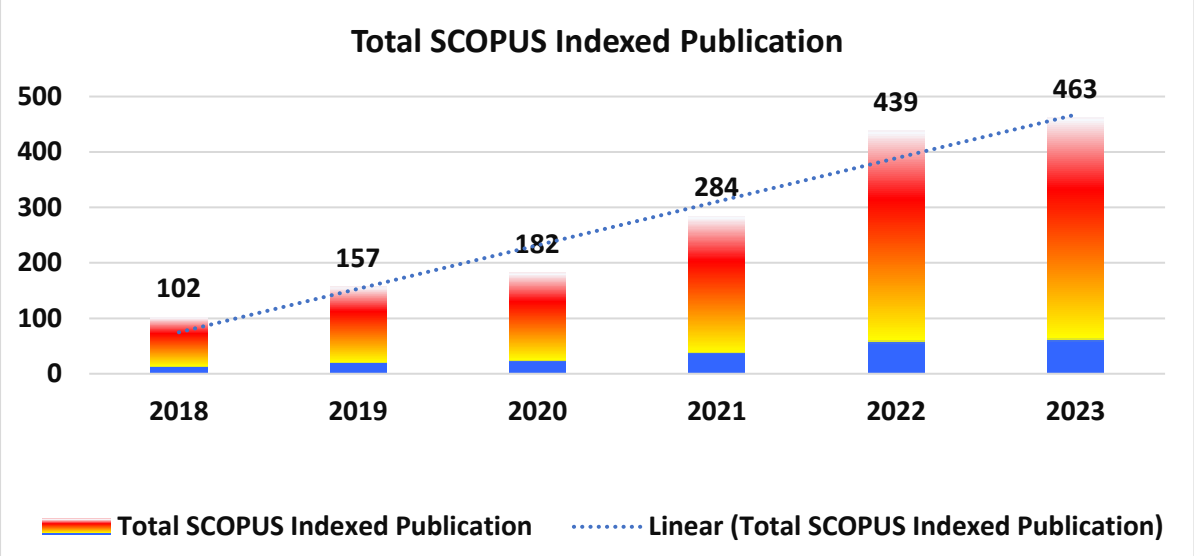
(Dr. P.K. Dutta)
Scientist - 'F'

KIET Research Credentials

A total of 675 SCI Research Publications and 1627 Scopus Indexed Research Publications with an affiliation of KIET Group of Institutions, Delhi-NCR, Ghaziabad are listed in Web of Science and in Scopus Database till December 2023.

Year	Total Number of SCI Indexed Publications	Total Number of SCOPUS Indexed Publications	Total Number of Research Publications
2018	62	102	164
2019	86	157	243
2020	108	182	290
2021	116	284	400
2022	166	439	605
2023	137	463	600
Total	675	1627	2302





Category	Number of Publication for November 2023	Number of Publication for December 2023
SCOPUS Publications	46	140
Web of Science Publication	13	12

Details of Patents Published/Granted

Title of the Invention: **Smart Suggestion System Based on User - Behaviour Using Machine Learning And Cloud Computing**
Application Number: 202311058762 A (Indian Patent Office)
Applicant(S): Raj Kumar (CS)
Date of Filing: 01-09-2023
Date of Publishing: 15-12-2023
Field of the Invention: The invention is related to the field of computer science where Image processing and Cloud based algorithms are applied for detecting user behaviour.
Objects of the Invention: The present invention is to make the smart suggestion system based on user-behaviour using machine learning and cloud computing. The main objective is to implement cloud based which stores the real-life live images and process it. In the present invention, the image is captured by the high-resolution camera and the image is processed through machine learning algorithms to get the user-behaviour. The process information is matched with the existing dataset and the appropriate action will be performed; if the data is new to the database, the suggestion will be provided by the system, and the response will be performed accordingly.

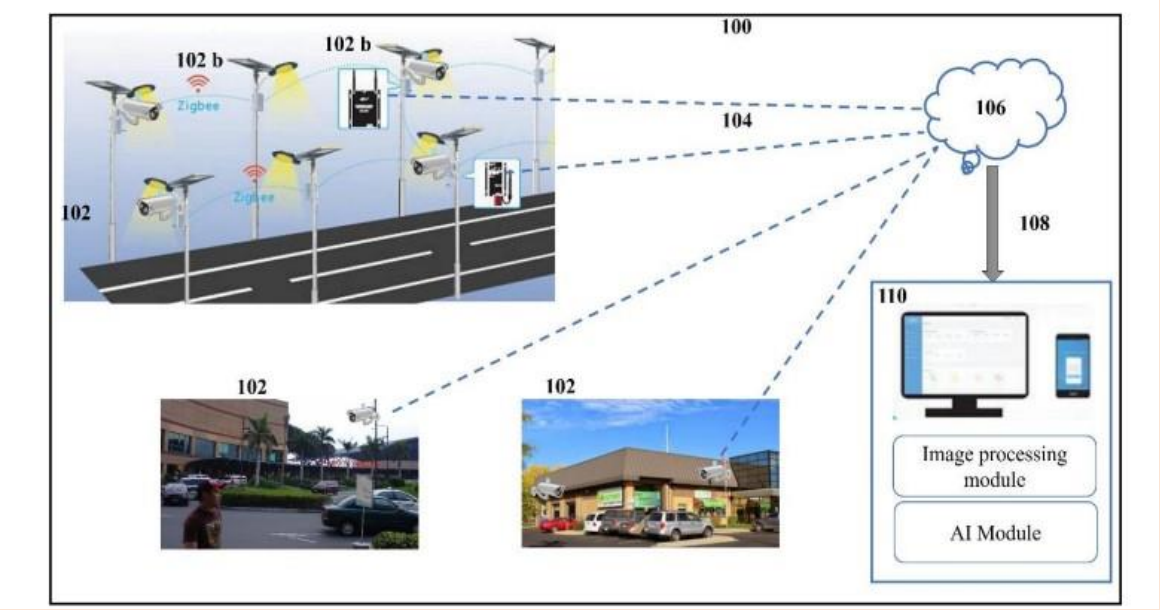


Figure 1: Illustrates an exemplary architecture of a system with an embodiment of the present disclosure.

Title of the Invention: Cyber-Shield: Ai-Powered Network Security System With Machine Learning Algorithm
Application Number: 202341076845 A (Indian Patent Office)
Applicant(S): Dr Parita Jain (CSE)
Date of Filing: 10-11-2023
Date of Publishing: 15-12-2023
Field of the Invention: The present invention aims to presents AI-based cybersecurity solutions can use machine learning and deep learning algorithms to analyze large volumes of data and information.
SUMMARY: Rapid technological breakthroughs have created new cybersecurity threats. New resilient, scalable, and flexible methods are needed to handle cyberattacks' computational complexity.
This article discusses AI-based cybersecurity. We demonstrate AI's use in malware, incursion, APT, spam, and phishing detection. Our manuscript also imagines harmful AI application. Modern AI cybersecurity invention focuses on network intrusion detection,

malware analysis and categorization, phishing, and spam emails. DL became the dominant trend there. Other intelligent methods, such bio-inspired methods, combined with ML/DL also excited inventors. Such combinations provide encouraging results and encourage additional invention. AI's function in cybersecurity is still being studied, but some of its deployment issues are notable. Examples include AI model adversarial attacks and autonomous intelligent malware. Therefore, invention on solving these threats should continue.

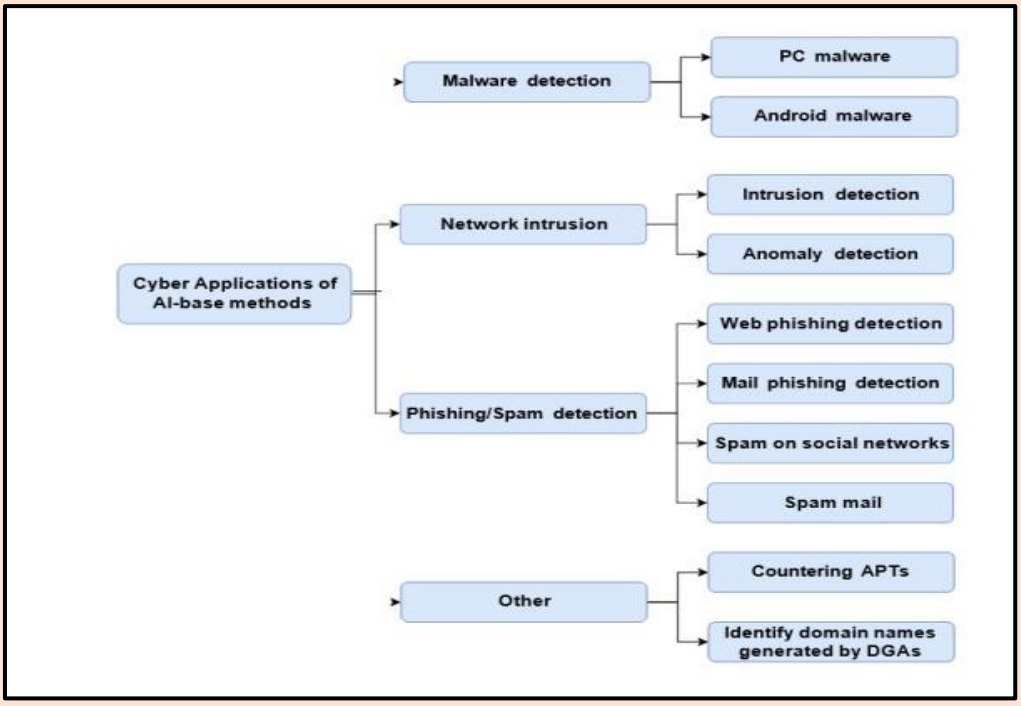


Figure 1: Depicts the main branches of cybersecurity applications adopting AI techniques.

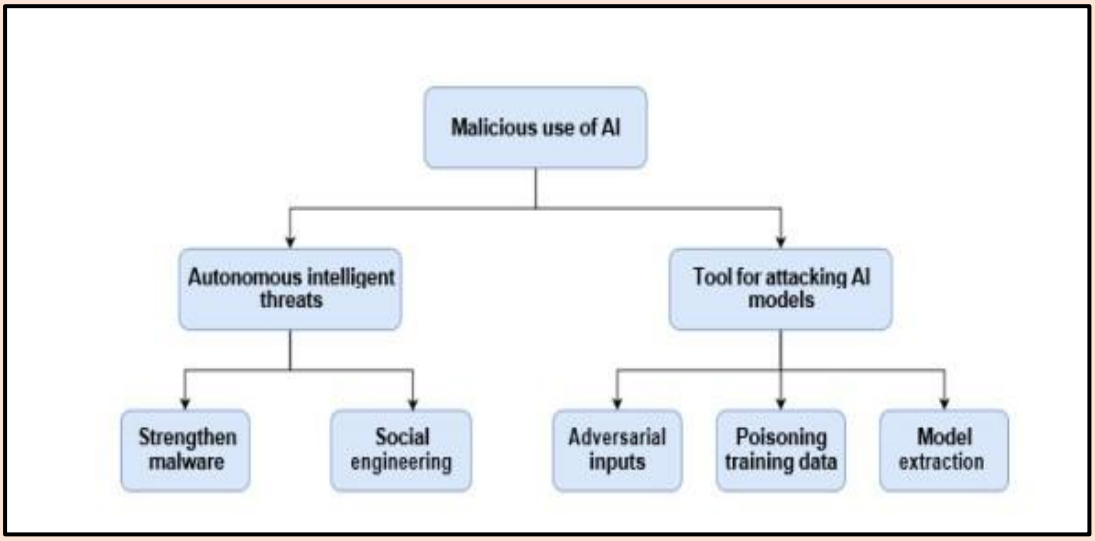
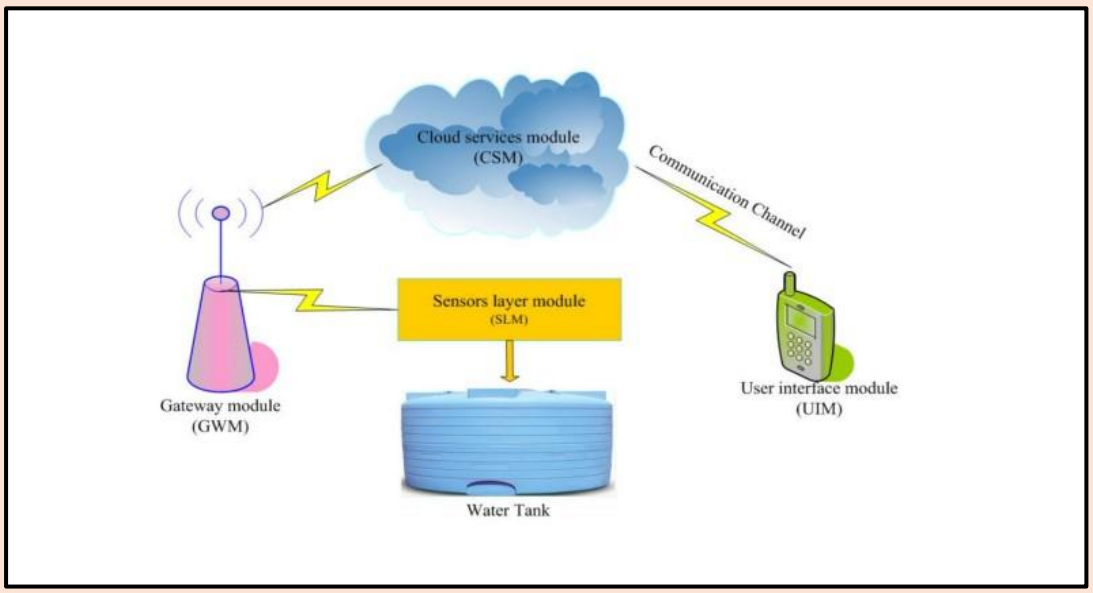


Figure 2: Depicts the use of AI for malicious activities in cybersecurity.

Title of the Invention: **Water Quality Monitoring and Awareness Message System Mode in Smart Cities**
Application Number: 202341079921 A (Indian Patent Office)
Applicant(S): Dr. Parita Jain (CSE)
Date of Filing: 24-11-2023
Date of Publishing: 22-12-2023

Field of the Invention: The present invention aims to show the Water Quality Monitoring and awareness message system model in smart cities.

Summary of the Invention: The Water Quality Monitoring and Awareness Message System Model in Smart Cities is a comprehensive framework designed to address water quality issues in urban areas. With the increasing challenges posed by water pollution and scarcity, this model leverages smart technologies to monitor and disseminate real-time information about water quality, ensuring prompt responses and fostering public awareness. Deploying a network of sensors across the city to continuously monitor water quality parameters such as pH, dissolved oxygen, turbidity, and contaminants. Gathering data from distributed sensors and integrating it into a centralized platform for real-time analysis and decision-making. Implementing machine learning algorithms to analyze historical and real-time data, detect patterns, and predict potential water quality issues or contamination events. Developing an alert system that triggers notifications to relevant authorities and stakeholders when abnormal water quality conditions are detected. This ensures a swift response to mitigate potential risks. Establishing a user-friendly interface accessible to the public through web portals, mobile applications, or other digital platforms. This interface provides real-time information on water quality, health advisories, and conservation tips. Encouraging community involvement through the dissemination of educational content, workshops, and campaigns aimed at promoting water conservation



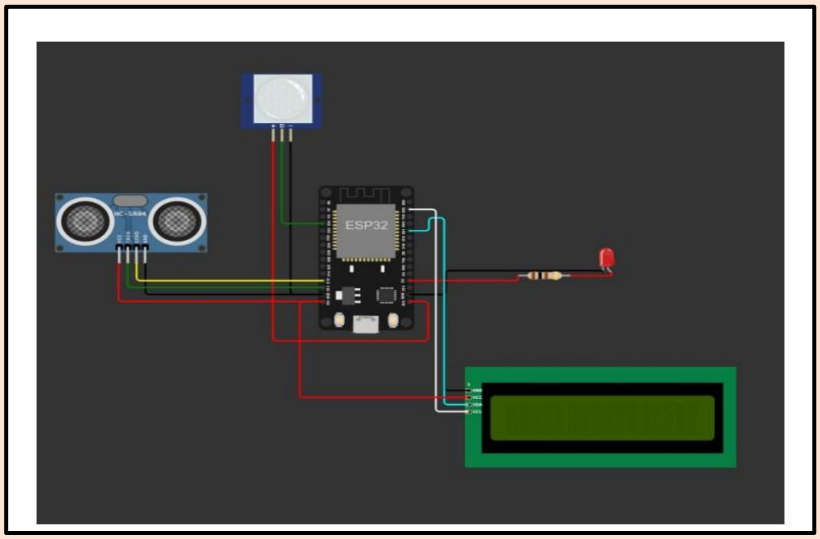
and responsible water usage. Collaborating with local government bodies and agencies to facilitate the integration of the water quality monitoring system into city planning and policy-making processes.

Title of the Invention: **IOT Based Smart Waste Management System**
Application Number: 202311078520 A (Indian Patent Office)
Applicant(S): Karan Agarwal, Karnik Gautam, Harsh Yadav, Gaurav Dubey, Harsh khatter (CS)
Date of Filing: 19-11-2023
Date of Publishing: 29-12-2023
Field of the Invention: The present invention is related to the Computer Science field, specifically, the work is related to Internet of Things.
Objects of the Invention: The present invention focuses on Power of Technology to reduce Human effort for garbage collection and tracking.
The main objective of the work is:

- Monitoring the garbage management.
- Providing a smart technology for garbage system.
- Reducing human time and effort.

- Resulting in healthy and waste ridden environment.

Summary: Garbage management system is an idea where users can control lots of problems which disturbs the society in pollution and diseases. The garbage management must be done instantly else it leads to irregular management which will have adverse effect on nature. The invention is to combine technology and waste management to create a safe and sanitary environment. Smart waste management uses technology and data, especially IoT (Internet of Things), to improve trash sector efficiency.



Its goals include optimizing resource allocation, lowering operational costs, and enhancing trash service sustainability. As a result, we can plan more efficient routes for waste collectors and reduce the likelihood of bins overflowing over extended periods of time.

Waste collectors and the technology that delivers real-time information on rubbish levels work well together. Collectors receive timely alerts when bins reach their capacity level, ensuring prompt waste collection and preventing littering in the surrounding area. Historical data aids in the identification of fill trends in individual containers, allowing for long-term management modifications.

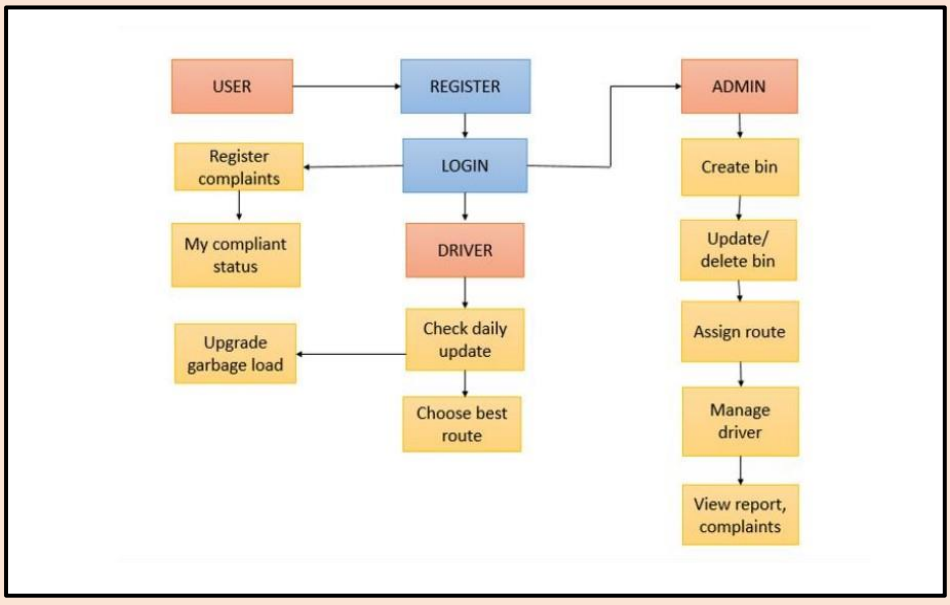


Figure 1: Flow Chart of the system

PATENTS Published - December 2023

S. No.	Title Of Patent	Dept.	Name Of Applicant	Date Of Publication	Status
1.	Innovative Developments in English Communication Skills In Engineering Sector	HSS	Dr. Sonia Gouri	01.12.2023	Published
2.	Single Nozzle Paste Filling Machine	KSOP	Dr. N. G. Raghavendra Rao	01.12.2023	Registration Of Design
3.	IOT Based Smoke and Heat Detector	CS (AI)	Ms. Kavya Gupta, Dr. Gaurav Agrawal, Dr. Abha Kiran Rajpoot	08.12.2023	Registration Of Design
4.	Smart Suggestion System Based on User-Behaviour Using Machine Learning and Cloud Computing	CS	Raj Kumar	15.12.2023	Published
5.	Cyber-shield: Ai-Powered Network Security System with Machine Learning Algorithm	CSE	Dr Parita jain	15.12.2023	Published
6.	Method And System for Utilizing Network Centrality for Selecting Suitable Managers in Organization	CS	Ms Anshula Gupta, Ms Shivani	15.12.2023	Published
7.	Water Quality Monitoring and Awareness Message System Model in Smart Cities	CSE	Dr. Parita Jain	22.12.2023	Published
8.	IOT Based Smart Waste Management System	CS	Karan Agarwal, Karnik Gautam, Harsh Yadav, Gaurav Dubey, Harsh khatter	29.12.2023	Published
9.	Neuroadapt Advancing Deep Learning with Dynamic Self-Adaptive Networks	CS	Anurag Mishra	29.12.2023	Published
10.	Multi-Model Language Acquisition Apparatus for Non-Native English Users	HSS	Dr. Preeti Chitkara	29.12.2023	Published

Details of Research Incentives for Journals

S. No.	Name of Faculty	Designation	Dept.	Title of Paper and Name of Journal	Impact Factor/Cite Score	Benefits/ Incentives	Index in Journal
1.	Dr. Gaurav	Assistant Professor	ME	Influence of Sn and Zn on age — hardening behaviour Of Mg — 6Al magnesium alloy	1.03	11000	SCI
2.	Ms. Karnika Dwivedi	Assistant Professor	CSE	EMViT — Net: A novel transformer based network utilizing CNN and multilayer perceptron for the classification of environmental microorganisms using microscopic images	5.1	15,000	SCIE
3.	Dr. Sanjeev Kumar	Associate Professor	IT	" Non — overlapping block level difference — based image forgery detection and localization (NB — localization)	3.5	11,000	SCIE/ Springer
4.	Ms. Anjali Jain	Assistant Professor	IT	Bio — inspired Approach for Early Diabetes Prediction and Diet Recommendation	4.3	5,000	SCOPUS

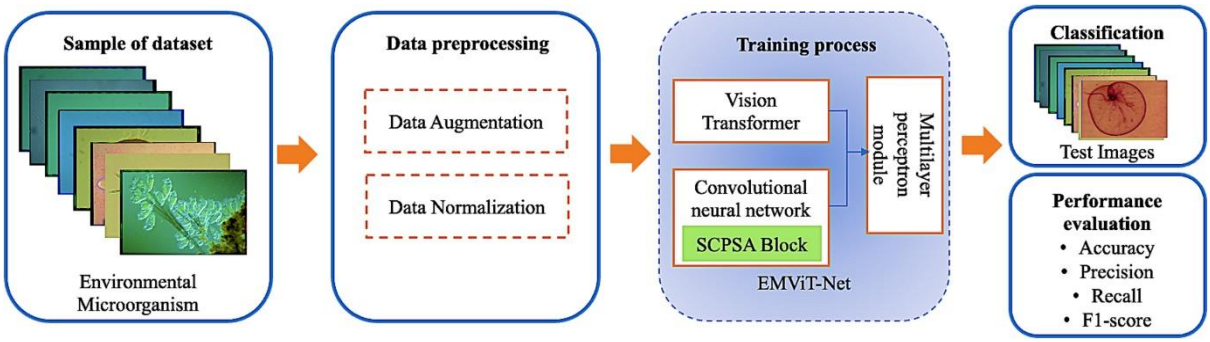
Highlights of the Published Journal Articles

1. Gaurav, Purnashis Chakraborty & Vikrant Tiwari (2024) Influence of Sn and Zn on age-hardening behavior of Mg-6Al magnesium alloy, Canadian Metallurgical Quarterly, 63:1, 12-22 DOI: 10.1080/00084433.2023.2169994

In the present work, a thermally stable as-cast Mg-6wt% Al-3wt% Sn (AT63) and a commercial AZ series Mg-6wt% Al-3wt% Zn (AZ63) magnesium alloy was developed to study age-hardening behaviour. Age-hardening behaviour was compared at temperatures between 200°C and 350°C for a prolonged period. The former alloy AT63 has two precipitates, $Mg_{17}Al_{12}$ and Mg_2Sn, showing a poor ageing profile, whereas the later has only $Mg_{17}Al_{12}$ precipitate and significant age hardening. Scanning electron microscopy (SEM) was used to observe precipitate formation in the aged samples of both alloys under the same annealing conditions. It was concluded that adding Sn to Mg-6Al alloy slows down the formation of $Mg_{17}Al_{12}$ and consequently reduces the ageing effect, though it aids in forming a new precipitate Mg_2Sn.

2. Karnika Dwivedi, Malay Kishore Dutta, Jay Prakash Pandey, EMViT-Net: A novel transformer-based network utilizing CNN and multilayer perceptron for the classification of environmental microorganisms using microscopic images, Ecological Informatics, Volume 79, 2024, 102451, ISSN 1574-9541, https://doi.org/10.1016/j.ecoinf.2023.102451.

Environmental microbes are certainly present in our surroundings since they are essential to the growth and survival of human advancement. The detailed analysis of environmental microorganisms (EMs) is crucial to recognize, understand and make use of microbes as well and prevent damage. Extracting the discriminatory features from a limited-size dataset is incredibly challenging for a deep learning model and a pure transformer-based network cannot achieve good classification results on a limited-size dataset due to the lack of muti-

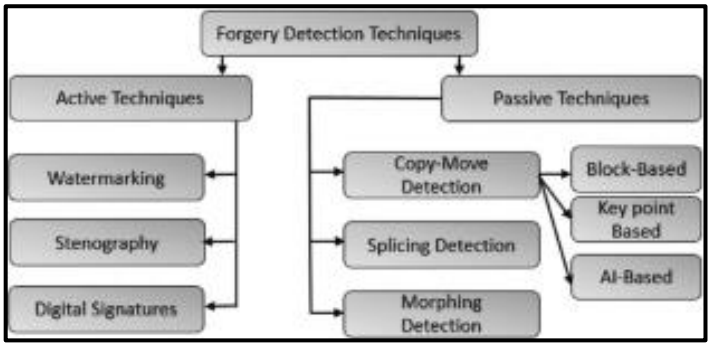


scale features. In this study, a novel vision transformer-based deep neural network is proposed by integrating the transformer with CNN for the classification of EM using microscopic images. The proposed network EMViT-Net has three main modules: a transformer module, a CNN module and a multilayer perceptron module. The transformer model extracted multiscale features to generate more discriminatory information from the images. A new separable convolutional parameter-sharing attention (SCPSA) block is integrated with the CNN module in the core of EMViT-Net, which makes the model robust to capture the local and global features, and simultaneously reduces the computational complexity of the model. The data augmentation is performed to introduce the variability in the dataset and counter the problem of overfitting and data imbalance. After extensive experiments and detailed analysis, it has been determined that the proposed model EMViT-Net outperforms the other existing methods and achieves state-of-the-art results with an accuracy of 71.17% which proves the effectiveness of the model for the classification of environmental microbes.

Keywords: Environmental Microorganisms classification; Microscopic images; Computer-aided system; Deep learning; Vision transformer

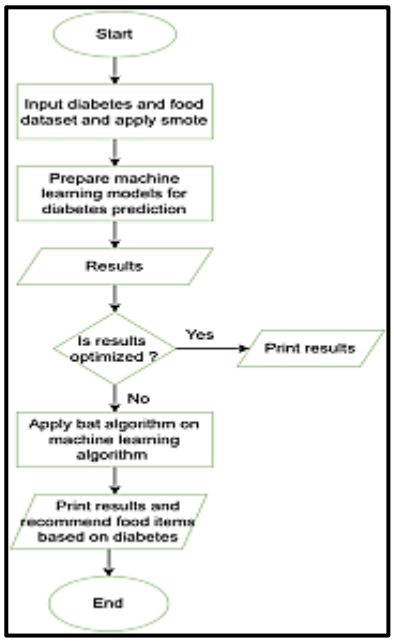
3. Kumar, S., Gupta, S.K., Gupta, U. *et al.* Non-overlapping block-level difference-based image forgery detection and localization (NB-localization). *Vis Comput* 39, 6029–6040 (2023). https://doi.org/10.1007/s00371-022-02710-z

With advent of digital devices, we are surrounded by many digital images. We usually believe on digital images in whatever form presented to us. Therefore, we need to be careful as the images may be forged. There exist several image forgeries through which original intent of the image may be hidden and some other meaning is reflected through forgery. Copy-move forgery is one such forgery technique, where the manipulator copies certain portion of the image and duplicates it in some other portion of the same image. In this paper, we propose a novel approach to detect the copy-move forgery in images using non-overlapping block level pixel comparisons and that can achieve better detection and classification accuracy. This approach divides image into 4, 5, 6 or more such blocks and compare each block by moving sliding window over the entire image which is not



overlapping with current block. It was found that with different number of blocks the forged region of different sizes can be easily found. We have used SSIM (structure similarity index) parameter to classify the image as forged or original. Algorithm is simulated on various datasets including (MICC, CASIA, coverage, and COMOFOD, etc.) and achieved maximum accuracy of 98% and also compared our result on precision, recall, FPR and FNR including other parameters.

4. Jain, A., Singhal, A. Bio-inspired Approach for Early Diabetes Prediction and Diet Recommendation. *SN COMPUT. SCI.* 5, 182 (2024). https://doi.org/10.1007/s42979-023-02481-x



Diabetes mellitus is one of the hyperglycemic diseases. To meet with an objective of early prediction of diabetes, the paper comprises of case studies of diabetes patients, the existing working models used to predict diabetes in patients. This study aimed to use the nature-inspired metaheuristic algorithms like ant colony optimization, Bat Algorithm, Cuttlefish Algorithm, Elephant Herd Optimization Algorithm, and Artificial Bee Algorithm, etc. which are usually utilized for numerical analysis such as accuracy and other performance metrics. The objective was to develop a model that accurately recognizes diabetes by employing algorithms influenced by nature on a particular dataset. Diabetes was detected using several classification algorithms, and the accuracy of the classifiers was improved by tuning their hyperparameters using Hybrid Bat Algorithm. Most of the classifiers in use have their performance improved using various techniques. With the maximum accuracy of 98%, the voting classifier along with Smote and Bat Algorithm exceeded the competition, which is shown and discussed in the paper. The focus is on diabetes prediction, and then delve into the dietary recommendation aspect.

Reimbursement of Conference Registration Fee

S. No	Name of Faculty	Designation	Dept.	Name of Conference	Title of Paper	Benefits/ Incentives	Published By
1.	Ms. Vrinda Mishra Ms. Kirti Jain	M.Tech (II Year) Student	CSE	(ICCPCT-2023) Organized by Baselios Mathews II College of Engg. Kerela, India	"A Hybrid Approach for Leaf Disease Classification Using Machine Learning and Deep Learning"	3500	IEEE
2.	Mr. Ankit Dutt	M.Tech (II Year) Student	CSE	International Conference on IoT, Communication and Automation Technology-	"The utilization of machine learning algorithms in the diagnosis	2450	IEEE

				2023 (ICICAT-2023) Organized by GIDA, Gorakhpur & Rajkiya Engg College, Sonbhadra U.P.	of heart disease"		
3.	Ms. Priyanshi Vashistha	B.Tech , Pass Out , Student	CS	International Conference on Frontiers of Science & Technology-2021 (ICFST-21)	"DEEPCNN: A Novel approach of Multiview face recognition"	5250	IEEE
4.	Mr. Abhijay Krishna	B.Tech , Pass Out , Student	IT	14th International Conference on Computing Communication and Networking Technologies (ICCCNT)	A Review of Latest Advancements in Brain Tumor Segmentation Using Deep Learning	4150	IEEE
5.	Dr. Sartaj Ahmad	Associate Prof.	IT	International Conference on Computing, Communication and Networking Technologies (ICCCNT) held at IIT-Delhi, in association with IEEE Electronics	Prediction of Insurance Premium Using Machine Learning with an Adaptive Approach	7500	IEEE
6.	Dr. Rohit Vashisht	Assistant Prof.	CSIT	(ICABCS — 2023) Conference Venue: Galgotias University, Greater Noida, Uttar Pradesh	A Systematic Study of Networking Design for co — Working Space Environment	6000	Scopus
7.	Dr. Rohit Vashisht	Assistant Prof.	CSIT	International Conference on Artificial Intelligence, Blockchain, Computing & Security (ICABCS — 2023) Conference Venue: Galgotias	" Live Virtual Machine Migration Towards Energy Optimization in Cloud Data Centers."	6000	Scopus

				University, Greater Noida, Uttar Pradesh			

Highlights of the Published Conference Articles

1. Jain, K., Mishra, U. (2024). A Hybrid Approach for Leaf Disease Classification Using Machine Learning and Deep Learning. In: Namasudra, S., Trivedi, M.C., Crespo, R.G., Lorenz, P. (eds) Data Science and Network Engineering. ICDSNE 2023. Lecture Notes in Networks and Systems, vol 791. Springer, Singapore. https://doi.org/10.1007/978-981-99-6755-1_15

Natural remedies are less expensive, non-toxic, and associated with negative side effects. As a result, their demand is rising, particularly for herbal-based medicinal products, health products, nutritional supplements, and cosmetics. Threats from leaf diseases exist to the global agricultural industry's economic and production status. The need for farmers to protect agricultural products is reduced by the ability to find illness in leaves utilizing Deep learning (DL) and Machine learning (ML). Our approach involves a combinations method for the diagnosis of flora illness. In our suggested method RESNET-50 is employed for extracting the deep features and Random Vector Functional Link (RVFL) is employed for the classification. To look at the efficiency of the suggested RES-RVFL model, its categorizing performance is contrasted with Support Vector Machine (SVM), Decision Tree, Random Forest and K-Nearest-Neighbors (KNN). The findings showed that RVFL is very suitable for classifying leaf diseases, with a disease classification accuracy of about 94%. The fact that this result highlights the significance of early detection and naming of flora diseases for justifiable cultivation and food security is incredibly positive. Our research has a solid foundation, thanks to the Plant Village dataset, and our findings add to the body of knowledge on applying deep learning and machine learning to identify plant diseases.

2. A. Dutt and S. Sharma, "The Utilization of Machine Learning Algorithms in the Diagnosis of Heart Disease," *2023 International Conference on IoT, Communication and Automation Technology (ICICAT)*, Gorakhpur, India, 2023, pp. 1-6, doi: 10.1109/ICICAT57735.2023.10263723.

According to data compiled by the World Health Organisation, heart disease and stroke account for 17.9 million annual deaths worldwide. Conditions including cardiac arrhythmias, stroke, and Cardiovascular rheumatism all belong to the larger category of heart and circulatory system illnesses. Stroke causes more than 80% of all fatalities from CVD, and it's the leading cause of mortality for those under 70 years old. In this study, we train and evaluate the k-nearest neighbour approach, the naive Bayes classifier, the stochastic gradient classifier, and the support vector machine using the Kaggle dataset of around 4238 individuals—to predict cardiovascular disease. Accuracy, Precision, recall, and f-score were only few of the criteria used to evaluate the various model's performance. Consequently, the stochastic gradient classifier model obtained a maximum accuracy of 93% in the heart condition dataset. The Jupyter notebook is the ideal tool for implementing Python code since it comes with a plethora of libraries and standard header files that guarantee flawless results.

3. Vashistha, P., Gupta, P., and Jha, S., "DEEPCNN: A novel approach of multi view face recognition", in American Institute of Physics Conference Series, 2022, vol. 2597, no. 1. DOI:10.1063/5.0116516.

Face recognition is extensively applied in most of the modern intelligent systems such as, intelligent access control system and smart video surveillance system. Most of the existing face recognition system completely depends on detection algorithm that may not handle longer period of occlusions, also is prone to attacks. In this paper, we have devised a solution for multiview face recognition system using an efficient deep learning approach called DEEPCNN. Here, CNN is pipelined with deep sort to encode the face regions deeply and to enhance security. The deep tracking method is followed in which, the tracker does not solely depends on detection algorithm, and instead deep sort is used in pipeline for human's face tracking. Firstly, Hungarian algorithm is employed as deep sort method for face detection and then height and position prediction is done by using YOLO-V3. The experimental results show

that the proposed approach has proven to give more accurate results and can work for larger period of occlusions.

4. Krishna, Abhijay et al. "A Review of Latest Advancements in Brain Tumor Segmentation using Deep Learning." *2023 14th International Conference on Computing Communication and Networking Technologies (ICCCNT)* (2023): 1-6.

Brain tumor is a life-threatening disease, which is having higher rate of mortality than the rate of survival. With the technological advancement, performing automated computer-based brain tumor picture analysis is becoming more popular as it is time saving. Tumor segmentation is a paramount issue discussed in available literature for brain tumor investigation. Nowadays, deep learning approaches have become more conspicuous due to inbuilt capacity to grasp on their own. The purpose of this study is to give an overview of recent research that employs deep learning approaches for segmentation of brain tumors. Present research begins by outlining the advantages of using computer vision to segment brain tumors. The most current cutting-edge efforts in brain tumor segmentation and prediction are then discussed.

5. S. Ahmad, A. Agarwal and H. Ansari, "Prediction of Insurance Premium using Machine Learning with an Adaptive Approach," *2023 14th International Conference on Computing Communication and Networking Technologies (ICCCNT)*, Delhi, India, 2023, pp. 1-5, doi: 10.1109/ICCCNT56998.2023.10307009.

The insurance market is exceptionally large and expanding day by day. There are many parameters to consider before deciding on insurance premiums. Sometimes it becomes difficult to browse all the documents before applying for insurance, so it is necessary to understand the insurance industry and point out issues related to competition in that industry. This type of company is very interested in forecasting. The goal of this article is to find accurate predictions based on considering different dimensions of machine learning to reduce the company's financial losses. Machine learning helps companies to optimize their services with greater accuracy and fewer losses. It can also help insurance companies effectively screen cases, evaluate them more accurately, and make accurate cost forecasts. This research work uses machine learning-based methods like linear regression, KStar, and Random Forest and suggests a suitable method to produce results with high accuracy and less relative error. In addition to this, it demonstrates how to create a specific data subset that can be used to test and train a machine learning system. The effectiveness of the suggested strategy is assessed by contrasting the estimated value with the actual value of the simulated data. Insurance firms are capable to construct consistent financial structures, such as monthly premiums or payroll taxes, to provide funds to pay for the medical benefit agreements that are defined in insurance policies by calculating the whole risk of the expenses associated with health care and the medical system.

6. *Rohit Vashisht, Rahul Kumar Sharma, Gagan Thakral*, "A systematic study of networking design for co-working space environment", Artificial Intelligence, Blockchain, Computing and Security Volume 1, 1st Edition, CRC Press, 2023 eISBN: 9781003393580 .

In today's era of digitalization, there is pool of resources that are being shared commonly among various networking devices within in a network. The effectiveness of the network is highly dependent on the synchronization, utility and security of these devices. The aim of the study is to design an appropriate network system for "Co-working Space Organizations", a network in which multiple organizations will access common resources. The proposed architecture has three-level hierarchy with least cost design and proficient level security, in such a way that network devices will also meet standards linked with the company. This paper also discusses the budget challenges that the network will face in developing countries in detail. Developing countries have a bounded budget problem that impact choosing good quality routers, switches and various other devices in the network like servers. DHCP servers have been utilized to allocate IP addresses in the proposed system. The proposed network architecture performs well for 3000-4000 populations as per the experimental investigations and can also be scaled successfully to a large number of network users.

7. Rohit Vashisth, Gagan Thakral, Rahul Kumar Sharma, "Live virtual machine migration towards energy optimization in cloud datacenters", In Book Artificial Intelligence, Block Chain, Computing and Security Volume 1, e-ISBN-9781003393580, CRC Press 2023.

Cloud computing is a fast-emerging utility- oriented paradigm providing services to a large number of users across World Wide Web based on spend-as-per-your-utilization model. To offer its users computational services, data centers eat up a lot of energy. Such excessive consumption of power by those virtualized data centers has increased the operating cost of cloud environment for both cloud service provider as well as for intended user. Normally, a typical data center wipes out energy which generally equals to energy consumption of 25000 houses. Along with increasing cost, it also degrades the environment badly by emitting large amount of carbon dioxide gas and thus becoming one of the major causes for environmental issues like global warming and green house effects. In this research paper, the proposed technique not only trying to meet energy efficiency requirement but will also prevent the breaching of Service Level Agreement (SLA) and thus provide cloud users with Quality of Service (QOS).

Research Incentive for Book Chapters

S. No	Name of Faculty	Designation	Dept.	Category	Title of Book Chapter	Benefits/ Incentives	Published By
1.	Dr. Amit Kumar Arora	Associate Professor	MBA	Book Chapter	""Advances in Global Business, Economics, Finance and Social Sciences"	2000	Springer

CRDC Presentation Series

Activity Report December 2023

Collaborative Research and Development (CRD) Presentations 2022-23 (Odd)

Title: Sustainable Packaging: Exploring Consumer Perceptions, Preferences and Purchase Intentions

In today's world, where environmental concerns have reached a critical juncture, the concept of packaging has transcended its conventional role. It has now become a symbol of sustainability, prompting a fundamental shift in consumer perceptions, preferences, and purchase intentions.

While this research provides a comprehensive exploration of consumer perceptions, preferences, and purchase intentions concerning sustainable packaging, several avenues for future research remain unexplored. The findings of this study lay the groundwork for further investigations that can deepen our understanding and address emerging questions within the domain of sustainable packaging and consumer behaviour.

1. Longitudinal Studies:

To assess the durability of consumer preferences and behaviours, longitudinal studies could track participants' purchasing decisions over an extended period. Such studies would offer insights into how sustained exposure to sustainable packaging options influences long-term consumer choices and whether initial preferences translate into consistent behaviours.

2. Cross-Cultural Comparisons:

Examining consumer attitudes and behaviours across diverse cultural contexts can uncover variations in the significance of packaging attributes and sustainability considerations. Comparative studies would elucidate whether the findings of this research hold true across different societies with distinct values, norms, and packaging practices.

3. Experimental Designs:

Experimental designs can manipulate specific factors related to sustainable packaging to explore causal relationships. For instance, controlled experiments could investigate the impact of varying pricing structures, communication strategies, or packaging designs on consumer perceptions, preferences, and purchase intentions.

4. Effect of Marketing Strategies:

Future research could delve into the effectiveness of different marketing and communication strategies in influencing consumer perceptions and purchase intentions for sustainable packaging. A comparative analysis of how various advertising campaigns, labeling initiatives, and messaging tactics resonate with consumers could yield valuable insights.

5. Psychological Factors:

Exploring the psychological underpinnings of consumer behavior in sustainable packaging remains a fertile area for research. Investigations into cognitive dissonance, social norms, and emotional triggers could shed light on the decision-making processes that lead to sustainable packaging adoption.

Conclusion

In a world where environmental concerns are paramount, the study of sustainable packaging has evolved into a critical domain of research, reflecting the profound intersection of

consumer behavior, environmental consciousness, and industry practices. This research paper embarked on a journey to unravel the complex interplay between consume perceptions, preferences, and purchase intentions concerning sustainable packaging, shedding light on the evolving landscape of packaging sustainability.

The exploration of consumer perceptions unveiled a multifaceted tapestry where packaging is no longer merely functional but rather symbolic of personal values and environmental responsibility. Attributes such as recyclability, biodegradability, and transparency emerged as key drivers of positive perceptions. The qualitative phase of in-depth interviews unearthed the emotional dimensions that underpin these perceptions, revealing a deep-seated desire among consumers to make sustainable choices that resonate with their ethical aspirations.

Quantitative analysis of consumer preferences corroborated these qualitative insights, quantifying the prevalence of preferences for specific sustainable packaging attributes. Biodegradability, recyclability, and reusability emerged as cornerstones of consumer preference, reflecting a strong inclination towards packaging options that mitigate environmental impact. The study also highlighted the significance of aesthetic appeal and design, showcasing the integral role of visual impressions in shaping consumer choices.

Crucially, the research delineated the link between consumer preferences and purchase intentions. Regression analysis illuminated the pathways through which preferences for sustainable packaging attributes translate into real-world decisions. While preferences exerted a positive influence on purchase intentions, pricing emerged as a moderating factor, demonstrating that consumers are willing to trade off sustainability for cost considerations.

The study also identified barriers and motivators in the realm of sustainable packaging. Limited availability of sustainable options, coupled with ambiguities in labeling, emerged as key barriers that impede informed decision-making. Intrinsic motivators, including environmental concern and ethical considerations, were revealed as strong drivers that propel consumers towards sustainable packaging choices.

The implications of this research are manifold. Businesses are urged to prioritize transparent communication about packaging attributes and embrace design innovations that balance aesthetics and sustainability. Policymakers can leverage insights into consumer preferences to shape regulations that promote the adoption of sustainable packaging practices across industries. Furthermore, the study underscores the pivotal role of consumers as agents of change, shaping the trajectory of packaging sustainability through their preferences and choices.

As the research journey concludes, it is evident that the paradigm of packaging has evolved beyond functionality to become a canvas for environmental values and ethical aspirations. The holistic understanding of consumer perceptions, preferences, and purchase intentions provided by this research sets the stage for a future where packaging is a conduit for both utility and responsibility. As the call for sustainability grows louder, this research paper stands as a testament to the power of consumer behavior in propelling industries and societies towards a more environmentally conscious and ecologically responsible future.

By:
Rajat Tayal,
Assistant Professor
MBA

Title: Pre-Processing Techniques for Detection of Lung Cancer with Low-Dose CT Scan Images

Pre-Processing techniques with low dose CT Scan images for early detection of lung cancer is a significant area of research.

For bettering patient outcomes and lowering mortality rates, early identification of lung cancer is essential. Low-dose computed tomography (CT) scans have become an important tool in this process, although effective early-stage lesion diagnosis is still difficult because of noise and image distortions. This study investigates the use of pre-processing methods to improve the precision and effectiveness of early lung cancer diagnosis using low-dose CT scan images. The study shows encouraging findings that were attained by the application of numerous pre-processing techniques, such as noise reduction, image improvement, and feature extraction. The use of these methods addresses a variety of problems, including image noise, blurriness, and contrast imbalances, which might mask inconspicuous lung cancer symptoms.

Pre-processing methods applied to low-dose CT scan images have produced incredibly encouraging outcomes in the quest for early lung cancer detection. A glimmer of hope for both patients and doctors has emerged from this study's illumination of the potential for these techniques to drastically boost the accuracy and efficacy of early diagnosis. The study has demonstrated the pre-processing's transformative potential in the field of medical imaging. These approaches have revealed minor symptoms of malignancy that could have otherwise gone undetected by overcoming the difficulties presented by image noise, artifacts, and quality changes. The results of this study further highlight the crucial impact early diagnosis has in enhancing patient outcomes and lowering mortality rates. These pre-processing methods save lives by making it possible to detect lung cancer in its earliest stages, which may lead to less intrusive therapies and a higher possibility of effective interventions. Future research should continue to focus on improving and broadening pre-processing methods for early lung cancer detection, as shown by the encouraging findings given in this work.

Utilizing creativity and technology, we can expand the area of medical imaging, ultimately saving lives and advancing the ongoing fight against this terrible disease.

By:

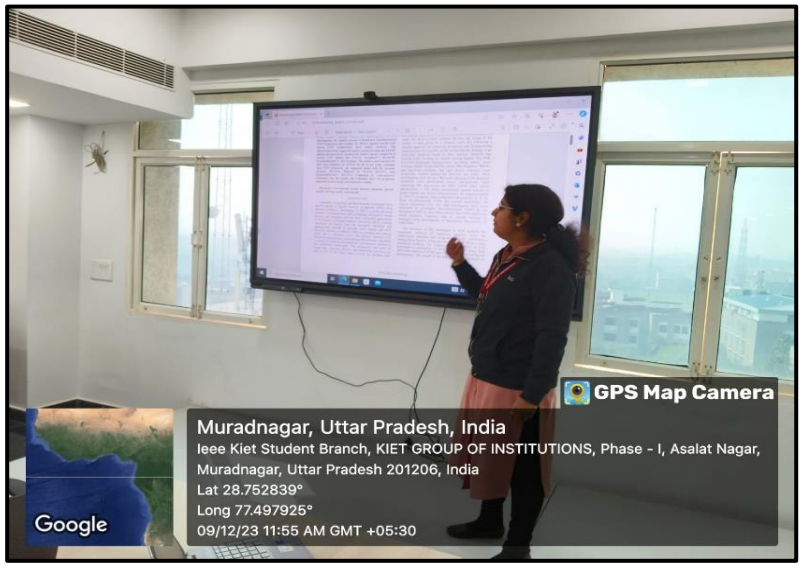
Gagan Thakral
Assistant Professor
CSE

Title: Ascertaining Speech Emotion using Attention-based Convolution neural network Framework

Automatic recognition and identification of emotions from speech signals in speech emotion recognition (SER) using machine learning is challenging.

Conversation among people is a profuse form of interaction that also carries emotional information. Speech input has been the subject of numerous studies over the last ten years, and it is now crucial for human-computer connection, as well as for medical care, privacy, and stimulation. This research aims to evaluate if the suggested framework can aid in speech emotion recognition (SER) activities and determine if Convolutional Neural Network (CNN) systems are efficient for SER activities using transfer learning models on spectrogram. In this investigation, the authors present a brand-new attention-based CNN framework and evaluate its efficacy against several well- known CNN architectures from earlier research. The effectiveness of the suggested system is assessed using the SAVEE dataset, an open-access resource for emotive speech, compared to famous CNN models like VGG16, InceptionV3, ResNet50, InceptionResNetV2, and Xception. The authors used stacked 10-fold cross-validation on SAVEE for all of our trials. Amongst
these CNN structures, the suggested model had the greatest accuracy (87.14%), followed by VGG16 (83.19%) and InceptionResNetV2 (82.22%). Compared to contemporary techniques, the test results and evaluation show our proposed approach to have steady and impressive results.

The potential of ML techniques in SER includes the systematic retrieval of emotional qualities from the unprocessed utterance and comprehending the correlations among those features. It has proven to be more effective than traditional methods. For instance, the researchers presented a combination of models constructed using long short-term memory (LSTM) and CNNs to implement temporal participation. participation.



Current research develops the model using a complete methodology considering its significance and application. As a result, it lacks a second predictor to do the categorization. Additionally, extract the emotions in communication using the attention component as a CNN layer. Additionally, because our representation uses the fourth pooling stage of the VGG-16 approach, it needs fewer components. In particular, this pooling stage collects priceless intriguing speech data, facilitating quick emotion identification.

The following are the primary benefits provided by our suggested approach:
 One of the best strategies for SER that our findings suggest is a unique CNN model that combines the VGG-16 with the attention unit.
 By combining the attention and convolution modules on VGG-16, the recommended approach may identify areas of utterance that are more prone to degrade at each level.
 Since the suggested CNN approach may be taught completely, an additional filter for development and evaluation is not necessary.
 The benchmark SAVEE datasets are used to assess our model.
 The proposed technique has been assessed both qualitatively and quantitatively. The assessment's findings show that our approach beats cutting-edge techniques.

By:
Ms. Ashima Arya
Assistant Professor
Department of CSIT

Title: Real Time Attentiveness Detection in Online Meeting Platforms

A system consisting of different modules to check attentiveness of people and notify them about it.

The Concept of online classes and meetings got a push during the pandemic, this led to providing people more ease at work, they tend to work in their comfort zone and for students it became easy attendance grabbing system.

- Thus, the online system has its shortcomings. To overcome the shortcomings and to help the organizers and the teachers we propose a system which detects the attentiveness of the attendees in the meeting.

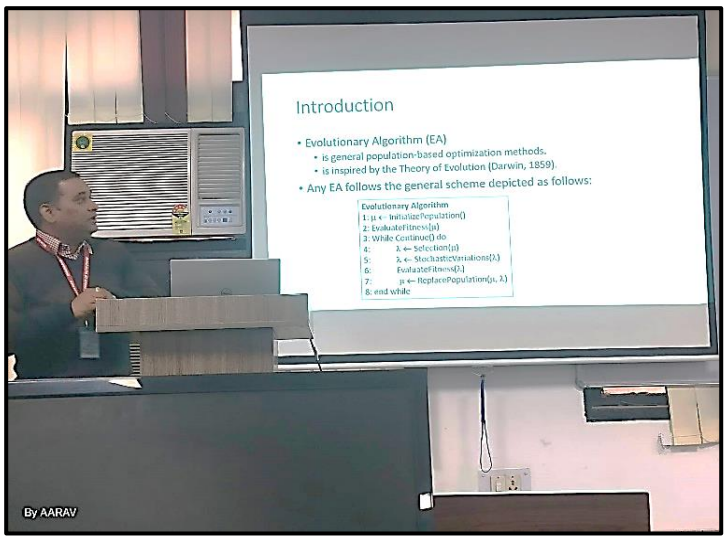
- The system on detecting the inattentiveness will trigger an alarm on the attendee's end. The organizer would also be shown with the related data on downloading the list of the attendees to know who all were present in the meeting and their attentiveness according to the set parameters.
- The detection for attentiveness is performed using Dlib Algorithm. Firstly, the face is detected followed by the detection of facial features- eyes and mouth for detecting eye movements and yawning respectively.
- The system can aid in enhancing the efficiency of the attendance management system. The focus of our system would be on eyes and mouth, the web camera will detect the features and based on the parameters defined it would monitor for attentiveness by using the efficient techniques of image processing.

By:
Arti Sharma,
Assistant Professor
CS Department

Title: MOEA (Multi Objective Evolutionary Algorithm)

A study of optimization technique

MOEA efficiently tackles multi-objective optimization problems by evolving diverse solutions. Widely applied in engineering, finance, and complex decision-making, it balances conflicting objectives. Future trends in MOEA involve enhanced algorithmic efficiency, integration with machine learning, and applications in emerging fields like sustainability and healthcare for robust decision support.



Multi-Objective Evolutionary Algorithms (MOEAs) are optimization techniques designed to address problems with multiple conflicting objectives. MOEAs explore a diverse set of solutions, known as Pareto fronts, allowing decision-makers to trade-off between different objectives. Common MOEAs include NSGA-II, SPEA2, and MOEA/D.

Applications span various domains, including engineering, finance, and logistics. In engineering, MOEAs optimize designs considering multiple factors like cost, performance, and reliability. In finance, they assist in portfolio optimization considering risk and return. Logistics benefits from MOEAs in route planning considering time and cost trade-offs.

Future directions for researchers in MOEA involve enhancing algorithmic efficiency, incorporating machine learning techniques for better adaptability, and addressing scalability challenges. Researchers are exploring hybrid approaches, combining MOEAs with deep learning to leverage the strengths of both paradigms. Additionally, there's a growing focus on applying MOEAs to emerging fields like sustainability and healthcare, where decision-making involves multiple conflicting objectives, such as balancing environmental impact and economic viability or optimizing patient treatment plans considering various medical goals.

Furthermore, improving the interpretability of MOEA results and developing novel convergence metrics are areas of interest. Overall, the future of MOEA research lies in refining its capabilities, expanding its application domains, and ensuring robust and efficient solutions for complex multi-objective optimization problems.

By:
Amit Kumar Singh Sanger
Assistant Professor
Computer Science

Title: Social Media and networking applications in the education sector: A Case of Delhi-NCR student

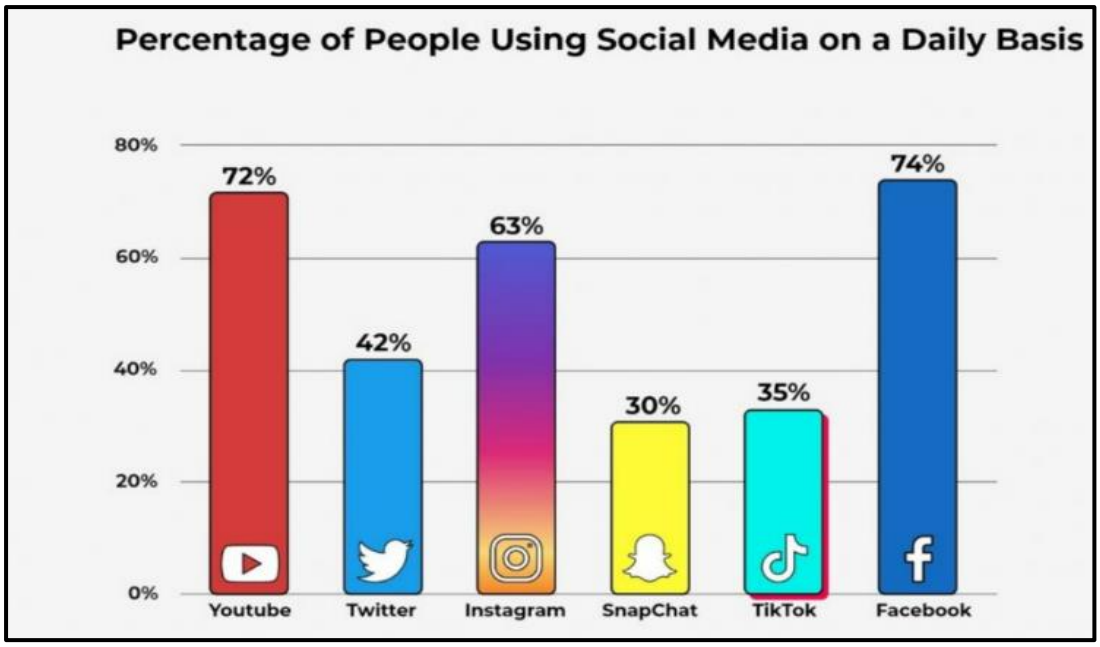
Online learning and social networking technologies are better than traditional classroom learning because there are more online resources and people can learn at any time from any site.

The use of social media is a budding phenomenon that is having a bigger impact on both personal and business life. Social networks are used as tools to facilitate human interaction. Use of social networking sites (SN) complements and improves instruction in conventional classroom settings.

For instance, there is a tonne of material available on YouTube, Facebook, wikis, and blogs on a variety of subjects. This study explores the necessity to modify the conventional methods of instruction and learning in light of social media innovation. Discovering the details why higher education students in Delhi-NCR use social media, recognizing the effects of social networking tools on learning and education generally, analyzing the challenges that students may encounter when using social media, and deciding whether traditional learning methods need to change in the age of social media technologies are the main goals of this study. The research technique would involve filling up an online questionnaire by the students at various universities, colleges, and other higher education institutions in Delhi-NCR to reach the study's objectives and investigate the potential effects of social networking platforms on teaching and learning methods. Both quantifiable and qualitative data were gathered. This study is based mostly on the student's viewpoint, examining how using social networking platforms affects students and how it alters conventional teaching and learning methods. To support the use of social networks in higher education, this study underlines the advantages of using them as instruments for creating a new style of learning as well as the drawbacks that may harm the learning process.

Conclusion

This study aims to learn more about how teenagers and teachers use social media sites like Facebook and YouTube to teach and learn. This paper uses a qualitative case study that includes filling up of online questionnaire with students taking a Business Administration course at a few colleges to evaluate the usefulness of YouTube videos/ Facebook posts as educational and communication tools. The study found that students prefer to use Facebook and YouTube videos to connect with their peers, meet new people, and learn new things at their own pace and in the setting of their choice. Through Facebook posts and YouTube videos, they learn things that aren't in books or taught in a classroom. But there are problems with using Facebook and YouTube for education. Facebook and YouTube have a lot of games and social invitations that "take away from learning time." The numbers show that both students and teachers like the idea of using Facebook as a "social" tool to help people get along outside of school. The study found that when students and teachers are linked and in touch through Facebook, they are more likely to become friends and share knowledge outside of the classroom and the textbook. So, Facebook connections and conversations between students and teachers help them get along better and build stronger relationships with each other. Face-to-face instruction, on the other hand, was stressed as being important for communication and to help both students and teachers learn formally. So, in reality, reading and writing skills, teaching in the classroom, and communication are still important and necessary, but they are no longer enough. Technology and literacy rates from the past have been improved, but they are still important. In the twenty-first century, social media can be used along with traditional and modern literacy tools to teach and learn.



Social media and networking applications in the education sector: A Case of Delhi-NCR student

By:
Dr. Tanushree Sanwal,
Assistant Professor,
MBA

Title: Emerging Social media and National Security at a Glance

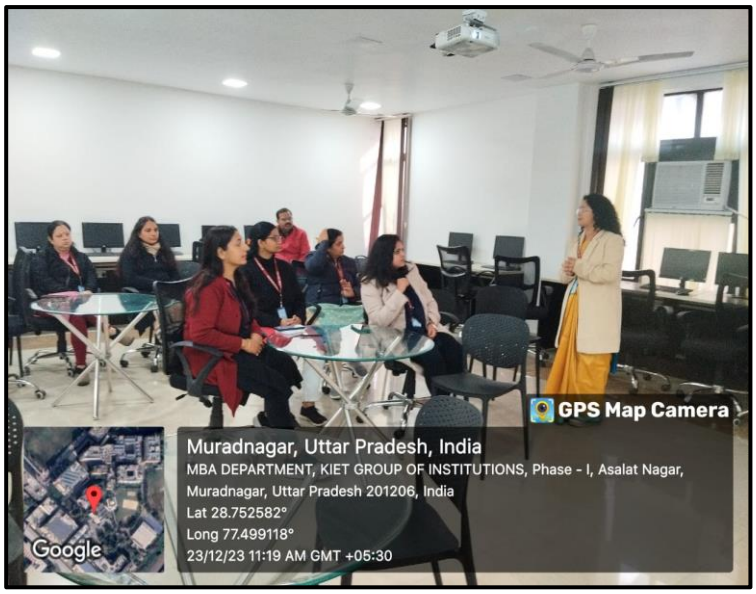
This is the world of internet; people do not imagine their life without it. They devote their maximum time to be connected with internet or social media. What is wrong and right is being decided by visiting social media trends, blogs and tweets now days. Sensitivity or importance of any issue is being judged by social media trends and trolls only. Students are influenced with the information being provided on social media as they are easily accessible and connected and they are manipulated through it. Internet is easily accessible in everyone's hand through emerging technologies that may arise danger for national or international securities.

All the nations who have minimum crime, strong infrastructure, strong laws are felt secure and safe. Security has two aspects- the external frontier which includes threat from foreign nations and terrorist organizations; and the internal frontier- involving curbing internal conflicts and maintaining law and order inside the boundaries of the nation. While security at both the fronts is equally important and should be given equal priority, the emphasis on internal security is of interest as a lot of disturbing elements are on the rise in the present times.

Challenges

- National disruptive groups (Marxist, Naxalites, Hawala group)
- Mafia (a secret terrorist group)
- Religious creed.
- Hacker groups.

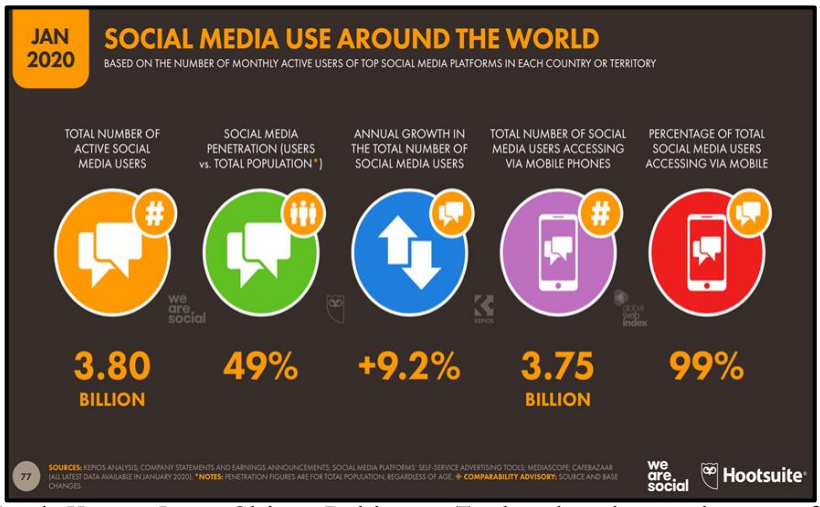
- MNCs
- Political Instability
- Nuclear attacks
- Cyberattacks
- Biological weapons (Ebola, Corona, Swine flu, etc.)
- National war, Trade war



Solutions

- A restricted or fixed time should be imposed for surfing social media per day
- The privacy should be applicable to accessing social media sites from country to country.
- Vigilance on these sites to control the fake news is necessary.
- Social media post-filtration using Artificial intelligence, such as violent videos or content having safety issues should delete automatically.
- Making Social site groups should have more formalities.
- Cyber hygiene and cyber disciplines should be followed by all users without negligence.

Conclusion - As the digital world is booming and flourishing, internet is becoming the basic requirement, and we cannot separate its spikes with its fruits. Use of social media is becoming an irresistible part in personal as well as organizational life to remain connected with the world in which we are living. Organizations use Twitter, Facebook, and YouTube, LinkedIn to engage with their staff and this highly dynamic method brings number of security concerns for the end user. Anti-national people use these platforms to steal wealth of information about the internal affairs and to propaganda videos to influence people. Rapid increase in the trend of social media is giving us chance to grow the chance as well of being in danger, the stuff being shared on internet is good for those who are saviour but can put us in danger also. Kids are spending more time on internet rather than field; everyone is seeking internet as its fellow or companion so these all should be used in a balance way. Youth or freshers to the global world or workplace are posing more security challenges as they mix up personal and private lives together. Every innovation comes with the boon and curse what matter is balance between these two. So many countries like North Korea, Iran, China, Pakistan, Turkey has banned some of the sites partially or fully in their countries to overcome the social media effect on national security that is the good practice indeed.



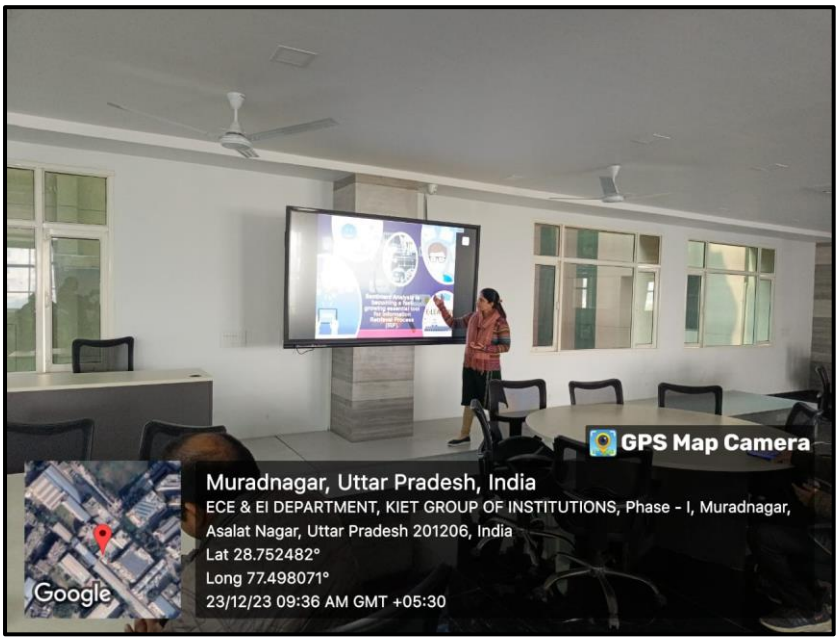
By:

Ms. Prerna Taylor
Assistant Professor
MBA

Title: Textual Sentiment Classification using Deep Learning Approach Via Autoencoders

Sentiment analysis is defined as the process of extracting the information of opinions, views, and emotions from heterogeneous sources such as tweets and database sources via NLP system.

The explosion of digital content across social media, reviews, and customer feedback has propelled the need for understanding sentiments expressed in textual data. Textual sentiment classification, a cornerstone of natural language processing, aims to discern the underlying sentiment—be it positive, negative, or neutral—from text. Deep learning, with its capacity to learn intricate patterns and representations, has revolutionized sentiment analysis. Among the various deep learning techniques, the utilization of autoencoders has emerged as a promising avenue for extracting meaningful representations from text data. **Autoencoders**, fundamentally used in unsupervised learning, operate on the principle of reconstructing input data, learning to encode and subsequently decode it. In the realm of textual sentiment classification, autoencoders offer a unique advantage by distilling essential features and patterns embedded within textual information. Textual sentiment classification using autoencoder-based deep learning methodologies represents an evolution in natural language processing, merging the power of neural networks with unsupervised learning principles. Autoencoders, pivotal in this approach, operate by compressing and reconstructing textual data, capturing intricate patterns and semantic features. The encoder component distills crucial information from input text, generating condensed representations that encapsulate underlying sentiment cues. These representations, learned through unsupervised training, serve as potent embeddings, encoding semantic nuances and contextual information crucial for sentiment comprehension. By employing these encoded features in subsequent sentiment classification models, this methodology facilitates a deeper understanding of sentiments within text, enabling machines to discern and categorize emotions expressed in diverse textual sources. Despite challenges like interpretability and computational intensity, this innovative approach fosters a more nuanced understanding of sentiments, advancing the frontier of sentiment analysis within natural language understanding paradigms. Ongoing research and refinement in this domain aim to further enhance the accuracy, efficiency, and interpretability of autoencoder-based sentiment classification models for broader practical applications.



This approach unveils hidden sentiment cues. However, challenges in model interpretability and computational complexity persist. Addressing these hurdles is imperative to unlock the full potential of autoencoder-based sentiment analysis, fostering more transparent models while optimizing computational resources. As research progresses, the focus extends to refining model architectures, integrating contextual information more effectively, and ensuring robustness in handling varied and imbalanced datasets.

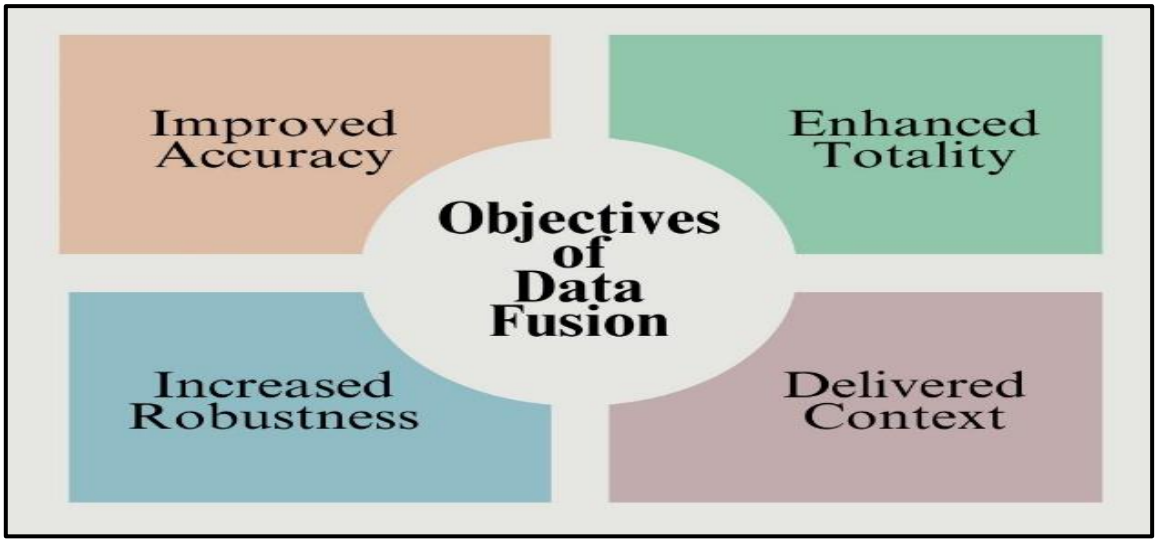
This concerted effort aims to not only enhance the accuracy and reliability of sentiment classification but also establish trust and understanding in the decision-making processes of these sophisticated deep learning models. Ultimately, advancements in this field hold the promise of enriching applications across sentiment-driven industries, from marketing to customer feedback analysis, by providing nuanced insights into human emotions expressed through text.

By:
Dr. Abha Kiran Rajpoot
Associate Professor
CSE(AI&ML)

Title: Harnessing Data Fusion and IoT Synergy for Realizing a Seamless Metaverse Ecosystem

Benefits of DF-IoT Synergy to Metaverse

In a visionary depiction of the Metaverse, users seamlessly engage in a collective digital reality, navigating diverse 3D environments. Personalized avatars facilitate communication, collaboration, and a thriving virtual economy. Powered by AR, VR, and AI technologies, the Metaverse blurs the line between physical and digital realms. Data Fusion (DF) is the amalgamation of disparate data sources for a comprehensive representation, vital for informed decision-making. Applied across domains, DF merges data from sensors, databases, and information streams to enhance understanding and utility. The Internet of Things (IoT) connects physical objects via the internet, collecting and exchanging data for automation and improved efficiency. As technology advances, IoT enriches the Metaverse by seamlessly integrating real-world data and interactions into digital landscapes. The synergy of Data Fusion and IoT in the Metaverse promises a transformative future, enhancing digital environments across industries. Challenges like data privacy and inclusivity must be addressed ethically. Navigating these complexities with responsible innovation can reshape entertainment, education, and healthcare, creating a technologically advanced and socially beneficial Metaverse.



While the journey is intricate, embracing the potential of DF-IoT synergy offers tools to shape a connected, innovative, and boundless future in the digital age.

By:
Ms. Kavya Gupta
Assistant Professor
CSE (AI&ML)

Title: A Review Literature on Fixed Point Theorems

In the present paper, a review on fixed point theory is given. Fixed point theory plays an important role in pure and applied mathematics. The contribution by various authors for said topic is discussed.

The theorems concerning the existence of fixed points and their properties are called fixed point theorems. Informally speaking, fixed point theory is a branch of mathematics that attempts to identify all self-maps (or self-correspondence) under which at least one element is left invariant.

Fixed point theorems are developed for single-valued or set-valued mappings of abstract metric spaces. In particular, the fixed-point theorems for set-valued mappings are rather advantageous in optimal control theory and have been frequently used to solve many problems in economics and game theory.

In a wide range of mathematical problems, the existence of a solution is equivalent to the existence of a fixed point for a suitable map. The existence of a fixed point is therefore of paramount importance in several areas of mathematics and other sciences. Fixed point results provide conditions under which maps have solutions. The theory itself is a beautiful mixture of analysis (pure and applied), topology, and geometry. Over the last 50 years or so the theory of fixed points has been revealed as a very powerful and important tool in the study of nonlinear phenomena. Fixed-point techniques have been applied in such diverse fields as biology, chemistry, economics, engineering, game theory, and physics. The aim of this presentation is to report new fixed-point results and their applications in which the indispensability of the fixed-point results is highlighted.

By:

Dr Archana Sharma,
Assistant Professor
Applied Sciences Department

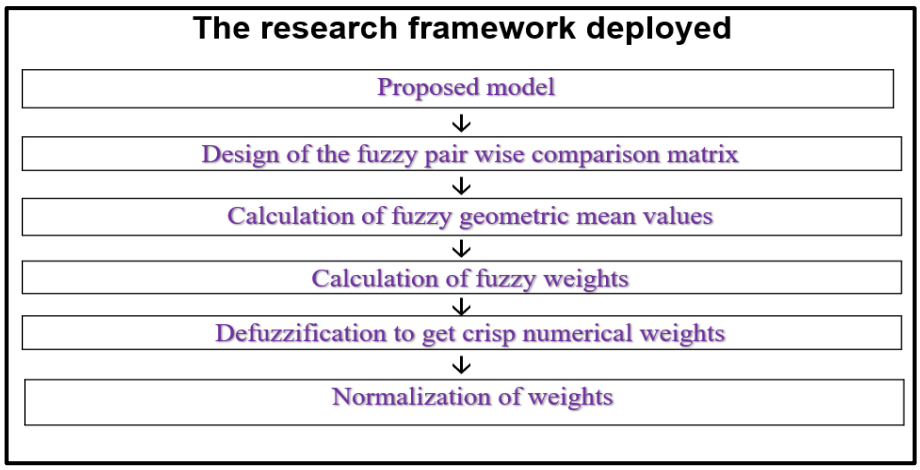
Title: Multi Criteria Decision Making

Exploration of critical factors in adoption of electrical vehicles in India using Fuzzy Analytic Hierarchy Process method

Multi Criteria Decision Making (MCDM) provides strong decision making in domains where selection of best alternative is highly complex.

In our day today life, so many decisions are being made from various criteria's. It is important to determine the structure of the problem and evaluate on the same. On the basis of sufficient information, we have to find out an optimum solution.

For complex problems, conventional methods (non-fuzzy) are usually dependent on mathematical approximations (E.g. linearization of nonlinear problems), which leads to poor performance and very expensive. Under such circumstances, fuzzy systems often outperform conventional MCDM methods.



weights of factors

	Mi	Ni	Rank
Battery Charging Time & Storage Technology (BTR)	0.22	0.21	2nd
Driving Range (DR)	0.08	0.08	4th
Safety Mechanism (SFT)	0.03	0.03	7th
Charging Station Availability (CTA)	0.36	0.34	1st
Service Station Availability (SSA)	0.17	0.16	3rd
Spare Parts Availability (SPA)	0.05	0.05	6th
Purchase Price (PRP)	0.06	0.06	5th
Running Cost (RC)	0.02	0.02	8th
Price Parity (PRT)	0.01	0.01	9th

Crisp weight age (M) and normalized average crisp weight ages (N) of all critical barriers, in above Table, expresses the ranks of the barriers with application of using Fuzzy AHP. It shows that 'Charging Station Availability (0.34)' has emerged the most culpable barrier in adoption of electrical vehicles.

The present assessment work is to use the 'Fuzzy Analytical Hierarchy Process' (FAHP) to investigate the crucial barriers in the adoption of electric vehicles in India. This demonstrates computation of relative weightage of components in adopting of electric automobiles using Multi Criteria Decision Making technique 'Fuzzy Analytical Hierarchy Process' (FAHP). The results may be utilized by the policy creators for nurturing adequate reforms and policies to effectively deal with adoption of electric automobiles. Fuzzy AHP had been developed to resolve the hierarchical fuzzy problems, Avoiding its risks on performance. Probably the first fuzzy AHP methodology had been presented by van Laarhoven and Pedrycz. Buckley's technique is applicable to calculate the relative importance weights for alternatives as well as criteria in fuzzy AHP.

It is requisite to identify critical barriers in the adoption of electric vehicles in India. NINE BARRIERS have been sorted from literature and expert's inputs in three categories. ***'Technical Barriers', 'Infrastructure Barriers', 'Economical Barriers'***

'Technical Barriers': Battery Charging Time & Storage Technology, Driving Range, Safety Mechanism

'Infrastructure Barriers': Charging Station Availability, Service Station Availability, Spare Parts Availability

Economical Barriers: Purchase Price, Running Cost, Price Parity.

Few more multi criteria decision analysis methodologies like 'Decision making trial and evaluation laboratory', Best Worst Method, 'Technique for order performance by similarity to ideal solution' and many more can be applied to get results for comparison.

By
Dr. Manisha Sharma
Associate Professor
Applied Sciences Department

Title: Securing the biometric through ECG using Machine Learning techniques

A LSTM Technique for Biometric Authentication Using ECG Beat Template Matching

An electrocardiogram (ECG), akin to fingerprints, serves as an individual's distinct biomarker; its form and rhythm vary considerably between individuals. Escort cloning and manipulation are exceedingly challenging with ECG-based biometric systems. Thus, ECG signals have been effectively implemented in a variety of security-sensitive biometric recognition applications. Significant obstacles in the current body of literature include (i) signal noise components, (ii) the incapability to extricate the feature set autonomously, and (iii) system performance. This article proposes a beat-based template matching deep learning (DL) method for resolving issues that conventional methods fail to address. Segmentation, R-peak detection, and ECG pulse denoising are performed during the pre-processing phase of the proposed method. The grayscale images of these noise-free ECG pulses are subsequently utilized in the proposed deep learning methodology. Additionally, this study develops a customized activation function to accelerate the convergence of the deep learning network. The proposed network is capable of autonomously extracting features from the input data. Using a publicly accessible ECGID biometric database, the efficacy of the network is evaluated, and the proposed method is contrasted with those described in the extant literature. The comparison reveals that the modified Siamese network authenticated biometrics, as proposed, exhibit the following performance metrics: 99.85% accuracy, 99.30% sensitivity, 99.85% specificity, and 99.76% positive predictivity. The experimental outcomes demonstrate that the proposed method outperforms currently available techniques.

1.Instead of classification, a retrieval-based algorithm is suggested for identifying the individual; thus, the system is secure.

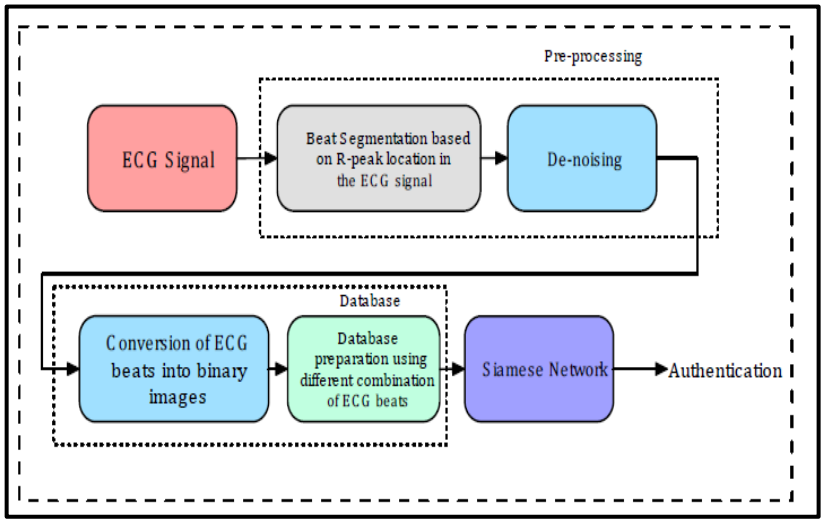
2. The system is made resistant to noise and extracts comprehensive information through the use of image-based beat authentication.

3.In a single frame image, the proposed customized deep learning model is evaluated with various rhythm combinations. This amalgamation enables the extraction of additional features from the subject data.

4.By transforming ECG signals into image data, we can leverage recent advancements in computer vision for image-related tasks. Image analysis is thus more straightforward than signal data analysis.

5.In this work, a customized activation function is created in order to devise a deep learning architecture with rapid convergence.

6. In order to evaluate the feasibility of the suggested approach, thorough comparative analyses are performed employing an assortment of measurement parameters—such as area under the curve (AUC), sensitivity, specificity, and positive predictivity.



We plan to implement Android and standalone applications for securing smartphones and laptops, as well as deploy the algorithm to the cloud for real-time industrial applications, in future development. Furthermore, the authors intend to implement an identical authentication process for offline databases.

By:

Praveen Kumar Gupta,
Assistant Professor
Department of Computer Applications

Title: Sustainable Energy Solutions and Smart Villages: *Empowering living standard of Villagers*

"Uplifting lives in rural communities through sustainable energy solutions and smart villages, empowering residents with a brighter and sustainable standard of living."

India has rich natural resources, diverse landscapes, and a unique cultural heritage. It is characterized by its ethnic diversity, with a significant tribal population contributing to its cultural richness. Agriculture is another important component of the country's economy, supporting a large section of the population.

Mainly, rainfed agriculture faces challenges like low productivity, lack of modern technology and inadequate irrigation facilities. The government is implementing schemes to promote sustainable farming practices and increase the income of farmers. Most of the farming in India is done mainly by small and marginal farmers adopting traditional farming methods. There is immense potential for horticulture and organic farming in the country. The government promotes horticulture through various schemes to diversify crops and increase

the income of farmers. Despite these efforts, challenges such as fragmented land holdings, lack of market access and vulnerability to climate change remain. Sustainable agricultural practices, technological interventions and market linkages are important to transform the agricultural landscape and ensure food security.

In the pursuit of inclusive development, ensuring the well-being of villagers is of paramount importance. Sustainable energy solutions and the concept of smart villages play an important role in raising the standards of living, especially in rural areas where agriculture is a way of life. Addressing the key needs of villages includes tackling common problems and challenges faced by farmers, implementing the Prerana initiative, leveraging government schemes like Kusum Yojana and adopting innovative approaches like micro farming and renewable energy integration. Let us look at these aspects to understand the transformative potential of these initiatives.

Major needs of villages:

Rural communities often struggle with infrastructure challenges, including limited access to electricity, inadequate irrigation facilities, and unreliable transportation. These factors significantly hinder agricultural productivity and the overall quality of life of villagers. Sustainable energy solutions aim to comprehensively address these challenges.

Common Problems and Challenges:

Farmers in rural areas face many challenges, from reliance on traditional, labor-intensive farming methods to the unpredictable nature of weather patterns. The lack of access to modern technology and reliable energy sources further exacerbates these issues, hindering agricultural development and economic growth in these areas.

Motivation and Initiative:

It is important to motivate villagers to adopt sustainable practices. Awareness programs highlighting the benefits of renewable energy such as lower energy costs and improved efficiency can encourage the adoption of sustainable energy solutions. Additionally, training

programs on the use of modern agricultural techniques and technology empower farmers to increase productivity.

Kusum Scheme:

In India, government initiatives like Kusum Yojana play an important role in promoting the use of solar energy in agriculture. The scheme encourages installation of solar pumps and grid-connected solar power plants, providing farmers with a reliable and sustainable source of energy for irrigation and other agricultural activities. Such initiatives contribute not only to energy efficiency but also to the economic well-being of farmers.

Micro Agriculture and Renewable Energy Integration:

Micro-level interventions, such as integrating renewable energy solutions in agriculture, offer promising prospects. The combination of solar energy for irrigation, biomass for cooking and wind energy for small-scale power generation forms a holistic approach to meet the energy needs of villages. This integration ensures continuous and reliable energy supply for various agricultural and domestic purposes.

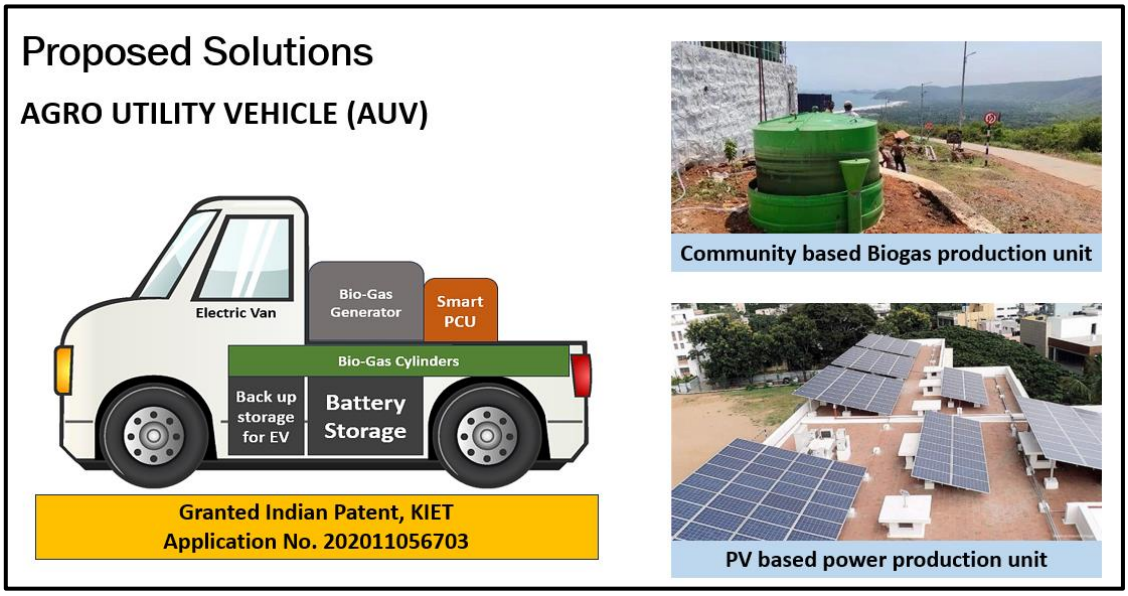
Essential Development:

There is a need for infrastructure development in rural areas to make sustainable energy solutions more accessible. This includes establishing reliable electricity supply systems, improving road networks for efficient transportation, and ensuring affordable financing options for farmers to invest in renewable energy technologies.

Hybrid Energy Systems and Agricultural Utility Vehicles:

Hybrid energy systems, combining multiple renewable sources, provide a flexible and consistent energy supply. Furthermore, the introduction of agricultural utility vehicles powered by clean energy sources could revolutionize farming practices. Electric tractors and other farm equipment reduce carbon footprint, reduce operating costs and contribute to sustainable farming practices.

Ultimately, sustainable energy solutions and smart villages are integral parts of rural development, promoting a more prosperous and sustainable future for villagers. By addressing the key needs of villages, overcoming common challenges faced by farmers and



implementing innovative initiatives like KUSUM Yojana and micro-farming and renewable energy integration, we can create a transformative impact. The adoption of hybrid energy systems and agricultural utility vehicles strengthens the foundation of a sustainable and empowered rural community. As we move forward, it is imperative to continue investing in such **initiatives to unleash the full potential of rural areas and improve the quality of life of their residents.**

By:

Dr. Brijesh Singh
Associate Professor
Department of EEE

Innovation Spotlights of the Month

Fungi Bio-Pesticide Offers Natural Solution Against Destructive Eucalyptus Beetle

Scientists have identified a pathogenic fungus naturally preying on eucalyptus snout beetles that shows promise as an affordable, eco-friendly biopesticide to protect eucalyptus plantations from the voracious pests.

Characterization studies confirm the fungus' insecticidal efficacy and durability, positioning it for mass production to sustainably manage beetle outbreaks threatening vast swaths of eucalyptus forests grown for paper pulp and timber.

The eucalyptus snout beetle (*Gonipterus platensis*), native to Australia but now globally invasive, represents an enormous threat to eucalyptus crops.

The beetles damage trees by aggressively feeding on leaves, buds, and shoots – stunting growth and depriving plants of photosynthesis. Severe outbreaks can entirely defoliate forests.

Unchecked infestations have exhibited explosive impact. A 1998 Colombian outbreak spread across 1,150 square kilometers in a single year, expanding its range 160 km annually. Losses reached 100% leaf area with up to 86% less harvestable wood volume.

Chemical insecticides offer only temporary control but jeopardize environmental and human health. Introduction of specialized tiny wasps as natural predators has succeeded but depends on expensive ongoing releases.

Seeking an organic, self-perpetuating method, researchers focused on entomopathogenic fungi that penetrate insect cuticles to invade tissue and release toxins – a common natural balancer of pest populations.

Studying infected beetles revealed two fungi genera – Beauveria and Metarhizium – with strains demonstrating both contact and ingestion lethality necessary for an effective biopesticide.

Selecting the Beauveria pseudobassiana strain based on its strength, adaptability and resilience, scientists further enhanced its properties to produce a optimized fungi-based commercial biopesticide product called Bpbm Eco-Vida.

The process involved confirming its ideal mode of action, screening for UV radiation tolerance and genetic stability across generations – necessary for reliable long-term field control after spraying.

Bpbm Eco-Vida achieved 100% beetle mortality in trials, also exhibiting favourable traits like shelf-life retention in storage and feasibility for economic mass production.

With over twenty million hectares of eucalyptus planted globally, primarily for paper and wood pulp feedstock, sustainable solutions to curb its most threatening insect pest are essential.

The Bpbm Eco-Vida biopesticide harnesses nature's own defense mechanisms against beetles in a self-perpetuating, ecosystem-friendly form with longevity advantages over short-term synthetic chemicals or costly introduced wasps.

Combined with vigilant monitoring, sanitation and cultural controls like trap trees, the fungi offer forest managers an affordable biological weapon for integrated pest management ensuring eucalyptus crop protection into the future.

Its successful development from forest floor discovery to optimized commercial product demonstrates how ecological principles can sustainably support essential forestry industries.

Source: https://www.gktoday.in/fungi-bio-pesticide-offers-natural-solution-against destructive-eucalyptus-beetle/

Biosensors in disease diagnosis

Biosensors represent a transformative class of analytical devices that merge biological components with transducers to detect and quantify specific molecules. These devices have gained prominence across diverse fields, from medical diagnostics to environmental monitoring, due to their precision, speed, and sensitivity. The fundamental principle involves harnessing the unique interactions between biological molecules, such as enzymes, antibodies, or nucleic acids, and their corresponding target analytes. When these interactions occur, they generate a measurable signal, typically converted into an electrical, optical, or other detectable output by a transducer [1]. (schematic diagram Fig. 1)

In healthcare, biosensors play a critical role in disease diagnosis, offering rapid and accurate detection of biomarkers associated with various conditions. They enable early intervention, personalized medicine, and point-of-care testing, revolutionizing traditional diagnostic approaches. Beyond healthcare, biosensors find applications in environmental monitoring, food safety, and security, contributing to the detection of pollutants, pathogens, and toxins. As technology advances, biosensors continue to evolve, promising further miniaturization, increased specificity, and expanded utility, thereby shaping a future where real-time, on-site detection becomes an integral part of diverse scientific and industrial processes [2].

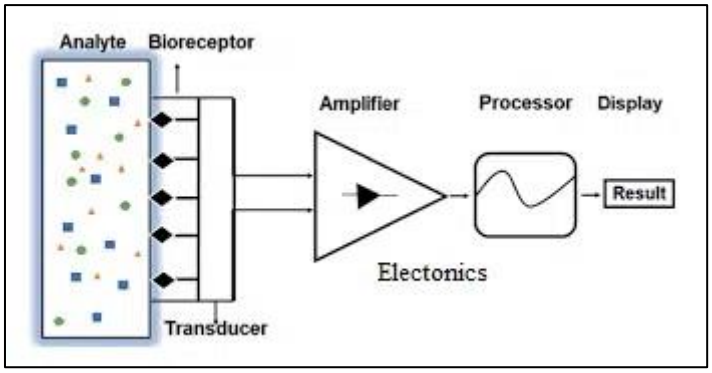


Fig. 1. Biosensor design schematic Diagram

Biosensors play a pivotal role in revolutionizing disease diagnosis by offering rapid, sensitive, and specific detection methods. These devices integrate biological components with transducers to convert biological signals into measurable electrical, optical, or other quantifiable signals. The application of biosensors in disease diagnosis has led to advancements in early detection, personalized medicine, and point-of-care testing across various medical domains [3].

(1) Early Detection:

Biosensors enable the early detection of diseases by identifying specific biomarkers associated with various conditions. In cancer diagnosis, for instance, biosensors can detect trace amounts of tumor-specific markers, allowing for early intervention and improved treatment outcomes [4].

(2) Point-of-Care Testing:

One of the most significant contributions of biosensors is their potential for point-of-care testing. Portable and user-friendly biosensor devices can be employed in settings outside traditional laboratories, facilitating rapid and on-site diagnosis. This is particularly valuable in resource-limited areas where access to sophisticated diagnostic facilities may be limited [5].

(3) Personalized Medicine:

Biosensors contribute to the concept of personalized medicine by enabling the identification of individual variations in disease markers. This allows for tailored treatment plans based on the unique characteristics of a patient's condition, optimizing therapeutic outcomes and minimizing adverse effects [6].

(4) Infectious Disease Diagnosis:

Biosensors have proven valuable in the rapid detection of infectious diseases. They can identify specific pathogens or antigens, aiding in the timely diagnosis of conditions such as HIV, malaria, or respiratory infections. This quick detection is crucial for implementing timely treatment and preventing the spread of infectious agents [7].

(5) Continuous Monitoring:

Implantable biosensors provide a means for continuous monitoring of physiological parameters, offering real-time data on an individual's health status. This continuous monitoring is particularly useful in chronic diseases such as diabetes, where biosensors can measure glucose levels, allowing for prompt adjustments to treatment plans [8].

(6) Neurological Disorders:

Biosensors are also being explored for diagnosing and monitoring neurological disorders. They can detect biomarkers associated with conditions like Alzheimer's and Parkinson's disease, aiding in early diagnosis and providing insights into disease progression [9].

(7) Environmental Monitoring:

Biosensors are not limited to clinical applications; they also find use in environmental monitoring. They can detect pollutants, toxins, and pathogens in air, water, and soil, contributing to the early identification of potential health hazards [10].

(8) Cost-Effective Screening:

With advancements in technology and manufacturing processes, biosensors have become more cost-effective. This makes them viable for large-scale screening programs, facilitating the identification of at-risk populations and contributing to public health initiatives [11].

In conclusion, biosensors have emerged as powerful tools in disease diagnosis, offering innovative solutions for early detection, personalized medicine, and point-of-care testing. As technology continues to advance, biosensors are likely to play an increasingly prominent role in transforming healthcare, improving patient outcomes, and contributing to a more efficient and accessible diagnostic landscape.

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KIET (R&D) Policies

Promotion of research culture with the formulation of policies by the R&D Committee is as follows:

- KIET Research Policy
- KIET Ethics Policy for Students and Faculty Members
- CV Raman Award Policy
- Policy for KIET Research Faculty Members
- Guidelines for Organizing International Conferences in Institute
- Departmental Research Committee
- KIET Policy for Research Proposals/Grants
- KIET Policy for Research Guidance/Ph.D. Guidance for Improving Research Culture

For details, kindly refer - https://www.kiet.edu/Research%20and%20Development%20Policy

Research Incentives for Students for Journal Publication

- An incentive amount of rupees five thousand (Rs. 5,000/-) is applicable to student authors for publications in any SCI, non-paid journals.
- An incentive amount of rupees three thousand (Rs. 3,000/-) is applicable to student authors for publications in any Scopus, non-paid journals.
- Published papers must have "**KIET Group of Institutions, Delhi-NCR, Ghaziabad**" as the affiliation.
- The application with the relevant documents to be submitted to the Head of the Department once the research paper is published.
- The author needs to claim the incentive only after the volume number, issue number, and page number have been assigned to the research paper by the journal.
- Authors must also be aware of the KIET Ethics Policy for Students and Faculty Members on academic dishonesty and plagiarism **(Annexure I)**.
- A publication claim under the Research Incentive Schemes (RIS) of KIET must be made within a month of publication in the prescribed form to the Head of the Department (**Annexure II (a)**). The Head of the Department will send the file with recommendations to the Registrar office for further processing.

Presentation of Research Papers in Conferences in India

- The International/National conference must be of repute (viz. IEEE, Springer/Wiley/IPC etc.) and the hosting institutions must be of repute as well (IITs/IISc/NITs/IIITs/Universities/Deemed Universities etc.).
- For the Research paper Publication by students (based upon Final Year Project outcome as notified by Dean Academics) in Scopus Indexed Conference, the institute will reimburse

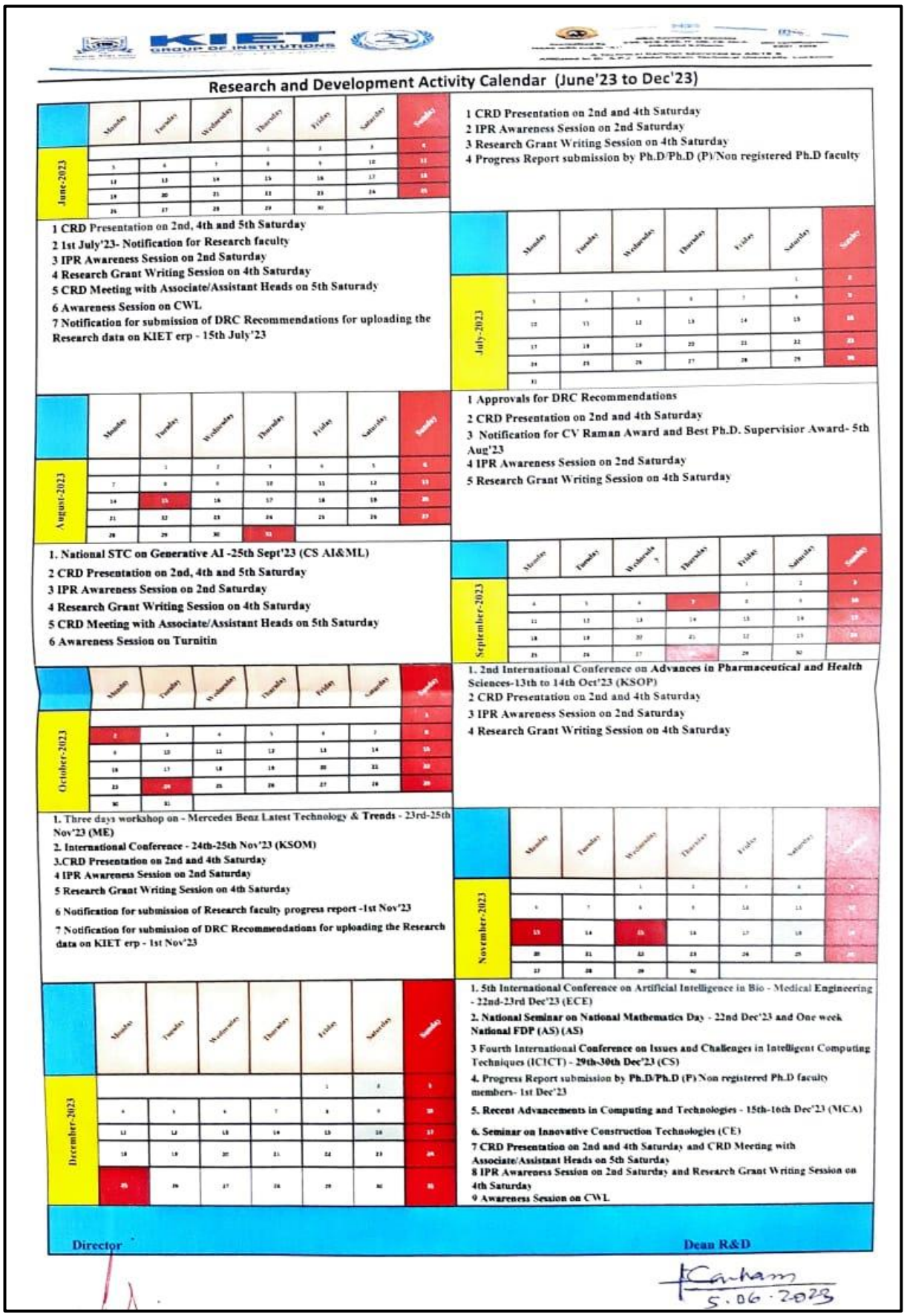
50% of the registration fee to each project group.

- For the Research paper Publication by students (other than Final Year Project outcome) in Scopus Indexed Conferences by student of I, II, II and IV years, the institute will reimburse Rs. 2,000/- or T.A (as per Institute policy) + registration fees whichever is less.
- Only one student may use the facility in the case of joint authorship.
- Authors must also be aware of the KIET Ethics Policy for Students on academic dishonesty and plagiarism (**Annexure I**).
- Published paper must have '**KIET Group of Institutions, Delhi-NCR, Ghaziabad**' as the affiliation.
- The application with the relevant documents to be submitted to the HoD once the research paper is published and is available online.
- A publication claim must be made within a month of the publication of a research paper in the prescribed form to the Head of the Department (**Annexure III (a)**). The Head of the Department will send the file with recommendations to the Registrar office for further processing.

Note: For Annexures and more details kindly refer:

https://www.kiet.edu/Research%20and%20Development%20Policy

Research and Development Activity Calendar (June 2023 – Dec. 2023)



KIET GROUP OF INSTITUTIONS

Research and Development Activity Calendar (June'23 to Dec'23)

June-2023

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

1 CRD Presentation on 2nd, 4th and 5th Saturday
2 1st July'23- Notification for Research faculty
3 IPR Awareness Session on 2nd Saturday
4 Research Grant Writing Session on 4th Saturday
5 CRD Meeting with Associate/Assistant Heads on 5th Saturady
6 Awareness Session on CWL
7 Notification for submission of DRC Recommendations for uploading the Research data on KIET erp - 15th July'23

1 CRD Presentation on 2nd and 4th Saturday
2 IPR Awareness Session on 2nd Saturday
3 Research Grant Writing Session on 4th Saturday
4 Progress Report submission by Ph.D/Ph.D (P)/Non registered Ph.D faculty

July-2023

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

August-2023

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

1. National STC on Generative AI -25th Sept'23 (CS AI&ML)
2 CRD Presentation on 2nd, 4th and 5th Saturday
3 IPR Awareness Session on 2nd Saturday
4 Research Grant Writing Session on 4th Saturday
5 CRD Meeting with Associate/Assistant Heads on 5th Saturday
6 Awareness Session on Turnitin

1 Approvals for DRC Recommendations
2 CRD Presentation on 2nd and 4th Saturday
3 Notification for CV Raman Award and Best Ph.D. Supervisior Award- 5th Aug'23
4 IPR Awareness Session on 2nd Saturday
5 Research Grant Writing Session on 4th Saturday

September-2023

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
				1	2	3
4	5	6	7	8	9	10
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25	26	27	28	29	30	

October-2023

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
						1
2	3	4	5	6	7	8
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23	24	25	26	27	28	29
30	31					

1. Three days workshop on - Mercedes Benz Latest Technology & Trends - 23rd-25th Nov'23 (ME)
2. International Conference - 24th-25th Nov'23 (KSOM)
3.CRD Presentation on 2nd and 4th Saturday
4 IPR Awareness Session on 2nd Saturday
5 Research Grant Writing Session on 4th Saturday
6 Notification for submission of Research faculty progress report -1st Nov'23
7 Notification for submission of DRC Recommendations for uploading the Research data on KIET erp - 1st Nov'23

1. 2nd International Conference on Advances in Pharmaceutical and Health Sciences-13th to 14th Oct'23 (KSOP)
2 CRD Presentation on 2nd and 4th Saturday
3 IPR Awareness Session on 2nd Saturday
4 Research Grant Writing Session on 4th Saturday

November-2023

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
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27	28	29	30			

December-2023

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
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25	26	27	28	29	30	31

1. 5th International Conference on Artificial Intelligence in Bio - Medical Engineering - 22nd-23rd Dec'23 (ECE)
2. National Seminar on National Mathematics Day - 22nd Dec'23 and One week National FDP (AS) (AS)
3 Fourth International Conference on Issues and Challenges in Intelligent Computing Techniques (ICICT) - 29th-30th Dec'23 (CS)
4. Progress Report submission by Ph.D/Ph.D (P)/Non registered Ph.D faculty members- 1st Dec'23
5. Recent Advancements in Computing and Technologies - 15th-16th Dec'23 (MCA)
6. Seminar on Innovative Construction Technologies (CE)
7 CRD Presentation on 2nd and 4th Saturday and CRD Meeting with Associate/Assistant Heads on 5th Saturday
8 IPR Awareness Session on 2nd Saturday and Research Grant Writing Session on 4th Saturday
9 Awareness Session on CWL

Director

Dean R&D

5.06.2023

Various Research Labs in KIET

S. No.	Research Lab/Centre of Excellence	Department
1	Centre of Robotics and Mechatronics	ECE
2	KIET NI LABVIEW Academy	ECE
3	Bio-Medical Instrumentation MBS	ECE
4	Space Technologies	ECE
6	D-Link Global Center of Excellence	IT, CS, MCA
7	Centre for Automotive Mechatronics in association Mercedes Benz	ME
8	CAD/CAM Lab	ME
9	Material Science & Testing Lab	ME
10	IC Engine and Automobile Lab	ME
11	Maker's Space Innovation Lab	All Branches
12	Central Instrumentation Lab	Pharmacy
13	Pharmacology research Lab	Pharmacy
14	Center of Excellence for Renewable Energy based Power System for Electrical Power Supply and Transportation	EN
15	Centre of Excellence in latest art of structural analysis and design facilities viz. STAAD PRO, E-TABS, SAP, ANSYS, PLAXIS, Primavera etc.	CE
16	Centre of Excellence in Process Control and Industrial Automation	EN
17	Finance Lab	MBA


Centres of Excellence
KIET-MBS Research & Development Centre for Bio-Medical Instruments
Centre for Advanced Woodworking
Automotive Mechatronics Centre in Collaboration With Mercedes-Benz India Pvt. Ltd.


A Glimpse of Collaborative Research and Development Presentation
GPS Map Camera
Muradnagar, Uttar Pradesh, India
KIET Group of Institutions, IT Department,Muradnagar, Ghaziabad, Uttar
ZT Architecture in 6G

Meghnad N. Saha (Born Oct. 6, 1893, Seoratali, near Dacca, India—died Feb. 16, 1956, New Delhi) Indian astrophysicist noted for his development in 1920 of the thermal ionization equation, which, in the form perfected by the British astrophysicist Edward A. Milne, has remained fundamental in all work on stellar atmospheres.

This equation has been widely applied to the interpretation of stellar spectra, which are characteristic of the chemical composition of the light source.

The Saha equation links the composition and appearance of the spectrum with the temperature of the light source and can thus be used to determine either the temperature of the star or the relative abundance of the chemical elements investigated.

Saha became professor of physics at the University of Allāhābād in 1923 and was elected a fellow of the Royal Society in 1927. He went to the University of Calcutta in 1938, where he was instrumental in the creation of the Calcutta Institute of Nuclear Physics, of which he became honorary director.

In his later years Saha increasingly turned his attention to the social relation of science and founded the outspoken journal *Science and Culture* in 1935. In 1951 he was elected to the Indian Parliament as an independent.