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अनुसंधान

(KIET Research Magazine)

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**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.



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Message from the Face of Cover Page



Dear Readers,

I am glad to wish the contributors of the monthly Research Magazine, "अनुसंधान (KIET Research Magazine)", which is dedicated to bring out the current technical of the ongoing research.

This is an incredible practice that must be proliferated for further collaborative research and enlightening the readers as well as leverage the shared knowledge while executing the published ideas to find solutions in this time zone of global environmental issues like climate change, water crisis, energy transition, water pollution, and other environmental pollution challenges.

One of the major challenges that humanity is facing is polluted water resources, water scarcity, and clean drinking water. Water is the major survival element of this planet. The rise in contaminants like microplastics/ nanoplastics, fluoride as a groundwater pollutant, arsenic contamination, natural organic matter, and nitrate contamination are widespread and can be resolved through processes and technologies like adsorption process, magnetic separation, coagulation, membrane bioreactor technology, etc. The research in this magazine may ignite the brilliant mind to bring out more ideas from the upcoming youth to resolve contamination issues and remove the contaminants and pollutants from the environmental substrate resulting in the relocation of the present imbalanced ecosystem towards more resilient and sustainable cities. Interdisciplinary technological amalgamation between researchers, engineers, and domain experts may foster innovation and enable a holistic understanding and solution to complex environmental challenges.

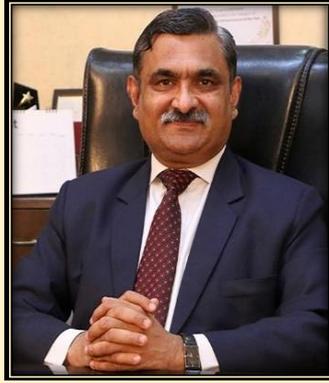
From technological development to operational establishment, interdisciplinary research integration is required to empower us to push the boundaries of what seems to be impossible. By harnessing the power of the innovative and creative minds of budding technocrats and combining it with our expertise and guidance, we can continue to innovate and safeguard our mother nature, which has given us life. Together, let us embark on this journey of knowledge, discovery, and impact in environmental research.

In conclusion, I am glad to witness the transformative role that research plays in shaping our domain. I would like to convey my heartiest congratulations to KIET Research Magazine for its remarkable efforts in the promotion and presentation of the research in the research community. The research work presented in the KIET magazine will serve as a valuable resource for those who want to do action-oriented research. I wish all the researchers at KIET continued success and perfection in their scholarly pursuits. May your dedication to research, your spirit of inquiry, and your commitment to excellence continue to push the boundaries of human knowledge and contribute to a brighter and more prosperous future for all of us.

With the warmest congratulations and best wishes.

Dr. Mika E.T. Sillanpaa
Department of Chemical Engineering Technology
University of Johannesburg, South Africa

Message from Chief Patron



Dear Members of the Research Community,

As the Director of the KIET Group of Institutions, I am pleased to introduce our latest research endeavours and their possibilities for shaping the future. Our vision is to push the boundaries of knowledge and innovation, and through the tireless efforts of our dedicated researchers, we can achieve this goal.

In the coming months, we will focus on various cutting-edge research topics, including artificial intelligence, biotechnology, and renewable energy. We aim to use these fields to address the most pressing challenges faced by society today, such as climate change, disease, and poverty.

We believe that by fostering an environment of collaboration and open communication, we can make significant progress in these areas. Our researchers will work closely with industry partners, government agencies, and other academic institutions to share their findings and develop new technologies and solutions.

We are excited about our research's possibilities and look forward to sharing our progress with the community. We expect our work to lead to breakthroughs and technologies that will positively impact society, and we are committed to making our research accessible to all who can benefit from it.

Finally, I would like to extend my warmest wishes to all our researchers and partners. Their hard work and dedication make our institute a leading force in the research community, and we are honoured to have you on board. Together, we can achieve remarkable things.

Dr. (Col) A Garg

Director

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 new technologies and solutions, share their findings, and disseminate their findings.

Our studies will ultimately 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 great 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

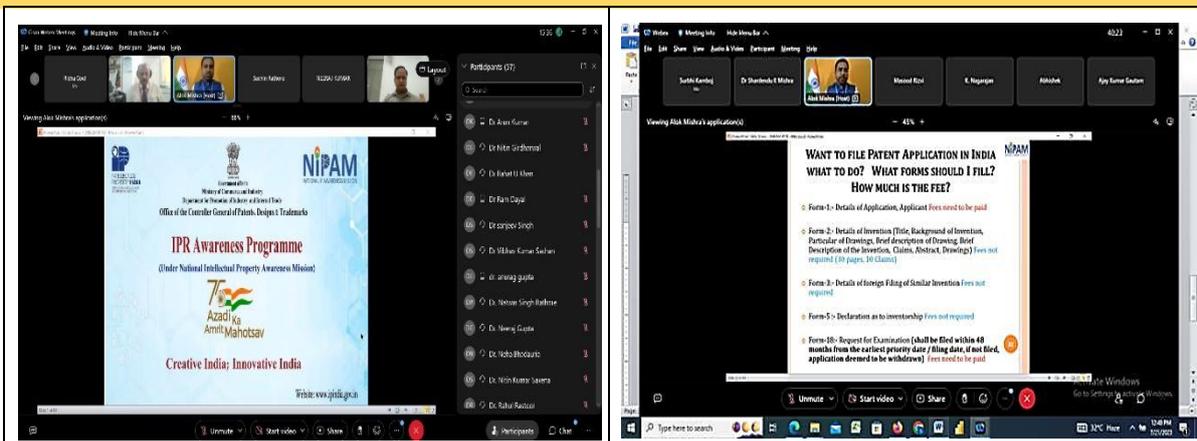


An informative and interactive session was organized by the Electrical and Electronics Engineering Department, featuring Dr. R. Harikumar, a renowned expert in energy management and conservation. Dr. Harikumar, the Director of the Energy Management Centre (EMC) under the Government of Kerala, has spearheaded numerous initiatives to promote renewable energy and enhance energy efficiency. With over 28 years of diverse experience, he has played a key role in shaping India's energy landscape.

During the session, Dr. Harikumar shared his insights on the successful launch of "Soura," a joint program by KSEBL and ANERT. This initiative aims to achieve 1000 MW of solar power by 2022, and Dr. Harikumar provided valuable information about its progress and achievements.



The Centre for Automotive Mechatronics successfully concluded its 5th ADAM Batch with 100% placement, and the next session for Batch 6 is going to commence soon. The three-day EV training for Batch 5 was conducted by Mr. Shivaji Bhosale, Aftersales Manager, Mercedes Benz India Pvt. Ltd.



KIET Group of Institutions organized an "online workshop" on "IPR-Patents, Designs & Trademarks Filing Procedures under the National IP Awareness Mission (NIPAM 2.0)" on 21 July 2023. The event was conducted in association with the Office of the Controller General of Patents, Designs and Trademarks, Ministry of Commerce & Industry, Government of India.

The event featured Mr. Alok Mishra, Assistant Controller of Patents & Designs, and NIPAM Officer, Patent Office, New Delhi, as the esteemed speaker.



The Department of Electrical & Electronics Engineering at KIET Group of Institutions, Ghaziabad, has achieved another milestone by signing a Memorandum of Understanding (MoU) with Shaft Energies Pvt. Ltd., Noida, on 27th July 2023. This collaboration holds great promise for both the institution and the industry.

Shaft Energies Pvt. Ltd. specializes in Lithium-ion battery pack solutions for electric vehicles across various segments, aligning perfectly with the growing demand for sustainable and eco-friendly transportation solutions. Through this partnership, KIET's Electrical & Electronics Engineering students can gain valuable insights into cutting-edge technology and practical applications related to electric vehicle battery technology.

Mr. Manish Bhardwaj's presence at the ceremony as the Founder and CEO of Shaft Energies Pvt. Ltd. indicates his dedication to fostering innovation and nurturing young talent. His vision to develop startups, offer internships with potential for pre-placement offers, and promote research-based project learning for KIETians showcases Shaft Energies' commitment to empowering the next generation of engineers and entrepreneurs. The MoU exchange ceremony represents a significant step towards bridging the gap between academia and industry.

Statistics of KIET Research and Development Activities

Rankings & Accreditations

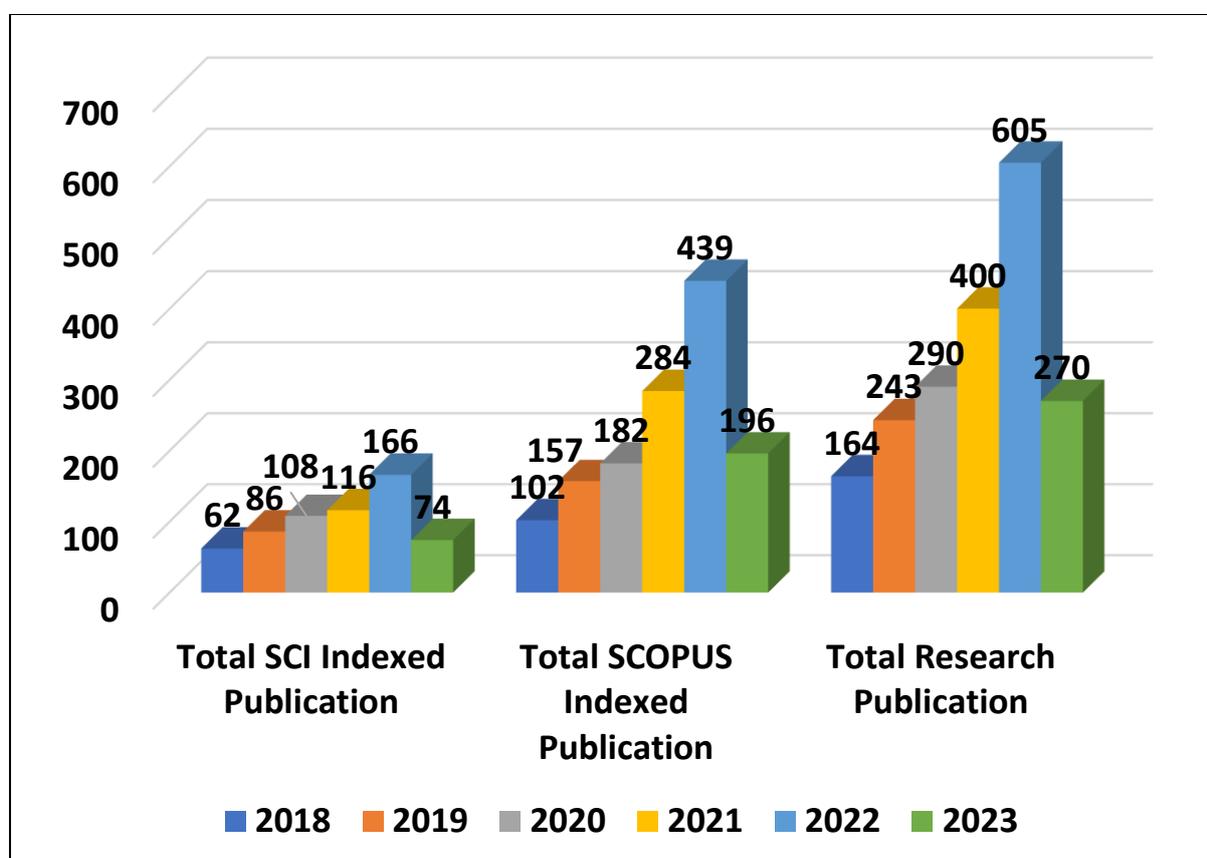
- NAAC - Grade 'A+' (Cycle 2 Assessment) - Accredited for 5 years till 03 Jan 2027.
- NIRF 2023 (Pharmacy – Rank 88 & Engineering - Rank Band (151-200)).
- NIRF 2023 Innovation Rank Band (51-100).
- QS-IGAUGE - 'Diamond' College Rating (till Feb 2024) & 'Institution of Happiness' Award.
- Innovation 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)

 <p>सूचना का अधिकार RIGHT TO INFORMATION</p>	<p>दूरभाष/TEL : 26962819, 26567373 (EPABX) : 26565694, 26562133 : 26565687, 26562144 : 26562134, 26562122 फैक्स/FAX : 26960629, 26529745 Website : http://www.dsir.gov.in (आयुर्विज्ञान 9001:2008 प्रमाणित विभाग) (AN ISO 9001:2008 CERTIFIED DEPARTMENT)</p>	 <p>सत्यमेव जयते</p>	<p>भारत सरकार विज्ञान और प्रौद्योगिकी मंत्रालय वैज्ञानिक और औद्योगिक अनुसंधान विभाग टेक्नोलॉजी भवन, नया महरौली मार्ग, नई दिल्ली - 110016 GOVERNMENT OF INDIA MINISTRY OF SCIENCE AND TECHNOLOGY Department of Scientific and Industrial Research Technology Bhavan, New Mehrauli Road, New Delhi - 110016</p>
			
F.No. 11/791/2018-TU-V		Date: 28 th April 2022	
<p>The Vice Chairman Krishna Charitable Society, 13 KM Stone, Ghaziabad-Meerut Road, Ghaziabad – 201206, Uttar Pradesh</p>			
<p>Subject: Renewal of Recognition of Scientific and Industrial Research Organisations (SIROs).</p>			
<p>Dear Sir,</p>			
<p>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.</p>			
<p>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.</p>			
<p>3. Receipt of this letter may kindly be acknowledged.</p>			
<p>Yours faithfully,  (Dr. P.K. Dutta) Scientist - 'F'</p>			

KIET Research Credentials

A total of 612 SCI Research Publications and 1360 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 July 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	74	196	270
Total	612	1360	1972



Category	Number of Publication for June 2023	Number of Publication for July 2023
SCOPUS Publications	33	32
Web of Science Publication	11	14

Details of Patents Published/Granted

Title of the Invention: **Formulation and Evaluation of Solid Dispersion of Curcumin for the Enhancement of Solubility and Bioavailability using Poloxamer**

Application Number: 202311039917 A (Indian Patent Office)

Applicants(s): KIET Group of Institutions (KSOP)

Date of Filing: 12-06-2023

Date of Publishing: 07-07-2023

Field of the Invention: The invention is related to Curcumin, which is the main active constituent of turmeric, derived from *Curcuma longa*, represented by the family Zingiberaceae that can be employed in the management of several ailments, but its major anomaly is, its imperfect water solvability, that tend to restrict its bioavailability.

OBJECTS OF THE INVENTION: The objective of this work is to Prepare& and characterize the Solid dispersion of curcumin that may overcome the hurdle of poor solvability and Bioavailability.

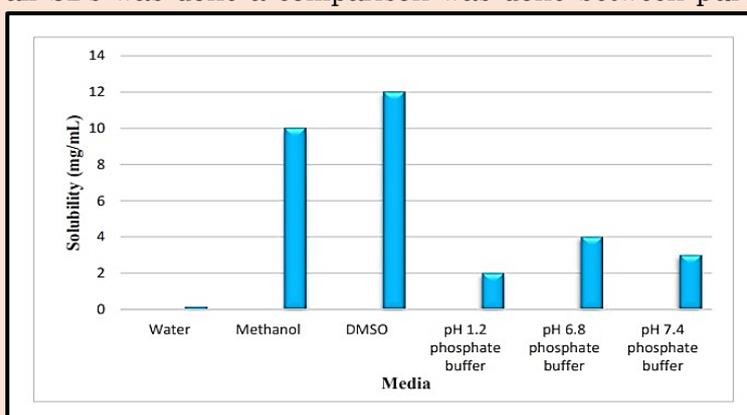
Methodology: The solid dispersion of curcumin was produced by the hot melt method by utilizing curcumin, Poloxamer 188, and Mannitol a pre-formulation study was performed and its melting point, solvability, and release was assessed, drug release of all SDs was compared with pure curcumin, The 15 formulations were prepared and the formulation was optimized, on the basis of solubility study and drug release data, optimized formulation was subjected to FTIR, TLC, etc. The optimized formulation was subjected to SEM, DSC, and XRD. The in vitro drug release pattern of all prepared SDs was carried out and a comparison was made with pure curcumin. Also, the formulation was subjected to stability study, percentage drug content evaluation, etc.

Results: The release pattern of all SDs was done a comparison was done between pure

curcumin and SDs, the prepared solid dispersion represented an extensive escalation in the solvability and drug release, and the optimized preparation was subjected to FTIR, demonstrating that there was no interactivity between the carrier and Drug itself, the creation of solid dispersion could be satisfied with the

SEM, XRD etc. The Stability study was performed for 6 months which demonstrated that SDs were quite stable. The prepared formulation has demonstrated that there was a tremendous escalation in drug release and Solvability.

Conclusion: The prepared solid dispersion of curcumin with Poloxamer 188, meets the expectation of the solvability enhancement and release of curcumin from prepared formulation. **Fig above: Representing solubility pattern of Curcumin in solvents**



S. No	Medium	Solubility(mg/ml)
1	Water	0.15±0.20
2	Methanol	10.02±0.34
3	DMSO	12.01±0.98
4	Phosphate buffer pH 1.2	2.0±0.54
5	Phosphate buffer pH 6.8	4.0±0.28
6	Phosphate buffer pH 7.4	3.0±0.35

All values represent mean ±(n=3)

Figure 2: Solubility outline of Curcumin in various solvents

Title of the Invention: System and Method for Medicinal Plant Leaves Detection

Application Number: 202311033667 A (Indian Patent Office)

Applicant(s): Mohammad Ausaf and team (KIET Group of Institutions, CS)

Date of Filing: 12-05-2023

Date of Publishing: 14-07-2023

Field of the Invention: The present invention is related to the Computer Science field, specifically, the work is related to computer vision, machine learning, and image processing. The field of invention is for medicinal plant leaves detection system.

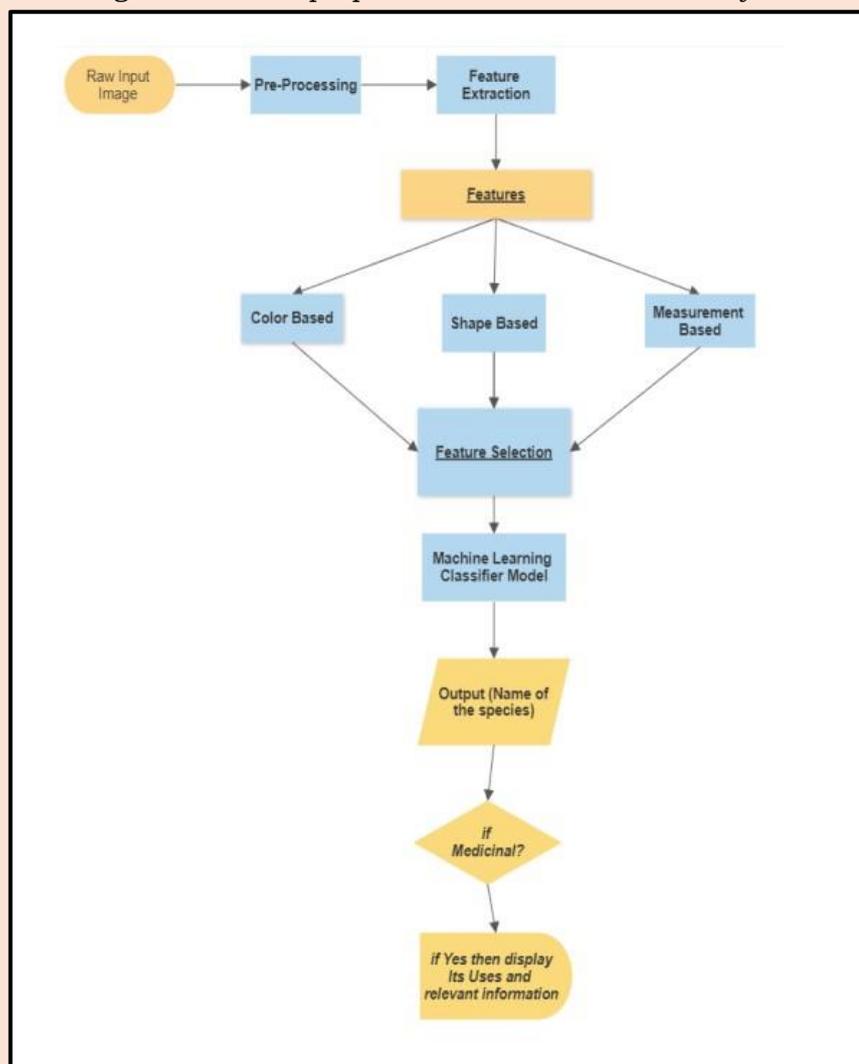
The present invention is directed to:

- Limited availability of trained experts: Currently, identifying and classifying medicinal plant leaves require specialized knowledge and expertise, which may not be readily available in all regions. A detection system can overcome this challenge by automating the process and making it accessible to a wider audience.

- Inaccurate identification: Mistakes in identifying medicinal plant leaves can have serious consequences, such as misdiagnosis and improper treatment. A detection system can reduce the risk of error by using advanced technology to analyse leaves and provide accurate identification.

- Time-consuming manual analysis: Traditional methods of identifying medicinal plant leaves involve visual inspection and manual analysis, which can be time-consuming and labor-intensive. A detection system can streamline the process by automating the analysis, thus saving time and effort.

- Preservation of biodiversity: Many medicinal plants are endangered or at risk of extinction, and their leaves may be difficult to identify in



the field. A detection system can aid in the preservation of biodiversity by facilitating the identification and classification of medicinal plant leaves, which can inform conservation efforts. Above all the state-of-the-art technology includes the closest citations or Prior Art for both Patented and Non-Patented Citations:

- Deep Learning: Deep learning algorithms such as Convolutional Neural Networks (CNNs) are widely used to analyze images of medicinal plant leaves. These algorithms are trained on large datasets of annotated images to learn the features and characteristics of different plant species.
- Hyperspectral Imaging: Hyperspectral imaging is a technology that captures images of medicinal plant leaves at different wavelengths, providing detailed

information about their chemical composition and physiological properties. This technology can be used to identify the presence of specific compounds in medicinal plant leaves.

- Near-Infrared Spectroscopy (NIRS): NIRS is a nondestructive analytical technique that measures the absorbance of near-infrared light by medicinal plant leaves. This technology can be used to determine the chemical composition of plant leaves and identify different plant species.
- Mobile Applications: Mobile applications that use image recognition and machine learning algorithms can be used to identify and classify medicinal plant leaves in the field. These applications can be used by farmers, botanists, and researchers to identify different plant species quickly and accurately.

All publications herein are incorporated by reference to the same extent as if each individual publication or patent application were specifically and individually indicated to be incorporated by reference. Where a definition or use of a term in an incorporated reference is inconsistent or contrary to the definition of that term provided herein, the definition of that term provided herein applies and the definition of that term in the reference does not apply.

Title of the Invention: System and Method for Smart Healthcare Management

Application Number: 202311040373 A (Indian Patent Office)

Applicant(s): Ms. Khushi and team (KIET Group of Institutions, CS)

Date of Filing: 13-06-2023

Date of Publishing: 14-07-2023

Field of the Invention: The present invention is related to the Computer Science field. The technology related to Healthcare & Management i.e., Healthcare Technology/Smart Health which combines technology and digital tools to improve the storage of reports of patients.

Objects of the Invention: The objective of the present invention is to provide a one-stop solution for selecting doctors according to the disease, Path-labs, Blood bank system, and e-pharmacy.

The main objective of SMART HEALTH is to accurately store the reports and records of patients such as lifestyle habits, and medical history.

This invention includes a website that will help in selecting the doctors for the particular disease based on the given symptoms by the user and his/her reports.

The main motive of the present invention is to provide a one-stop solution for many facilities and enhance existing healthcare systems by giving the feature of generic medicines.

The interface helps in buying medicine at a low cost by comparing the cost of medicine on all the online pharmacies and it will help a lot to the patients.

In addition to the above,

- Doctors can easily view all the patients either present or past.
- Doctors are also free to take help from the prescription of other doctors.

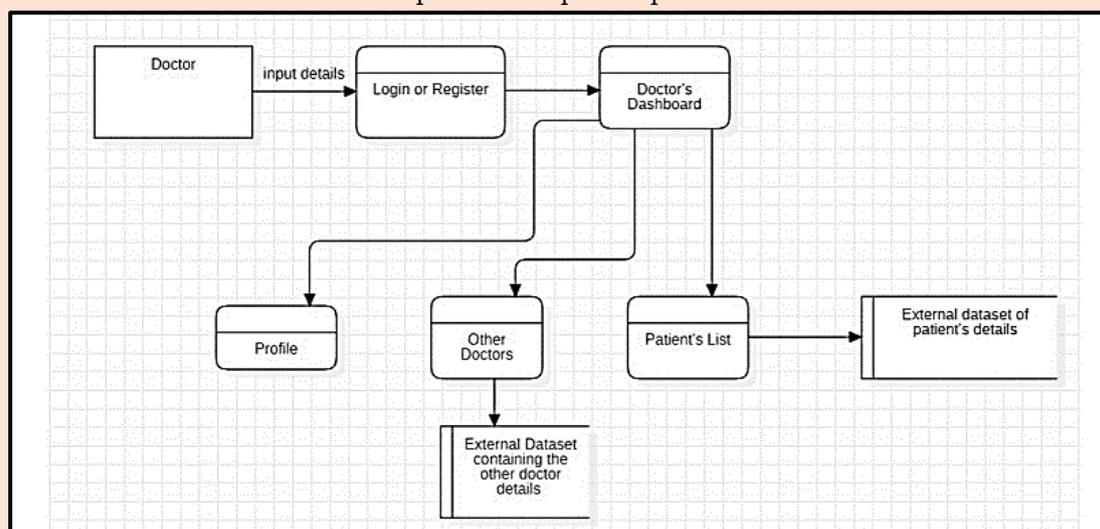


Figure 1: Data flow of the Doctor Module of the System

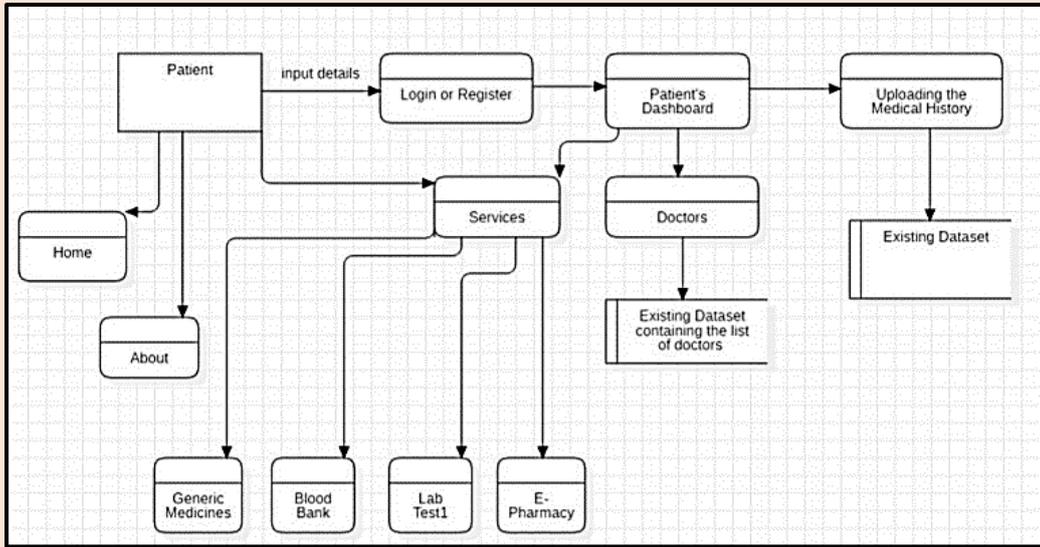


Figure 2: Data flow of the Patient Module of the System

Title of the Invention: Optimized Machine Learning-Based Solution for Smart Highway Emergency Assistance

Application Number: 202311042241 A (Indian Patent Office)

Applicant(s): Dr. Manish Bhardwaj and team (KIET Group of Institutions, CSIT, AS)

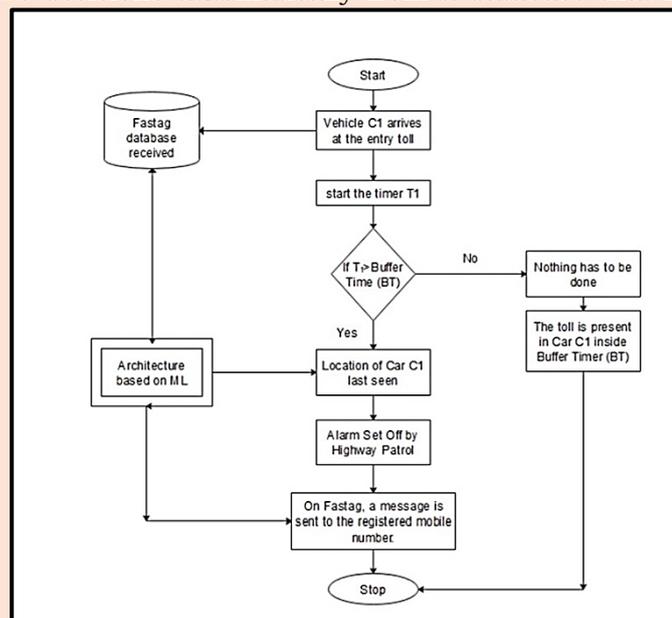
Date of Filing: 23-06-2023

Date of Publishing: 21-07-2023

Field of the Invention: The present invention relates to the field of Emergency Situations at Highways and is relevant to the current invention. The answers provided by the current innovation apply to the field of Sensor Fields and Smart Highways. The current invention involves an Optimized Algorithm-based approach and Sensor-to-machine learning-enabled Smart Highways. The present invention is more specifically linked to applying Optimized Algorithms to provide emergency assistance at smart highways.

Objects of the Invention: The basic idea behind the current concept is to use Optimized Machine Learning algorithms to create an emergency assistance system for toll-based Smart Highways.

Summary: The system of automatic roadside help for the underprivileged at Smart Highways is the subject of the current invention. The innovation is built on a machine learning-based architecture that draws decisions automatically from a database that is kept in this manner. The invention will only be useful for highways or expressways that only allow toll-based entry or departure for each passing vehicle. The suggested technology will use a special machine learning algorithm to decide whether to call the Highway Patrol in an emergency or not. For highways having toll-based entry and exit, the system will function. A database will be kept utilizing the Fastag details for each Car (C1) that enters the highways. Every car that travels on the Smart Highways can be monitored more reliably using an image captioning technology based on machine learning. A Timer (T1) will start for each Car (C1) and be measured frequently for each potential Toll Exit. Depending on how long it took the car to travel to the toll exit, a decision will be taken on



providing emergency roadside assistance. A suitable action will be done if the Car (C1) exceeds that Total Time including Buffer Time. Thus, those in need no longer needs to call a government hotline to request roadside assistance thanks to this idea. An automatic emergency alarm will sound and the Fastag's registered phone number will receive a confirmation. **Fig. above in this abstract shown the flow of Activities for Smart Highway Emergency**

Title of the Invention: An AI Based System For Performance Assessment of Solar-Transformer Consumption

Application Number: 202311044510 A (Indian Patent Office)

Applicant(S): Dr Ekata and team (KIET Group of Institutions, AS)

Date of Filing: 03-07-2023

Date Of Publishing: 21-07-2023

Field of the Invention: The present invention relates to the technical field of electric power technology, and more particularly to an AI-based system for performance assessment of solar transformer consumption (STC) system.

Objects of the Invention: Some of the objects of the present disclosure, which at least one embodiment herein satisfies, are as follows.

It is an object of the present disclosure to ameliorate one or more problems of the prior art or to at least provide a useful alternative.

An object of the present disclosure is to provide an AI-based system for performance assessment of solar-transformer consumption.

An object of the present disclosure is to provide an AI-based system for performance assessment of solar-transformer consumption that can assess the performance of the STC system in different scenarios, including complete breakdown situations and varying levels of efficiency.

An object of the present disclosure is to provide an AI-based system for performance assessment of solar-transformer consumption that can analyze the reliability of the STC system, considering both repairable and non-repairable scenarios.

An object of the present disclosure is to provide an AI-based system for performance assessment of solar-transformer consumption that can analyze the cost function of the STC system to optimize its performance while considering economic factors.

An object of the present disclosure is to provide an AI-based system for performance assessment of solar-transformer consumption that can overcome the problem of vanishing gradient commonly faced by other neural networks, thereby increasing the efficiency of the system in real-time.

An object of the present disclosure is to provide an AI-based system for performance assessment of solar-transformer consumption that can provide numerical illustrations, including data tables and graphs, to demonstrate and analyze the results of system reliability and cost function, aiding system analyzers in their assessment.

PATENTS Published - July 2023

S. No.	Title Of Patent	Dept.	Name Of Applicant	Date Of Publication	Status
1.	An Automated Machine Learning and Ontology Based Applicant Screening System for Job Recruitment	MBA	Shruti Sharma	07.07.2023	Published
2.	Labelling the Resources of Different Resource Type Based on Availability In Cloud Computing	IT, CS	Dr. Ajay Agarwal, Ms. Ila Kaushik, Arti Sharma, Saurabh Sharma, Anurag Mishra	07.07.2023	Published
3.	Formulation and Evaluation of Solid Dispersion of Curcumin for the Enhancement of Solubility and Bioavailability Using Poloxamer 188	KSOP	Dr. Ashu Mittal, Debaprasad Ghosh, Anmol Vats, Kavita Katiyar, Harsh Srivastav	07.07.2023	Published
4.	Friability Tester for Pharmaceutical Purpose	KSOP	Prof. (Dr.) N. G. Raghavendra Rao		Design
5.	System and Method for Medicinal Plant Leaves Detection	CS	Mohammad Ausaf, Harsh Agrahari, Rahul Yadav, Sapna Juneja, Harsh Khatter	14.07.2023	Published
6.	Crop Yield Prediction Based on Soil and Environment Analysis Using Machine Learning	CS	Anurag Mishra	14.07.2023	Published
7.	A Novel Method for Protecting Privacy and Ensuring Integrity of Big Data in Cloud Environment	CSE	Hriday Kumar Gupta	14.07.2023	Published
8.	System and Method for Detection of Duplicate Milk Packet Using IOT	CS	Dr. Harsh Khatter	14.07.2023	Published
9.	System And Method for Smart Healthcare Management	CS	Khushi, Chhayank Tyagi, Hanu Agarwal, Dr. Harsh Khatter	14.07.2023	Published
10.	A System and Method for Detecting Hidden Potholes to Ensure Pedestrian Safety During Floods	IT	Dr. Jitendra Kumar Seth,	21.07.2023	Published

11.	An Arthritis Physical Therapy Device Based on the Internet of Things and Artificial Intelligence	IT	Dr. Jitendra Kumar Seth	21.07.2023	Published
12.	A Deep Learning-Based Steganography Image Reconstruction And Extraction	IT	Mr. Shashank Yadav, Mr.Pramod Nath, Mr. Dinesh Kumar	21.07.2023	Published
13.	Optimized Machine Learning Based Solution for Smart Highway Emergency Assitance	CSIT, AS	Dr. Manish Bhardwaj, Prof. Chandra Mohan Batra, Dr. Kuldeep Sharma, Dr. Pinki Saxena, Dr. Archana Sharma), Dr. Anamika Singh, Dr. Ajay Dixit, Dr. Neelam Chantola, Mr. Analp Pathak, Ms. Supriya Dubey	21.07.2023	Published
14.	Process Parameters Evaluation of CNC Turning Machine	ME	Kuldeep Singh	21.07.2023	Published
15.	An Ai Based System for Performance Assessment of Solar-Transformer Consumption	AS	Dr Ekata, Dr Ritu Gupta, Dr Chandra Mohan Batra, Ms. Akanksha Gupta, Ms. Prakriti	21.07.2023	Published
16.	Color Scheme Based on Load Balancing Capacity of Resources in a Hybrid Cloud Environment	CS	Anurag Mishra	28.07.2023	Published
17.	Ammonium Transmembrane Gradient System for Efficient Loading of Liposomes with Amphipathic Drugs and their Controlled Release	KSOP	Prof. (Dr.) N. G. Raghavendra Rao, KIET	28.07.2023	Published
18.	Design the Smart Security and Surveillance Systems	CSIT	Anchal Awasthi, Rahul Sonkar, Sudhanshu Singh, Apoorva Saraswat, Dr. Manish Bhardwaj	28.07.2023	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.	Abhishek Kumar	Assistant Professor	KSOP	Molecular Targeting and Novel Therapeutic Approaches against Fungal Infections	2.616	11000	SCIE
2.	Shikha Kaushik	Assistant Professor	KSOP	Promising Schiff bases in antiviral drug design and discovery	2.351	11000	SCIE & Springer
3.	Parvin Kumar	Associate Professor	ECE	Optimized DPMZM based RoF link against Fiber Impairments	2.017	11000	SCIE & Springer
4.	Mayank Tyagi	Student	M. Pharm (Pharmaceutics) II year	Extrusion Spheronization Pelletization Technique and Wurster Coating (Bottom Spray)	-	2000	Scopus & SCI
5.	Masood Rizvi	Associate Professor	EN	Demand-side management in microgrid using novel hybrid metaheuristic algorithm	1.63	11000	SCIE & Springer
6.	Gaurav	Assistant Professor	ME	A Comparative study of different constitutive models to predict the dynamic flow behaviour of a homogenized AT61 magnesium alloy.	4.01	11000	SCIE
7.	Gaurav	Assistant Professor	ME	Recrystallization concurrent precipitation, and texture	1.03	11000	SCI

				evolution in a cold deformed Mg-alloy			
8.	Parul Grover	Associate Professor	KSOP	Piperidine Nucleus as a Promising Scaffold for Alzheimer's Disease: Current Landscape and Future Perspective	3.57	11000	SCIE
9.	Parul Grover	Associate Professor	KSOP	Development and Validation of Liquid Chromatography-Tandem Mass Spectrometric Method for the Quantification of Declofenac in Human Plasma.	0.97	11000	SCIE
10.	Arunesh Chandra	Professor	ME	"Optimisation of Machining Parameters for CNC Milling of Fibre Reinforced Polymers"	3.90	5000	SCOPUS

Highlights of the Published Journal Articles

1. **Kumar, Abhishek; Bansal, Priya; Katiyar, Deepti; Prakash, Surya; Raghavendra Rao, Nidagurthi G., Current Molecular Medicine, Volume 23, Number 8, 2023, pp. 726-736(11), Bentham Science Publishers. DOI: 10.2174/1566524023666230302123310.**

Background: Fungal infections have become a worldwide problem due to their involvement in numerous diseases. The risk factors for fungal infections are multiple surgeries, transplant therapies, frequent administration of antibiotics, cancer treatments, and prosthetic devices. The problem of resistance in fungi against drug therapies is widespread, becoming a severe health-related problem.

Objective: The study's objective was to identify molecular targets that may open new paths for fungal treatment.

Methods: Several research and review articles were studied to gather information regarding the novel mechanism of antifungal drugs. However, identifying novel targets is challenging due to the similarities between host and fungal cells. However, the plasma membrane and cell wall of fungi offer various drug targets that may target to fight against microbial infections. Unfortunately, biofilm formation and over-expression of protein are a few mechanisms through which fungi develop resistance.

Results: Despite these problems, several approaches have been working to prevent and treat fungal infections. Modifying the chemical structure of antifungal drugs may also improve their activity and pharmacokinetics. In this review article, we have discussed the molecular targets and novel techniques to be used for the development of antifungal drugs. In addition, different strategies to overcome resistance in fungi have also been described.

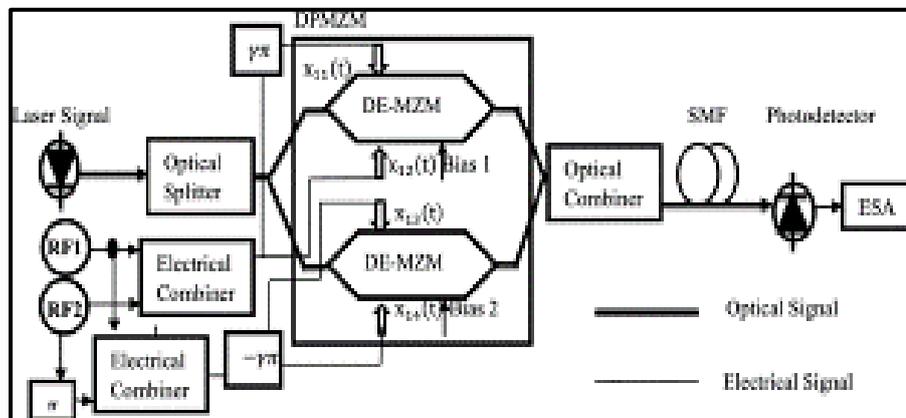
Conclusion: This article may be helpful for the researchers working on the discovery and development of new antifungal works for resistance to fungal diseases.

- 2. Kaushik, S., Paliwal, S.K., Iyer, M.R. et al. Promising Schiff bases in antiviral drug design and discovery. Med Chem Res 32, 1063–1076 (2023). <https://doi.org/10.1007/s00044-023-03068-0>**

Emerging and re-emerging illnesses will probably present a new hazard of infectious diseases and have fostered the urge to research new antiviral agents. Most of the antiviral agents are analogs of nucleosides and only a few are non-nucleoside antiviral agents. There is quite a small percentage of marketed/clinically approved non-nucleoside antiviral medications. Schiff bases are organic compounds that possess a well-demonstrated profile against cancer, viruses, fungus, and bacteria, as well as in the management of diabetes, chemotherapy-resistant cases, and malarial infections. Schiff bases resemble aldehydes or ketones with an imine/azomethine group instead of a carbonyl ring. Schiff bases have a broad application profile not only in therapeutics/medicine but also in industrial applications. Researchers have synthesized and screened various Schiff base analogs for their antiviral potential. Some of the important heterocyclic compounds like istatin, thiosemicarbazide, quinazoline, quinoyl acetohydrazide, etc. have been used to derive novel Schiff base analogs. Keeping in view the outbreak of viral pandemics and epidemics, this manuscript compiles a review of Schiff base analogs concerning their antiviral properties and structural-activity relationship analysis.

- 3. Kumar, P., Garg, A., Sharma, S.K. et al. Optimized DPMZM Based RoF Link Against Fiber Impairments. Wireless Pers Communication 128, 1859–1871 (2023). DOI: 10.1007/s11277-022-10023-6.**

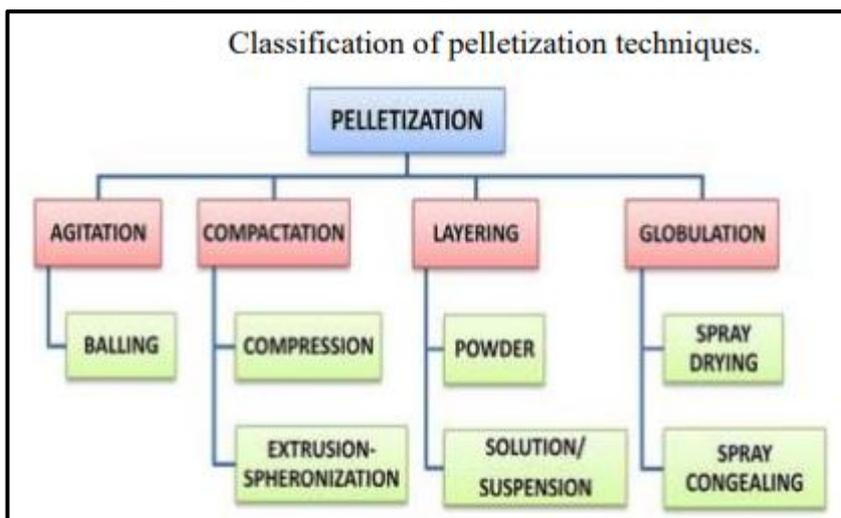
The demands of emerging wireless communication are higher bandwidth, low latency, high-quality multimedia applications, less environmental impact, etc., with cost-effective network implementation. The Radio over Fiber (RoF) link will be the best substitute, and this paper presents an analysis and simulation of the dual parallel DE-MZMs based RoF link while considering different optical fiber distances. The utility of dual parallel DE-MZMs in RoF link provides a significant enhancement in a dynamic range of link in microwave photonic link. Further, it is found that the IM3 terms are approximately eliminated or 40.9 dB much lower w.r.t. fundamental signals for 1 km optical fiber length by the proposed



DPMZM-based RoF link. The analytical analysis is verified by simulation using OptSIM (Optical Simulator) software. Finally, the comparative analysis of the proposed DPMZM-based RoF link with the conventional link confirms the optimization against third-order intermodulation and fiber impairments. This optimization of the proposed link will be helpful for microwave photonic links without any digital processing.

- 4. Mayank Tyagi, Anuj Pathak, N.G. Raghavendra Rao, Abhay Bhardwaj, Surya Prakash, “Extrusion Spheronization Pelletization Technique and Wurster Coating (Bottom Spray): A Review, Eur. Chem. Bull. 2023, 12 (1), 2839 – 2855, DOI: 10.31838/ecb/2023.12.1.357.**

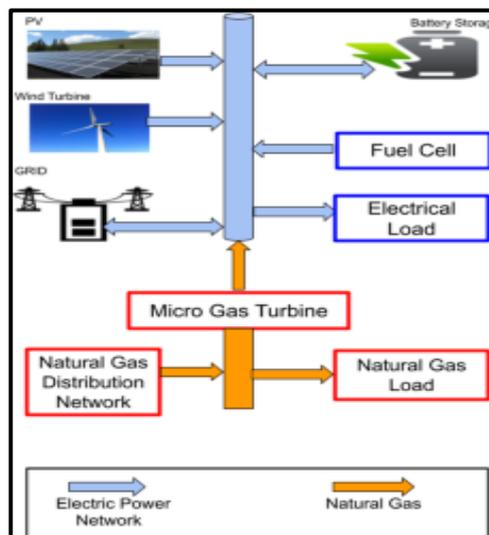
This review paper discusses several aspects related to the extrusion-spheronization technology with Bottom spray/Wurster coating (fluidized bed processor). The first section discusses the various steps involved in producing pellets by granulation firstly the extrusion produces the extrudates (rough irregular pellets joined in cylindrical shape). This paper also discusses how different factors like equipment, formulation, and process play a vital role in finalizing the pellets. Different parameters are used in optimization of the final acceptable extrudates & spheronized drug pellets. How can we finalize the formulated pellets? How can we



judge that these extruded drug pellets with appropriate strength and fines? The second part deals with coating, formulated drug pellets undergo coating with different polymeric coatings which are often applied to fixed surfaces using bottom-spray fluid-bed advanced technology usually used for functional coating with spraying the fixed amount of dispersion, where Wurster coating is mostly used for functional coating of pellets & further discussed the process variables involved in fbp which helps in proper functional coating of the pellets. Different process parameters are optimized during the process to get the finalized desired pellets.

5. Rizvi, M., Pratap, B. & Singh, S.B. Demand-side management in microgrid using novel hybrid metaheuristic algorithm. *Electr Eng* 105, 1867–1881 (2023). <https://doi.org/10.1007/s00202-023-01778-7>.

The paper presents the development of demand-side management to minimize the cost of operation and dispatch of optimal power. The microgrid is coupled with the natural gas network to overcome the intermittent nature of renewable energy. To avoid congestion in the gas network, its coordination with the electric network has been incorporated using the hybridization of two optimization approaches, grasshopper, and flower pollination algorithm. The demand response strategy based on time-of-use tariff is implemented to decrease the peak of the demand curve which helps the grid to shave the peak of the load curve by reducing the power shared among the utility and microgrid. The proposed strategy is implemented using a seven-node natural gas system tied with the 33-bus IEEE test system.



6. Gaurav Singh, Purnashis Chakraborty, Vikrant Tiwari, “A comparative study of different constitutive models to predict the dynamic flow behaviour of a homogenised AT61 magnesium alloy,” *Structures*, Volume 54, 2023, Pages 631-643, ISSN 2352-0124, DOI:10.1016/j.istruc.2023.05.074.

In the present work, phenomenological and physical models were established to predict the plastic flow behaviour of homogenised AT61 magnesium alloy. The models were developed using experimental data obtained from compression experiments under quasi-static and dynamic loading conditions over a wide range of strain rates (10–4–4000 s⁻¹) and temperatures (25–250 °C). The quasi-static and high strain rate compression experiments were performed on a universal testing machine and a split Hopkinson pressure bar,

respectively. Several types of basic and modified (m-) constitutive models, including Johnson-Cook (JC), Khan-Huang-Liang (KHL), and Zerrilli-Armstrong (ZA), were calibrated to predict the plastic flow behaviour of an AT61 alloy. The prediction capabilities of these constitutive models were compared statistically in terms of average relative error and correlation coefficient. It was noticed that the predictions of the models JC, m-JC, and m-KHL were quite similar to the experimental findings; however, ZA model deviates more from the experimental data.

7. Gaurav, Purnashis Chakraborty & Vikrant Tiwari (2023) Recrystallisation, concurrent precipitation, and texture development in cold forged Mg-6Al-3Sn magnesium alloy, Canadian Metallurgical Quarterly, 62:3, 408-420, DOI: 10.1080/00084433.2022.2102307.

The present investigation has highlighted the effect of annealing temperatures from 200°C to 300°C on the recrystallisation behaviour and texture evolution of cold-forged Mg-6Al-3Sn (AT63) magnesium alloy. A new microstructure with a modified grain size was formed under different annealing conditions. The dominant nucleation sites of recrystallised grains were found at twin/grain-boundary and twin/twin intersections and twin interiors. Recrystallisation was incomplete at an annealing temperature of 200°C, even for a prolonged time. It may be ascribed to concurrent precipitation (Mg₁₇Al₁₂ and Mg₂Sn), which interferes with grain boundary motion during recrystallisation. However, at high annealing temperatures, the volume of these precipitates was very low. They did not effectively hinder the recrystallisation process, resulting in faster recrystallisation kinetics. The average grain size was extensively refined from 85 to ~7 μm with cold forging and annealing approach. The cold-forged deformation texture of AT63 alloy shows the typical basal structure (0002) in nature. The recrystallised material retained the basal texture after isothermal annealing of cold-forged AT63 alloy.

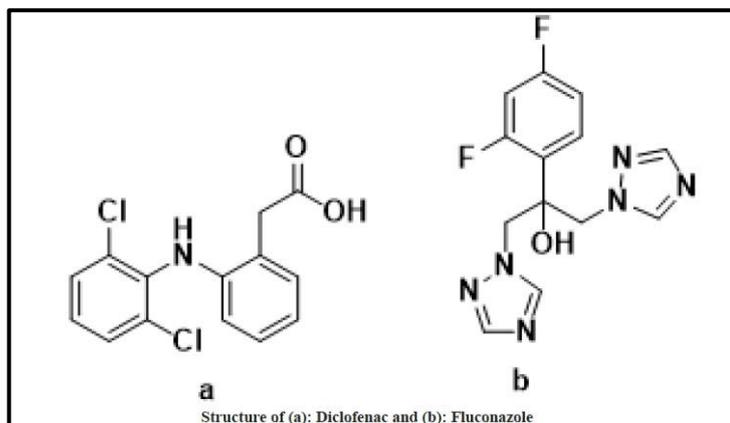
8. Grover P, Rohilla S, Bhardwaj M, Mehta L, Malhotra A. Piperidine Nucleus as a Promising Scaffold for Alzheimer's Disease: Current Landscape and Future Perspective. Curr Top Med Chem. 2023;23(13):1221-1259, DOI:0.2174/1568026623666230406084315. PMID: 37038678.

Heterocycles and their derivatives hold an important place in medicinal chemistry due to their vast therapeutic and pharmacological significance and wider implications in drug design and development. Piperidine is a nitrogen-containing heterocyclic moiety that exhibits an array of pharmacological properties. This review discusses the potential of piperidine derivatives against the neurodegenerative disease Alzheimer's. The incidences of Alzheimer's disease are increasing nowadays, and constant efforts are being made to develop a medicinal agent for this disease. We have highlighted the advancement in developing piperidine-based anti-neuronal disease compounds and the profound activities of some major piperidine-bearing drug molecules with their important target site. This review focuses on advancements in the field of natural and synthetic occurring piperidines active against Alzheimer's disease, with emphasis on the past 6 years. The discussion also includes the structure-activity relationship, the structures of the most promising molecules, and their biological activities against Alzheimer's disease. The promising activities revealed by these piperidine-based scaffolds undoubtedly place them at the forefront of discovering prospective drug candidates. Thus, it would be of great interest to researchers working on synthesizing neuroprotective drug candidates.

9. Parul Grover, Monika Bhardwaj, L. Mehta, and Sandeep Kumar, "Development and Validation of Liquid Chromatography-Tandem Mass Spectrometric Method for the Quantification of Diclofenac in Human Plasma", Indian Journal of Pharmaceutical Sciences, June 2023. DOI: 10.36468/pharmaceutical-sciences.1140

According to Food and Drug Administration requirements, a simple, sensitive, and specific liquid chromatography-tandem mass spectrophotometry method for quantifying diclofenac in human plasma was developed and fully validated. Electrospray ionisation in the positive mode produced protonated ions, which were utilised to detect analyte and fluconazole (internal standard). Protein precipitation generated by acetonitrile was used to extract the analytes, followed by liquid-liquid extraction with ethyl acetate. The reversed phase

separation was performed on a Chromolith speed ROD RP-18e (4.6 mm×50 mm) column with a simple isocratic mobile phase of 10 mM ammonium acetate in water, pH adjusted to 4.5 using acetic acid:acetonitrile in the ratio of (20:80, v/v) at a flow rate of 0.5 ml min⁻¹. On a triple quadrupole mass spectrometer, fragmentation of Diclofenac m/z 296.10- (parent) and 250 (product) and Fluconazole m/z 307.20- (parent) and 220 (product) for internal standard was monitored. The devised method was verified in human plasma spanning a concentration range of 18.75 to 2000.25 ng ml⁻¹, with a correlation coefficient (r²) of 0.9948. The detection was carried out using an electrospray ionisation approach on a triple quadrupole mass spectrometer that was used for multiple reaction monitoring. The intraday precision and accuracy values obtained from six different sets of quality control samples evaluated on different occasions ranged from 96.22-113.46 % and 2.66-9.95 %, respectively. For the analyte and internal standard, the overall recoveries were 61.98 3.97 and 55.01 1.18, respectively. The described approach was used to analyse diclofenac in human plasma samples with great performance.



10. Arunesh Chandra¹, Abhishek Yadav, Shwetabh Singh, Pawan Kumar Arora, “Optimisation of Machining Parameters for CNC Milling of Fibre Reinforced Polymers”, EVERGREEN Joint Journal of Novel Carbon Resource Sciences & Green Asia Strategy, Vol. 10, Issue 02, pp. 765-773, June 2023.

The objective of the presented work is to improve the machining parameters of fibre reinforced polymer (FRP) using Taguchi's robust design technique. Many variables impact the quality of the completed component throughout the machining process. The quality of machined FRP components is greatly influenced by the surface roughness. Manufacturers can make sure that the finished product fulfills the necessary quality requirements and is cost-effective by optimizing machining settings to achieve the specified surface roughness. Optimizing machining parameters for achieving the desired surface roughness can help reduce production costs by minimizing waste, improving tool life, and reducing the need for post-processing operations. To optimize the process, three levels of each parameter were chosen for investigation for each such adjustable process parameter. Machining was performed on a CNC milling machine using a carbide end mill. Experiments were conducted utilising

CNC milling machine specifications	
Type of machine	Vertical machine centre
Machine	JYOTI PX 40 VMC PX Series
Table size	915 x 460 mm
Spindle motor capacity	8.25 kW
Spindle speed (max)	6000 rpm
Feed rapid traverse (X, Y & Z Axis)	25 m/min
Feed cutting	10 m/min
Accuracy (positioning)	0.01 mm
Accuracy (repeatability)	0.005 mm



Machining of FRP on CNC milling

Taguchi's technique to generate an experiment design (L9 orthogonal array). Analysis of variance was used to determine the impact of each parameter (ANOVA). The recommended control factor values for the best possible surface finish of FRP are 1.64 m, 400 rpm spindle/cutting velocity, 1.5 mm depth of cut, and 0.3 millimeter/revolution feed rate. Surface roughness was shown to be most impacted by cutting speed, followed by feed rate and depth of cut. To determine the relationship between process parameters and quality attributes, regression analysis and response surface methodology were used.

Reimbursement of Conference Registration Fee

S. No	Name of Faculty	Designation	Dept.	Name of Conference	Title of Paper	Benefits/Incentives	Published By
1.	Dr. Vikas Goel	Professor	IT	International Conference, Maulana Azad National Institute of Technology, Bhopal	An Effective classification of DDoS cloud-based attack through Tree founded Classifiers.	3000	IEEE Conference
2.	Dr. Vikas Goel	Professor	IT	International Conference, Maulana Azad National Institute of Technology, Bhopal	Evaluation of Machine Learned Price for Models of Block-Chain Technology	1500	IEEE Conference
3.	Mr. Veepin Kumar	Assistant Professor	IT	International Conference, BMK Global Foundation	Stock Market Forecasting Using Sentiment Analysis and Deep Learning	9000	Springer
4.	Mr. Mohit Tyagi	Assistant Professor	ECE	International Conference, KIET Group of Institutions	Simulation and Comparative Analysis of Dynamic comparators at 1 MHz for biomedical applications	8500	IEEE Conference
5.	Mr. Aryan Kakra n	Student	ECE IV Year	International conference on "Power, Instrumentation, Energy & Control" (PIECON 2023)	Identification and Recognition of face and number Plate for Autonomous and Secure Car Parking	1770	IEEE Conference
6.	Md. Shariz Ansari	Associate Professor	EN	International Conference, Netaji Subhas University of Technology, New Delhi	To Design an Optimal PV/Diesel/Battery Hybrid Energy System for	1500	Scopus

					Havelock Island in India.		
7.	Md. Shariz Ansari	Associate Professor	EN	International Conference, Netaji Subhas University of Technology, New Delhi	To Design an Optimal Hybrid Energy System for Agatti Island in India.	2500	Springer
8.	Saurabh	Assistant Professor	IT	IEEE International Conference on (ISCON) 2023 Organized by GLA University Mathura	Character Recognition Technique Implementation for Complicated Deteriorated Scene	7000 & TA as per college norms.	Scopus

Highlights of the Published Conference Articles

1. V. Goel, P. Goel, R. Ranjan, and A. K. Sharma, "An Effective Classification of Ddos Cloud Based Attack Through Tree Founded Classifiers," 2023 1st International Conference on Innovations in High-Speed Communication and Signal Processing (IHCSPP), BHOPAL, India, 2023, pp. 446-449, DOI: 10.1109/IHCSPP56702.2023.10127202.

The term "cloud computing" refers to a relatively new technology that provides users with access to various computing services and resources, including software, data storage, and communication infrastructure. There are currently certain security concerns with cloud computing. An Intrusion Detection System (IDS) is a form of network security that monitors for malicious activity. In the cloud, an IDS might operate on individual hosts or over an entire network. DoS attacks, which aim to disrupt, disable, or otherwise harm a service, have become increasingly common against cloud applications and internet services. Due to the cloud's complexity and decentralized nature, it is difficult to detect attacks on its infrastructures. Moreover, by allowing a wide variety of smart devices to access cloud-based infrastructures, it raises both the difficulty and the complexity of assaults. A decision tree is a method of categorization used in data mining. It is recommended to utilize this method when developing a classification scheme from a reclassified data set. Classifiers such as the Classification and Regression Tree (CART), C4.5, and the Random Tree (RT) are proposed in this work. The utilized CART method has a tendency to generate additional trees on nodes until no tree can be formed judging whether or not a node is terminal. Because of its adaptability, the CART technique can handle gaps in the data. The tree is pruned to make it smaller and more manageable in C4.5. A classifier's complexity is decreased while its prediction accuracy is improved. Decision trees were used to generate the chain of basic decisions used in RT's label assignment process.

2. V. Goel, A. Sharma, R. Ranjan, and A. K. Sharma, "Evaluation of Machine-Learned Price Prediction Models for Block-Chain Technology," 2023 1st International Conference on Innovations in High-Speed Communication and Signal Processing (IHCSPP), BHOPAL, India, 2023, pp. 450-453, doi: 10.1109/IHCSPP56702.2023.10127185.

As a new form of technology, blockchain has much to offer. The technology has a wide range of potential uses and advancements, depending on the field of application. However, further study is required to realize the potential of advanced technologies like Blockchain and smart contracts. There is a lot of potential for investigation because the technology is so new. This research looked at the origins of the Blockchain and analyzed several different blockchain solutions. Ethereum was discovered to be the most often used platform for constructing distributed apps after being compared to other platforms. Therefore, a distributed smart energy microgrid application will be built on the Ethereum platform. There is a coin, or token, exclusive to each blockchain platform. Bitcoin's relationship to other cryptocurrencies was

measured using the Karl Pearson correlation coefficient. The research concludes that ether's price is most sensitive to changes in the price of bitcoin. On a preferred Ethereum network, a distributed application for managing smart microgrids has been built. The smart contract constitutes the heart of this program. As a result, we also take care of the smart contract's layout, coding, and optimization. In comparison to the original, less GAS is consumed by this smart contract. The entire distributed app has been built and thoroughly tested. Smart Energy Microgrid Distributed Application framework results demonstrate that the application functioned as expected.

3. Kumar, V., Singla, S., Shalika, Kang, S., Chadha, R. (2023). Stock Market Forecasting Using Sentiment Analysis and Deep Learning. In: Goar, V., Kuri, M., Kumar, R., Senjyu, T. (eds) Advances in Information Communication Technology and Computing. Lecture Notes in Networks and Systems, vol 628. Springer, Singapore. DOI: 10.1007/978-981-19-9888-1_48

Sentimental data processed from digital online communities can be used in different ways for market scrutiny. Sentiment Analysis is a way to extract opinion inclination (negative, neutral, positive) from a fragment of text cited for any institution or product. This word-of-mouth index can in turn be used to speculate the public mood and its market that has an impact on stock prices. Quarrying news articles and predicting the movements of product prices based on the content of the reviews corpus becomes beneficial. This research paper used Sentiment Analysis on the most popular Dow Jones Industries news articles to take advantage of this fact. We then combined this information with market index data from the company during the same time period to create a combined model that offers more accurate results based on Sentiment Analysis and Neural Networks (NN) and will assist the stockholder to lower risk and receive better returns.

4. M. Tyagi, P. Mittal and P. Kumar, "Simulation and Comparative Analysis of Dynamic Comparators at 1MHz for Biomedical Applications," 2022 3rd International Conference on Issues and Challenges in Intelligent Computing Techniques (ICICT), Ghaziabad, India, 2022, pp. 1-3, DOI: 10.1109/ICICT55121.2022.10064520.

SAR ADC is one of the most demanding Analog to digital converters for medium-speed, medium-resolution applications like ECG, EEG, and related biomedical applications. In this paper, we have designed and simulated the dynamic comparators with noise rejection and amplification capability in CADENCE Virtuoso 45 nm technology node. Designed Comparators are simulated at 0.8V and various parameters like power dissipation, maximum operating frequency, delay, and offset voltage are compared. Designed comparators are well employable in SAR ADC with a maximum operating frequency of 1MS/s. comparators are operated at varying supply voltage from 0 to 1 V. Basic comparator dissipates 9.17 pW as static power and 520.2 nW as dynamic power at VDD of 1 V and INN, INP difference of 0.9 V. Compared to basic comparator, dynamic comparator with tail transistors can be operated at 0.5 V with static power of 4.143 pW and 3.720 nW as dynamic power dissipation. The operating frequency of designed comparators is 1 MHz with a propagation delay of 522 ns by a dynamic comparator with tail transistors and 480 ns as of basic comparator.

5. A. Kakran et al., "Identification and Recognition of face and number Plate for Autonomous and Secure Car Parking," 2023 International Conference on Power, Instrumentation, Energy and Control (PIECON), Aligarh, India, 2023, pp. 1-6, DOI: 10.1109/PIECON56912.2023.10085910.

To identify and distinguish one individual from another, Face characteristics detection and evaluation is proven to be one of the significant techniques among various other biometric methods. The proposed work explores the use of face identification and detection techniques for automated elevated car parking systems. In recent years, Face recognition has been widely used in numerous applications which include criminal identification, unlocking smart gadgets, advanced security systems, and many others. The proposed system consists of MATLAB-based GUI, a microcontroller or complete embedded system for Hardware deployment, and a camera module. The camera device is used to detect the face and number plate of the car owner. Viola-jones algorithm in MATLAB is used for object identification and recognition. The comprehensive embedded system panel is responsible for monitoring and controlling the complete car parking system. The proposed system is tested with a variety of scenarios and a number of simulations runs and the results show that the proposed system is capable of accurately detecting the face of the car owner and synchronizing the car owner's identity with the corresponding number plate of the car.

6. Ansari, M.S., Gautam, A., Tomar, B., Gautam, M., Jalil, M.F. (2023). To Design an Optimal PV/Diesel/Battery Hybrid Energy System for Havelock Island in India. In: Rani, A., Kumar, B., Shrivastava, V., Bansal, R.C. (eds) Signals, Machines and Automation. SIGMA 2022. Lecture Notes in Electrical Engineering, vol 1023. Springer, Singapore. DOI: 10.1007/978-981-99-0969-8_21

In the case of hybrid model design, the Hybrid Optimization Model for Electric Renewables (HOMER) software is employed for optimization. This work aims to reduce overpriced net present cost (NPC) and cost of energy (COE) at Havelock Island in India and lower the air pollution index by utilizing non-conventional energy sources. Havelock Island's average daily radiation is 5.30 kWh/m²/day. The HOMER simulates, optimizes, and does sensitivity analysis on the proposed model for thousands of combinations to find the best answer. We are employing diesel generators, solar panels, and battery storage to develop the optimal hybrid system possible for modeling reasons. This model yields the lowest NPC and COE. In this analysis, the sensitivity variables for simulation are diesel generators' run time and fuel cost. The diesel price of Rs. 77/L and the generator run periods of 720 min were used as sensitivity variables for the optimized model. For these values of sensitivity variables, the NPC and COE come out to be Rs. 1.82 B and Rs. 19.87/kWh, respectively. Using an optimal hybrid system instead of an existing diesel-only system at Havelock Island, the pollution will also be reduced by 83.21%.

7. Ansari, M.S., Srivastava, A., Singh, A., Gupta, A., Faisal, A., Jalil, M.F. (2023). To Design an Optimal Hybrid Energy System for Agatti Island in India. In: Rani, A., Kumar, B., Shrivastava, V., Bansal, R.C. (eds) Signals, Machines and Automation. SIGMA 2022. Lecture Notes in Electrical Engineering, vol 1023. Springer, Singapore. DOI: 10.1007/978-981-99-0969-8_22

Since diesel generators are used to generate electricity mostly on smaller, isolated islands, the net present cost (NPC) and cost of energy (COE) are very high. The use of diesel generators also causes increased pollution. As a result, by using renewable energy sources such as solar, this initiative intends to reduce NPC, COE, and pollution. In India's union territory of Lakshadweep, Agatti Island would be the research site (UTL). The daily radiation on Agatti Island is 5.68 kWh/m²/day. Using HOMER software, modeling, simulation, and optimization of an ideal hybrid model were all done. The optimum solution is to combine diesel, PV, and battery power. In this approach, the NPC and COE are the least. The investigator has included the fuel rate (Rs) as a sensitivity factor. The best system uses the Rs. 72/L diesel price as a sensitivity variable. Furthermore, this optimal hybrid system reduces the pollutants by 90%.

8. S. Sharma, B. K. Pandey, D. Pandey, R. Anand, A. Sharma and S. Saini, "Character Recognition Technique Implementation for Complicated Deteriorated Scene," 2023 6th International Conference on Information Systems and Computer Networks (ISCON), Mathura, India, 2023, pp. 1-4, DOI: 10.1109/ISCON57294.2023.10112185.

There has been an increase in interest in digitizing and preserving old books and papers in the last few years. The quick advancement of data innovation and the Internet's quick spread have also contributed to the enormous volume of image and video data. The texts that are included in the image and video assist us in analyzing them and are also utilized for indexing, archiving, and retrieval. Different noises, such as Gaussian noise, salt and pepper noise, speckle noise, etc., can readily damage an image. Several images filtering algorithms, including the Gaussian filter, mean filter, median filter, etc., are employed to eliminate these various noises from images. This article analyses the impact of several pre-processing approaches, such as thresholding, morphology, and blurring procedures, to maximize text extraction strategies. The experiment's findings demonstrate that pre-processing approaches unquestionably improve the document's structural and visual quality.

Collaborative Research and Development Presentations

S. No.	Name of Presenter	Name of Department / School	Topic of Presenter
1.	Prof. Mayank Tyagi	IT	Related to Gaming Engines optimization
2.	Prof. Dinesh Kumar	IT	An Optimized Algorithm for Cluster Head Election in IoT-Based
3.	Prof. Priya Singh	IT	Embedded system for real time detection
4.	Mr Prince Kumar	CSIT	Personality analysis using ML
5.	Ms. Supriya Dubey	CSIT	A novel approach to detect cardiovascular Arrhythmia in Covid recovered patients through their electro-cardiogram.
6.	Ms. Richa Singh	CSE(AI)	Study on Zero-Trust Architecture, Application Areas & Challenges of 6G Technology in Future
7.	Dr Sanjeev Singh	Civil Engineering	Effect of Partial Replacement of RCA with and without SKY Glenium B8777
8.	Dr. Vinay Kumar	KSOP	Systematic literature serach for scientific and medical writing

CRDC Presentation Series

Activity Report July 2023

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

Presentation Topic: Study on Zero-Trust Architecture, Application Areas & Challenges of 6G Technology in Future

Details of Presenter

Ms. Richa Singh,
Assistant Professor
CSE AI Department

Date of Presentation

Session: 8th July 2023



Scope for Future Research Outcome

Research Paper (Journals/
Conferences/ Book Chapters etc.)

About Presentation:

5G, launched in India on September 22, 2022, focused on speed, latency, and reliability. It introduced advanced technologies like ML, DL, and Blockchain. 5G has two architectures: 3GPP and non-3GPP. 3GPP requires new devices with SIM cards for 5G, while non-3GPP allows limited 5G services on 4G-compatible phones. Upgrades in 5G include millimeter waves for high-frequency transmission, cellular cells every 200-250m for wider coverage, massive MIMO antennas, beamforming, and half-duplex transmission. The cost is a major challenge for 5G implementation, as the infrastructure and devices are expensive. Companies are already exploring 6G, projected to be 30 times faster than 5G and potentially launching globally by 2030. 6G proposes the Zero Trust (ZT) Architecture, emphasizing additional security layers at every endpoint to combat potential threats. AI-driven network automation eliminates manual router configuration, adapting automatically based on predefined thresholds. 6G is expected to have applications in healthcare, neuroscience, and XR. AI implementation on the brain could enable a normal life for individuals with neurological issues. XR will benefit from enhanced capabilities in the future. However, security remains a challenge in 6G due to increased openness and reliance on cloud infrastructure. Cost is another consideration for 6G implementation. These challenges need to be addressed to fully realize the potential of 6G technology.

About Presenter:

Ms. Richa Singh is Assistant Professor (CSE-AI) having experience in education sector, focused on AI/ML, and Data Science specialization. She has enrolled in Ph.D. (IT) program at Amity University, Lucknow. She is the editor of book focused on AI/ML and had published multiple research papers in Journals, International / National conferences, patents and, also published various book chapters. She is also a reviewer of national/ international conferences.



Presentation Topic: Systematic literature search for scientific and medical writing

Details of Presenter : Dr. Vinay Kumar,
Associate Professor
Department – KSOP
Qualification - M.Tech (NIT Durgapur)
Specialization - Data Optimization, Machine Learning

Scope for Future Research Outcome

Research Paper (Journals/ Conferences/ Book Chapters etc.)

About Presentation



A systematic literature search is an initial and very important step for the preparation of scientific and medical writing documents. Before the start of a literature search, one should be aware of the type of substance and type of information required, so that an appropriate literature search strategy can be prepared with appropriate databases. There are separate databases for the different types of compounds / substances viz. Pharmaceuticals, Cosmetics

ingredients, Food items, and inactive ingredient databases. Systematic literature search is essential to prepare good documents viz. regulatory dossiers, toxicity assessment reports, good publications (research and review articles), and other risk assessment reports etc. Literature search can be performed through PubMed search engine using various search keys including various filters activation.

About Presenter (Maximum 100-150 words)

Dr. Vinay Kumar completed his PhD in Pharmacology in 2011 from Hamdard University, New Delhi. He qualified GATE exam in Pharmaceutical Sciences in 2005 and 2006. He has more than 10 years of teaching experience in different Pharmacy colleges affiliated with AKTU, Lucknow (UP). He has more than 5 years of Industry experience in the field of regulatory, toxicology and scientific writing. He guided more than 20 M. Pharm. (Pharmacology) students. Under his guidance, one student has completed PhD and 02 are undergoing. He published more than 50 research and review papers in various peer reviewed National and International Journals. His areas of research work are Cardiovascular pharmacology, Diabetes, Obesity, Neuropharmacology and Psoriasis etc

Faculty Articles

Progress and Prospects of India's Growing Solar Energy Sector

In recent years, India's solar power sector has emerged as a shining beacon of success on the global stage. With a rapidly growing economy and an ever-increasing demand for energy, India has strategically turned to harnessing the sun's energy to meet its energy needs while striving for a sustainable future. The journey of India's solar sector, from its early days to its present performance and future potential, is a testament to the country's commitment to renewable energy. India's solar energy sector has grown significantly in the last decade. The introduction of ambitious policies like the National Solar Mission proved to be a turning point. By encouraging solar installations and setting aggressive targets, India rapidly transformed from a small player to a global leader in the solar landscape. As per my last knowledge update in June 2023, India already has 70.10 gigawatts (GW) of installed solar capacity, much higher than its initial target. One of the major achievements in India's solar journey has been the setting up of the world's largest solar park with a capacity of 1,000 megawatts (MW) at Kurnool in Andhra Pradesh. In addition, the sector has created numerous employment opportunities ranging from research and development to installation and maintenance, contributing to both economic growth and skill development. With the country being established as a global solar energy hub, the future of the country's solar energy sector has become even brighter. Probably, this has been possible due to a combination of the following factors:

Continued policy support: The continued support of the government of India for solar energy through policies and incentives will be critical. Initiatives such as the International Solar Alliance, which aims to promote solar cooperation among solar-rich countries, will contribute to the growth of this sector not only domestically but also on the international front.

Technological Advancement: Research and development in solar technologies will play an important role in increasing the efficiency and affordability of solar energy. Innovations such as floating solar farms, advanced energy storage solutions, and more efficient photovoltaic cells are expected to further accelerate the adoption of solar energy.

Private Sector Participation: Private sector participation, both domestic and international, will play an important role in increasing the solar sector. Investments in manufacturing facilities, research, and large-scale solar projects will contribute to the expansion of the industry's potential and capabilities.

Rural Electrification: India's solar power sector can play a transformative role in providing electricity to remote and off-grid areas. Solar mini-grids and micro-grids can bring electricity to areas that are difficult to reach through traditional methods, improving quality of life and driving economic growth.

Energy security and sustainability: With the growing concern for energy security and environmental sustainability, solar power aligns perfectly with India's long-term goals. By reducing dependence on fossil fuels, India can mitigate the effects of climate change and reduce its carbon footprint.

Global Leadership: India has the potential to become a global leader in solar energy technology, manufacturing, and policy advocacy. Sharing our experiences and knowledge with other countries can contribute to the global transition towards clean energy sources.

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India achieves 70.10 GW solar energy against target of 100GW by year 2022

PTI • Last Updated: Jul 27, 2023, 05:53 PM IST

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Synopsis
Total solar power capacity installed in the country as on June 30, 2023 is 70.10 GW and in addition, 55.90 GW is under installation, Union Minister of Power and New & Renewable Energy R K Singh said in a written reply to Lok Sabha on Thursday.



India had set a target of 100GW of solar energy capacity by year 2022 and achieved 70.10 GW by June 2023 while another 55.60 GW is under construction, Parliament was informed on Thursday.

"The government had set a target of achieving 100 GW of solar power installed capacity in the country by the year 2022," Union Minister of Power and New & Renewable Energy **R K Singh** said in a written reply to Lok Sabha on Thursday.

The minister told the House that state-wise targets (for renewable energy) are not set.

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Asian Paints Share Price	3259.30
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Oil & Natural Gas Corporation Share Price	174.70
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- World's biggest wind power projects are in crisis just when world needs them most

India's solar power sector has come a long way from its humble beginnings to emerge as a global leader in renewable energy. Rapid growth, innovative technologies, and supportive policies have paved the way for a sustainable energy future. As India continues to harness the power of the sun, the sector's trajectory points to even greater achievements. By leveraging its solar potential, India can not only meet its energy needs but also inspire the world to embrace the limitless power of this clean and renewable resource.

Dr. Brijesh Singh, Associate Professor (EEE),
(The article is the author's own opinion and is inspired by news published in Economic Times dated 27 July, 2023.)

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Innovation Spotlights of the Month

Softermii's Experience with Digital Transformation in the Pharmaceutical Sector

Team has developed several first-class digital solutions for the healthcare and pharmaceutical businesses. Their expertise extends to telemedicine and mHealth as well. They develop software for pharmacies, pharmacists, and their patients. For their part, they guarantee full regulatory compliance following such security protocols as HIPAA, GDPR, HL7, SOC2, and local privacy laws.

They have developed two products in the pharmaceutical sector.

MediConnect

MediConnect is a mobile application that serves as a tool to connect doctors with companies that deliver medical products.

They developed this application considering two groups of users:

- Doctors. Here they have presented a convenient search for medical products and services.
- Healthcare product companies. For them, we have added video and audio communication features to make interacting with doctors and selling products and services easier.

Their main goals in developing this app were:

- Increasing the effectiveness of interaction between doctors and healthcare product companies
- Opening new sales channels for product companies
- Creating a user-friendly interface

Locum App

Locum App is a mobile and web application for recruitment in the UK's pharmaceutical market.

Their main goals in developing this platform were:

- Solving the problem of recruiting pharmaceutical staff and making it easier for pharmacists to find an employer.
- Creating a convenient platform for interaction between employers and pharmaceutical workers

As a result, they have created a convenient platform that allows pharmacies to recruit the needed staff easily and quickly. Locum App became the market leader and the first online community of pharmacies and pharmacists in the UK.

Source: www.softermii.com

Indian Scientist Develops High-Precision Method for Nanomechanical Testing

An Indian scientist, in collaboration with international institutions, has introduced a novel method to assess nanomechanical properties of materials at minuscule scales with exceptional precision and accuracy. This methodology significantly enhances the nanoindentation technique's precision and accuracy for testing mechanical strength, while also enabling testing at higher rates, thus increasing throughput.

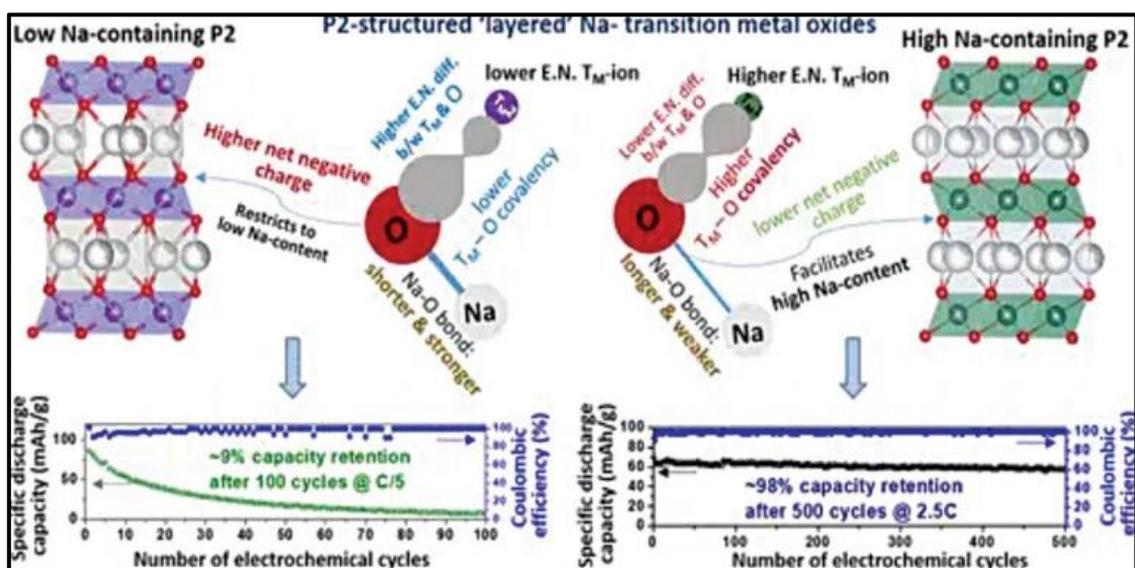
The technique was pioneered by Dr. Warren Oliver and Dr. John Pethica in the 1980s, becoming a cornerstone of materials science research. Dr. Sudharshan Phani from the Advanced Nanomechanical Characterization Centre collaborated with experts from KLA Corp. and Texas A&M University to develop this innovative approach, involving simulation and experimentation to improve precision. This breakthrough has the potential to revolutionize materials science research and strength measurement applications.

The newly developed method aims to assess the nanomechanical properties of materials with remarkable precision and accuracy at very small scales, contributing to advancements in the field of materials science. The novel methodology not only improves the precision and accuracy of nanoindentation, a technique to measure mechanical strength, but also allows testing to be conducted at significantly higher rates, thereby increasing testing efficiency. Nanoindentation involves probing the mechanical properties of materials at nanoscale levels. It addresses challenges in testing at such minute scales, often around 1/100th of the diameter of a human hair, where conventional methods are not always feasible.

Source: <https://www.gktoday.in/indian-scientist-develops-high-precision-method-for-nanomechanical-testing/>

High-performance cathode materials for Ni-ion batteries developed at IIT Bombay

Researchers at the Indian Institute of Technology (IIT) Bombay have developed new, high-performance cathode materials for Na-ion batteries that address air/water and structural-electrochemical instability issues at the same time. The team used materials science and electrochemical principles to develop a universal criterion for high-performance, stable Na-ion battery cathodes. In the Na-TM-oxide structure, alternating NaO₂ and TMO₂ 'slabs' share negatively charged O-ions, ionic for Na-O and ionobcovalent for TM-O bonds. By tuning TM-O bond covalency through TM-layer cation combination, electrostatic attraction, and repulsion between Na- and O-ions across the Na-layer can be adjusted. Increasing O-ion's negative charge enhances Na-O bond strength, stabilising Na-TM-oxide cathodes. Water-stable cathodes for Na-ion batteries can be made using a cost-effective aqueous process. Stronger TM-O covalency weakens Na-O bonds and widens inter-slab spacing. Lowering O-ion's negative charge improves rate-capability and power density in Na-ion battery cathodes.

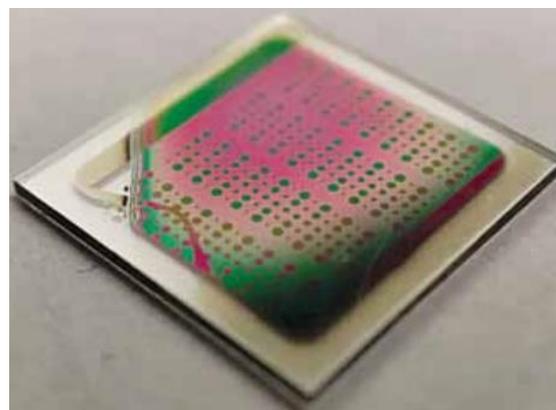


Depiction of the influence of raised TM-O bond covalency on the stabilisation of the P2 structure for Na-TM-oxide even at a high Na-content of ~0.84 p.f.u.; thus, leading to the development of a high capacity (greater than most reported to-date) and very stable P2-structured Na([|]0.06Li0.04Mg0.02Ni0.22Mn0.66)O₂ cathode material, which exhibits excellent performances in Na-ion cells (as published in Chem. Mater. 34[23] (2022) 10470-10483)

Source: <https://www.efymag.com/express/> - July Month EFY Magazine

New oxygen-ion battery can replace lithium-ion for large-scale energy Storage

New oxygen-ion battery can replace lithium-ion for large-scale energy storage Researchers at TU Wien have developed a durable oxygenation battery, a promising alternative to lithium-ion with a long lifespan and no irreversible capacity loss. The ceramic materials absorb and release double negative oxygen ions, enabling ion migration and generating electric current. Ceramic batteries resemble lithium-ion batteries but offer non-flammability and avoid rare and harmful elements. The key advantage of the new battery is its extended lifespan. Unlike conventional batteries, it can regenerate oxygen and overcome the capacity loss. While it has lower energy density and requires higher temperatures, it shows promise for energy storage. The researchers believe the oxygen-ion battery is ideal for large-scale energy storage such as solar or wind power. Its long lifespan, non-flammable nature, and lack of rare elements in storage buildings outweigh lower energy density and higher temperatures.



A prototype of the battery at TU Wien (Credit: TU Wien)

Source: <https://www.efymag.com/express/> - July Month EFY Magazine

New Cost-effective Method can benefit future 3D Printing of Metal Alloys

Researchers at MIT have discovered a straightforward and cost-effective method to enhance the strength of a crucial material commonly employed in various applications today. Using Inconel 718, a popular 'superalloy,' the team combines it with ceramic nanowires to create a nanoceramic coating. Laser powder bed fusion, a 3D printing method, melts layers of powder in a specific pattern, creating strong and stretchable parts. The cost-effective process improves thermal resistance and eliminates flaws, benefiting future 3D printing of metal alloys. According to the researchers, the rapid cooling of ultrathin 3D-printed metal alloy layers offers new alloy design possibilities. It surpasses conventional methods, allowing broader compositional exploration. This breakthrough in 3D printing opens up vast possibilities for alloy design and resilient materials in extreme conditions.



Source: An MIT-led team reports a simple, inexpensive way to strengthen a material key to applications in aerospace and nuclear energy generation. The MIT beavers and other shapes in this photo were created using the new technique (Credit: Alexander O'Brien)

Source: <https://www.efymag.com/express/> - July Month EFY Magazine

Solar, Wireless Sensor developed to monitor Bridge Deformation Continuously

Researchers at Drexel University's College of Engineering Researchers at Drexel University's College of Engineering have developed a solar-powered, wireless sensor system to monitor bridge deformation continuously and notify authorities of significant performance deterioration. The wireless displacement sensor comprises a solar cell, a displacement potentiometer, and a monitoring transceiver. It measures bridge deformation during traffic, transmitting data to a remote station. The lightweight potentiometer detects girder movement, identifying structural issues. Powered by solar cells and backup batteries, multiple sensors can be wirelessly installed on the bridge, supporting various monitoring sensors for acceleration, tilt, and displacement. The



system's main advantage is cable elimination, reducing costs and installation efforts. The wireless platform enables readings from various sensor types simultaneously. The team crafted a weather-resistant power supply featuring a 10W solar cell and a lithium-ion battery and tested it in harsh winter conditions to ensure enduring performance.

Photograph Credit: Drexel University, Wireless, solar-powered sensors developed by Drexel engineers could allow for continuous monitoring of bridges.

Source: <https://www.efymag.com/express/> - July Month EFY Magazine

KIET (R&D) Policies

Promotion of research culture with the formulation of policies by the R&D Committee are 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>

Salient Features of KIET (R&D) Research Policy

Incentive for the Publication in SCI/SCIE Indexed Journals (for faculty)

S. No.	Categories	Conditions	Incentive (in Rs.)
1.	Outstanding Research Publication Incentive	Publication in, Nature (British Multidisciplinary Scientific Journal), Science Academic Journal of the American Association, Harvard Business Review	25,000 /-
2.	Premier Research Publication Incentive	Paper must be published in SCI/SCIE/SSCI, American Mathematical Society, American Physical Society, American Society for Civil Engineers (ASCE), American Society for Mechanical Engineers (ASME), American Society of Testing Materials (ASTM), Association for Computing Machinery (ACM) Transactions, IEEE Transactions/ Journals/ Letters/ Reviews, IET Transactions/ Journals/ Letters/ Reviews, Institute of Civil Engineering Publishing, London, Institute of Mechanical Engineering, London In addition to the above list the SCI/ SCIE/SSCI journals with impact factor >= 7 will be considered	21,000 /-
3.	Commendable Research Publication Incentive	Impact factor between 5 to 6.99 and indexed in SCI/ SCIE/ SSCI	15,000 /-
4.	Admirable Research Publication Incentive for SCI	Impact factor between 0.750 to 4.99 and indexed in SCI/ SCIE/ SSCI	11,000/-

S. No.	Categories	Conditions	Incentive (in Rs.)
5.	Gratifying Research Incentive for SCI	Impact factor between 0.250 to 0.499 and indexed in SCI/ SCIE/ SSCI	5000/-
6.	Admirable Research Publication Incentive for SCOPUS	Quality research published in SCOPUS having Cite Score 3 and above	5000/-
7.	Valuable Research Publication Incentive for SCOPUS	Quality research published in SCOPUS having Cite score 2 to 2.999	4000/-
8.	Gratifying Research Incentive for SCOPUS	Quality research published in SCOPUS having Cite score 1.000 to 1.999	3000/-

Incentive for Publication in eSCI and CCR Expanded (for faculty)

S. No.	Categories	Conditions	Incentive (in Rs.)
1	eSCI indexed Journal	Quality research published in eSCI Journals is applicable for publications in any ESCI/CCR-Expanded journal, and a maximum of one ESCI/CCR-Expanded indexed research paper in an academic year shall be considered.	2000 -

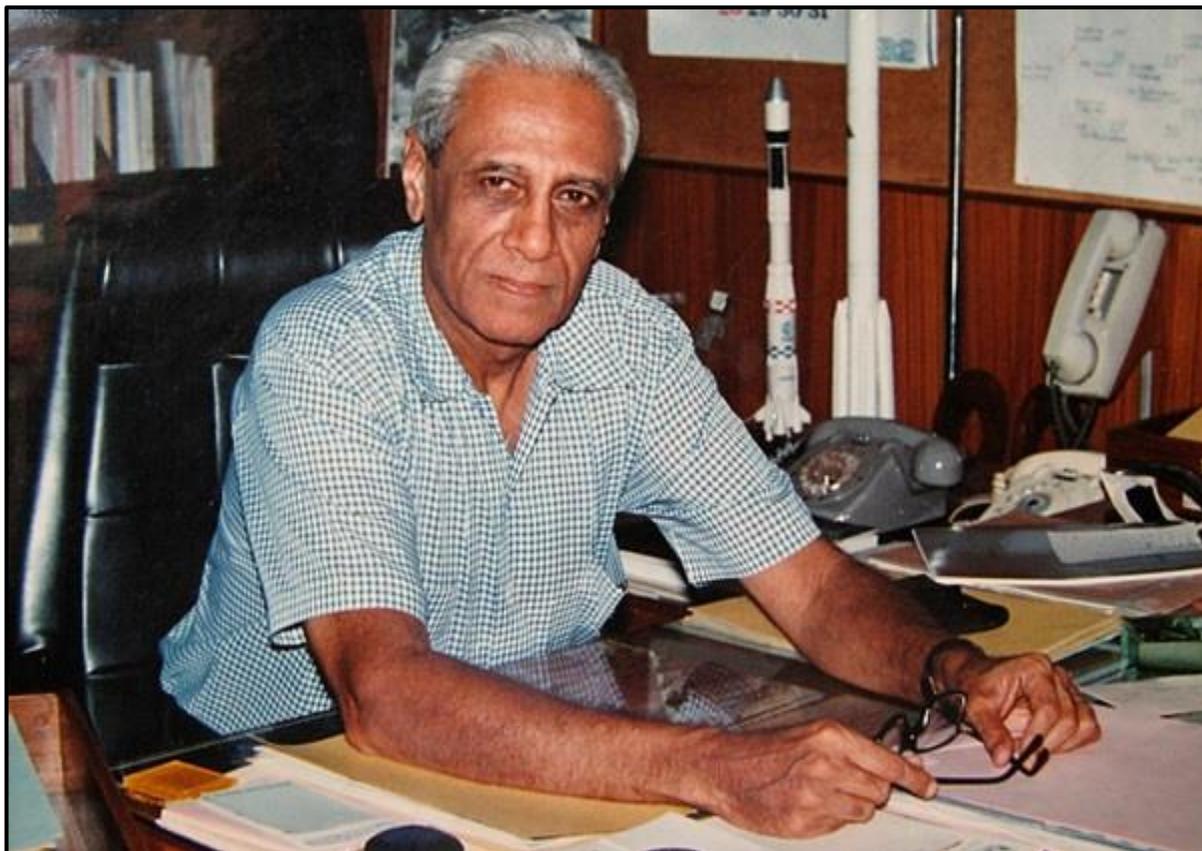
Incentive for Students

- Incentive amount of Rupees Two Thousand (**Rs. 2000/-**) is applicable to student authors for **publications in SCOPUS Journals.**
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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
5	Apple for iOS University Program	IT, CS, MCA
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





Dr. Satish Dhawan was an Indian mathematician and aerospace engineer, widely regarded as the father of experimental fluid dynamics research in India.

Dhawan was a professor in the Indian Institute of Science (IISc) and in 1962, he became its director. Despite being a celebrated researcher, he called himself a teacher and was devoted to that profession.

He was instrumental in carrying out ground-breaking research at a low cost. His research also helped solve many of the problems faced by the then new industry in India, the aircraft industry.

In 1972, Prof. Dhawan was appointed the Chairman of the Space Commission, the Chairman of the Indian Space Research Organisation (ISRO), and Secretary, Department of Space, Government of India.

He was awarded with Padma Bhushan and Padma Vibhushan award in year 1971 and 1981 respectively.

KIET Group of Institutions

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