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CTFC 2023

CONFERENCE ON TECHNOLOGIES FOR FUTURE CITIES - 2023

3rd in Series ————

📅 6th to 7th October 2023

ABSTRACT BOOK

Mahatma Education Society's
Pillai College of Engineering
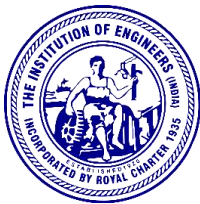
CTFC 2023

Conference on Technologies for Future Cities
3rd in the Series
October 6th - 7th, 2023

Sponsors

Knowledge Partner

Navi Mumbai
Local Chapter

Program and Abstract Book

Organized by
Pillai College of Engineering
Autonomous Institute Affiliated to University of Mumbai
(NAAC A+ Accredited, NBA Accredited, ARIIA Band 'Performer')

Conference Venue
Dr. K. M. Vasudevan Pillai Campus Sector 16, New Panvel,
Navi Mumbai –410206, Maharashtra, India

Website: https://www.futurecities.mes.ac.in, Email: ctfc@mes.ac.in

Our Mentors

Dr. K. M. Vasudevan Pillai

The CEO of the Management Board of MES and Founder of the Pillai Group of Institutions

An Entrepreneur and a social reformer who believes that education is the only means to large scale transformation, the only change of language

Dr. Daphne Pillai

The Chairperson of the Management Board of MES and Co-Founder of the Pillai Group of Institutions

A custodian of old-world values and an initiator of new-generation change.

Beyond teaching, mentoring.
Beyond career-building, character-building.
Beyond institution-building, nation-building.

Because

"A nation better taught, is a nation better empowered."

Dr. K. M. Vasudevan Pillai
– EDUNATION –

About Pillai College of Engineering

Pillai College of Engineering (Erstwhile Pillai Institute of Information Technology until April 2016), established in 1999 under the patronage of Dr. K M Vasudevan Pillai, is a reputed engineering college in Navi Mumbai. It is affiliated to the University of Mumbai, approved by All India Council for Technical Education (AICTE), New Delhi and is recognized by Government of Maharashtra. PCE has 6 UG, 6 PG and 4 PhD Research Centers. The UG program offered are Automobile Engineering, Computer Engineering, Information Technology, Electronics & Computer Science, Electronics and Telecommunication Engineering and Mechanical Engineering. The institute is NAAC accredited with A+ grade and five departments have been accredited by NBA. The institute strives to provide state of the art facilities conducive to effective teaching-learning, research and consultancy. It further takes every effort in inculcating in the minds of students the respect for the environment. Faculty of PCE is very active in R & D and have completed projects for government agencies such as DST, BRNS, ICSSR and UGC. PCE has also has undertaken and completed urbanization studies for UN office project on 'Urban Expansion' in collaboration with New York University and continues to provide consultancy in similar fields to Tata Consultancy Engineering (TCE) and CIDCO.

About Conference

Cities in developing countries are rapidly expanding. India has 438 cities with a population of more than 100,000 people, accounting for 11% of the world's cities. It is expected that the urban population will be doubled in next 25 years. Unfortunately, the development is unplanned and chaotic, resulting in inequitable distribution of public services, costly housing, a lack of adequate streets and roads, and insufficient open spaces. Scientists and engineers all over the world are looking for technological solutions to problems such as poor urban planning, non-availability of affordable housing, deficiency in water supply or electricity, unorganized traffic, poor quality public transport and parking facilities, poor healthcare system, waste management, air and water pollution, etc.

Pillai College of Engineering has taken a timely lead and has started a series of conferences on "Technologies for Future Cities" to examine some of the challenges raised above. The invited talks and contributed papers covered six tracks, namely (i) Software technologies for future cities, (ii) Hardware technologies for future cities, (iii) Systems for future cities, (iv) Materials for future cities, (v)Healthcare for future cities and (vi) Policies and governance for future cities. The first conference in theseries was held during January 08-09, 2019 and second conference during October 08-09, 2021. Both the conferences were a great success. There were about dozen invited talks followed by a Panel Discussion. About 250 scientists and engineers attended the conference. The full details of theconferences are available on www.futurecities.mes.ac.in.

About Panvel, Navi Mumbai

Panvel is an old town in Raigad District of Maharashtra and is famous for its heritage of lakes, temples, nearby sanctuary and forts. Panvel Municipal Corporation is the first Municipal Corporation of Raigad. The authority of City and Industrial Development Corporation (CIDCO) has been the backbone in the development of Panvel. The town is situated on the outskirts of Mumbai and is all set to become the new transportation hub of Maharashtra serving the major trade and passenger routes by road, rail and air. It is reachable from Mumbai railway stations by local train and by taxi from Mumbai airport. Depending on the starting point, the travel time varies but, generally, does not exceed 90 minutes.

Tracks and Track Chairs

Software Technologies for Future Cities (Track Chairs: Dr. Sharvari Govilkar, Dr. Archana Patankar)
Hardware Technologies for Future Cities (Track Chairs: Dr. Monika Bhagwat, Dr. Sudhakar Mande)
Systems for Future Cities (Track Chairs: Dr. Gajanan Thokal, Dr. S R Mohanty)
Policies, Governance and Education for Future Cities (Track Chairs: Dr. Leena Potdar, Dr. Reni Francis)
Materials for Future Cities (Track Chairs: Dr. Jeet Patil, Dr. Raju Bhosale)
Healthcare and Fitness for Future Cities (Track Chairs: Dr. Sreedevi Kulkarni, Dr. Mansee Thakur)

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Conference on Technologies for Future Cities 2023 (CTFC-2023)
6th - 7th October 2023
Program Schedule

Time	Activity	Venue
Day 1: 6th October 2023		
8.30 - 9.30 am	**Registration** **Breakfast**	Reception Area Old Canteen Area
9.30 - 11.15 am	**Inauguration** • Welcome Address by Dr. Sandeep Joshi, Principal PCE • Inaugural Address by Chief Guest Dr. R Chidambaram • Keynote Address by Prof. Asim Tewari, IITB	Auditorium 7th Floor
11.15 - 11.30 am	Tea Break	Auditorium
11.30 am - 12.15 pm	**Plenary Talk 1** Dr. C P Vinod, Senior Principal Scientist, CSIR-NCL, Pune	Auditorium 7th Floor
12.15 - 1.00 pm	**Plenary Talk 2** Mr. Gajanan Pulsule, Chief Architect, TCS	
1.00 - 2.00 pm	Lunch	Old Canteen Area
1.30 - 2.00 pm	**Visit to Workshop and Sponsored Stalls**	R001, R101
2.00 - 3.00 pm	**Poster Session** [Paper ID: 1, 8, 17, 28, 30, 33, 42, 44, 45, 54, 57, 58, 60]	Stilt Area
3.00 - 4.30 pm	**Parallel Session of Contributed Oral Papers** Session A - ST [Paper ID: 2, 4, 11, 14, 19] Session B - HT [Paper ID: 32, 39, 53, 61] Session C - SY [Paper ID: 3, 7, 13, 21, 23, 25] Session D - MT [Paper ID: 5, 15, 20, 29, 41] Session E - HC [Paper ID: 10, 12, 18, 37, 49]	G - 501 G - 502 G - 503 G - 504 G - 402
4.30 - 5.15 pm	**Plenary Talk 3** Dr. Srivalli Shrikanth, Professor and Head, MGM Dental College	Auditorium 7th Floor
5.15 - 5.30 pm	Networking and High Tea	Old Canteen Area
Day 2: 7th October 2023		
9:00 – 10:00 am	**Registration** **Breakfast**	Reception Area Old Canteen Area
10.00 - 10.45 am	**Plenary Talk 4** Mr. Avinash M Shabade, Institute of Engineers	Auditorium 7th Floor
10.45 - 11.30 am	**Plenary Talk 5** Mr. B K Sethuraman, Managing Director, Celanese Corporation	
11.30-11.45 am	Tea Break & Networking	Old Canteen Area
11.45 am - 1.00 pm	**Contributed Oral Papers** Session F - ST [Paper ID: 34, 35, 36, 43, 46] Session G - ST [Paper ID: 48, 51, 55, 56] Session H - SY [Paper ID: 31, 38, 47, 50, 52, 59]	G - 501 G - 502 G - 503
1.00 - 2.00 pm	Lunch	Old Canteen Area
2.00 - 2.45 pm	**Plenary Talk 6** Dr. Priam Pillai, COO Mahatma Education Society	Auditorium 7th Floor
2.45 - 3.30 pm	**Plenary Talks 7** Mr. Bijon Roy, Principal Lead Product Manager, Microsoft	
3.30 - 3.45 pm	Tea Break	Auditorium
3.45 - 4.45 pm	**Panel Discussion** Mr. Sunil Pote, Mr. Nikhil Mahadeshwar, Mr. Bhavesh Mehta	Auditorium 7th Floor
4.45 – 5.30 pm	**Valedictory** • Prize Distribution • Address by Chief Guest Dr. Debdatta Ratna, NMRL • Vote of thanks	
5.30 - 6.00 pm	Networking and High Tea	Old Canteen Area

ST - Software Technologies for Future Cities

HT - Hardware Technologies for Future Cities

SY - Systems for Future Cities

PG - Policies, Governance and Education for Future Cities

MT - Materials for Future Cities

HC - Healthcare and Fitness for Future Cities

Conference on Technologies for Future Cities 2023 (CTFC-2023)

6th - 7th October 2023

Complimentary Workshops for Participants

SN	Detail	Day & Time	Venue
1	**Additive Manufacturing** By Addonix Technologies Pvt. Ltd.	6th & 7th October 2023 10.00 am - 5.00 pm	R001
2	**Embedded Internet of Things** By Digitoad Technologies	7th October 2023 10.00 am - 5.00 pm	R102

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Inaugural Session

Chief Guest: Dr. R Chidambaram

Formerly Principal Scientific Adviser to the Government of India

Dr. Rajagopala Chidambaram is a Physicist who is known for his integral role in India's nuclear weapons program. He coordinated test preparation for the Pokhran-I (1975) and Pokhran-II (1998). He previously served as the principal scientific adviser to the federal Government of India. He also served as the director of the Bhabha Atomic Research Centre (BARC)— and later as chairman, Atomic Energy Commission of the Government of India and he contributed in providing national defence and energy security to India. Dr. Chidambaram was chairman of the board of Governors of the International Atomic Energy Agency (IAEA) during 1994–95. He was also a member of the Commission of Eminent Persons appointed by the Director-General, IAEA, in 2008 to prepare a report on "The Role of the IAEA to 2020 and Beyond".

Keynote Speaker: Dr. Asim Tewari

Professor, IITB

Asim Tewari is a Professor in the Department of Mechanical Engineering and a faculty member of the Center for Machine Intelligence and Data Science (C-MInDS) at the Indian Institute of Technology Bombay, Mumbai. He graduated with a B. Tech degree from IIT Kanpur, followed by an M.S. and Ph.D. from Georgia Institute of Technology, Atlanta. He has over two decades of work experience working in both corporate R&D and National research laboratories. His area of research is in mathematical models for microstructural-mechanics and applied machine learning. He has over 100 international journal & conference publications and ten international and four Indian patents. He has graduated thirteen Ph.D. students and more than fifty M.S. students. Over the last decade, he has secured research funding of over 15 million USD.

Dr. Vinod C Prabhakaran

Senior Principal Scientist, CSIR-NCL, Pune

Dr. Prabhakaran completed his MSc in Physical Chemistry from the school of Chemical Sciences, Mahatma Gandhi University, Kottayam, Kerala, in 1995. He obtained PhD in Chemistry from Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore. He did post-doctoral work at various institutes including the Technical University Eindhoven, The Netherlands; Denmark Technical University, Denmark; and Cardiff University, United Kingdom. He joined CSIR-NCL in 2010 and started his independent research group at the Catalysis Division.

Title: Sustainability through Catalysis

Abstract: Global CO_2 emissions are having catastrophic effects on our climate and weather patterns with other looming socio-economic issues. With a worldwide population of 7.8 billion in 2020 and expected to touch 9.9 billion by 2050, the goal of achieving net C-neutrality by this time will take a humungous effort by science and technologists alike. With increasing emissions expected from the population growth due to the demands met in food, energy and social security there are several options available to cut down on the global CO_2 emissions. Switching to renewable energy is one of the options where wind, solar and water can be used for meeting energy demands. Until alternate viable renewable technologies are developed, coal and oil will still be our main sources of energy. In this scenario, there is an urge to decarbonize the CO_2 to the levels where global warming temperature can be kept below 1.5 deg C. To accomplish this goal CO_2 capture and utilization strategies have been intensely pursued by the scientific community. In my talk, I will show how catalysis can be at the forefront of CO_2 conversion technologies where it can be transformed into a variety of platform molecules.

Mr. Gajanan Palsule
Chief Architect ,TCS

Mr. Gajanan Palsule currently working as 'Chief Architect' for CIO organization , heads cluster of Architecture and Engineering CoEs with focus on digital transformation leveraging cloud native architecture and hybrid cloud environments. He has more than 22 years of experience in the IT sector. He worked in the roles of Solution Architect, Business Analyst and Project Manager in various industry verticals including Banking, Insurance, Service and manufacturing. Contributed in business systems transformation as well as digital transformations for multiple global customers.

Title: With Metaverse – Let us make our cities smarter and sustainable

Abstract: With rapid and unplanned urbanization, overcrowded cities are facing a wide range of challenges like increased pollution, congestion degraded lifestyle and social inequality. Next Generation digital technologies like Metaverse can play a crucial role to overcome this crisis situation. This session will give a bird's eye view of various Metaverse components and how they will help to resolve severe concerns and help to make our cities smarter and sustainable.

Dr. Srivalli Shrikanth
Professor and Head, MGM Dental College

Dr. Srivalli Shrikanth is a Oral And MaxilloFacial Surgeon in Vikhroli, Mumbai and has an experience of 31 years in this field. Dr. Srivalli Shrikanth practices at Godrej Memorial Hospital in Vikhroli, Mumbai. She completed MDS - Oral & Maxillofacial Surgery from Dr. TN MGR Medical University in 1992.

Title: Computer assisted Maxillofacial Surgery: A precision tool

Abstract: Technology has served as a very effective assistant to surgeons in order to see and plan beyond what is perceptible to the normal surgeons eye. Computer assisted surgery (CAS) has led to greater levels of precision and much better clinical and surgical outcomes in various applications like management of Maxillofacial injuries and tumor ablations and reconstructions that follow. Thanks to the high velocity road traffic accidents which are steadily on the rise in developing countries like India, which leave the facial skeleton completely mutilated in worse case scenarios. This leaves the surgeons with absolutely no landmarks which can serve as a guide to restore the normal shape and symmetry of the face. In such cases, Technology which uses DICOM images, mirroring, 3 D printing and fabrication of STL models allow presurgical planning in terms of the exact localisation and quantitation of the problem and help evolve customized solutions. Oncological resections also lead to large ablative defects that need customized defect-based reconstructions. Use of virtual surgical planning (VSP) helpsfabricate surgical guides which help transfer the preplanned margins of resections with precision onto the table and also help in harvesting and shaping the bone grafts which are put in for reconstruction of these defects. These advances have gone a long way in achieving good functional and aesthetic resultswith reduced operating time and effort. This interdisciplinary approach holds a lot of promise and is thefuture.

Mr. Avinash M Shabade
Transportation Engineer (Special Projects) at CIDCO

Mr. Avinash M. Shabade, a visionary professional with an unwavering passion for transforming urban landscapes and improving the lives of citizens. Avinash's journey began in the serene town of Latur, Maharashtra, where he completed his Civil Engineering degree in 2006. Fuelled by a desire to create impactful change, he embarked on a remarkable academic voyage, earning his M. Tech Degree from the prestigious institute, The IIT Bombay in 2009.

Title: 3 Generations of Railway Stations in Mumbai Metropolitan Region

Abstract: This presentation delves into the pivotal role of transportation in the daily lives of Mumbai Metropolitan Region residents. It emphasizes the significance of efficient public transport systems in urban settings, with a spotlight on Mumbai's iconic local trains connecting Mumbai and Navi Mumbai. The presentation then navigates through the evolution of suburban railway stations in this region, showcasing three distinct generations. It traces their architectural and functional development, highlighting how they mirror the evolving needs of commuters and urban growth.

By examining these generational shifts, we gain insights into the dynamic interplay between urbanization, transportation, and the urban fabric, offering valuable lessons for future urban planning and sustainable city development. This analysis also emphasizes the necessity of a scientific and logical approach in prioritizing transport facilities for citizens, ensuring their accessibility, efficiency, and sustainability in a rapidly urbanizing world.

Mr. Belur Krishnamurthy Sethuraman
Managing Director, Celanese Corporation, India

Sethu is the Managing Director for Celanese India, with responsibilities of charting a profitable growth path for Celanese in India. He and his team are committed to catalyzing usage of engineering plastics and specialty chemicals in a wide spectrum of end-use markets, and working with customers to develop innovative solutions in emerging segments like 5G, Advanced Mobility, Medical Devices and Sustainability.

Before joining Celanese, Sethu spent 14 years with Dow Chemical and Rohm and Haas, where he held various sales, marketing, country and business leadership responsibilities in the Asia Pacific region.

Sethu has a B. Tech in Chemical Engineering from IIT Madras, an MS from Clarkson University, USA and an MBA from Sasin School of Business, a Kellogg-Wharton program. He is also a Certified CEO Coach from Coaching Foundation of India, a partner at Social Venture Partners and Member of the Celanese Global Diversity and Inclusion council.

Title: Advanced and Sustainable Engineered Plastics for Future Cities

Abstract: Trend of Increasing urbanization is bound to continue. India's vision for 2047 unveiled by our PM on Aug 15, 2022, includes one for a Developed India. Realizing the goal will require our cities to be designed and developed in a holistic manner. Choice of materials will play a big role in meeting those requirements. The talk will provide an overview of advanced and sustainable engineeringpolymers that are likely to be needed in such future cities for enhanced mobility, rapid and seamless connectivity, affordable and quality healthcare and net zero living and work spaces. Examples will include polymers for clean energy devices like hydrogen electrolysers, tunable polymers for high-speednetworks, implants for long-acting dosage forms and low carbon footprint bio-based materials. It will be important for industry-academia-government ecosystems to work together to develop solutions to meet future needs.

Dr. Priam Pillai
COO, Mahatma Education Society

Dr. Priam Pillai graduated with a PhD in mechanical engineering from MIT in 2011. He is currently an Associate Professor at PCE in Mumbai, India as well as serves as the Chief Operating Officer of Mahatma Education Society (MES). He has started many new initiatives at MES including launch of Pillai Center of Innovation and Entrepreneurship, Google Apps for Education in the 48 institutions, founded the Urban Expansion Observatory, numerous Industry-Institute Interactions, development and adaptation of open-source software and technologies for education and many others.

As a faculty member at PCE, his research interests include development of instruments for material testing. His research interests also include applications of GIS and remote sensing for development of maps that can be used for Urban planning. He is the founding partner of the Urban Expansion Observatory, a joint research initiative in Geospatial technologies between Mahatma Education Society and New York University. He is also the director of Valectus Pvt Limited, a geospatial analytics company, that specializes in providing geospatial solutions to small and medium businesses as well as government agencies. The company was the winner of the Maharashtra State Innovation Society's startup award in 2020.

Title: Combining GIS and Remote Sensing with Artificial Intelligence to Study Cities.

Abstract: We are combining GIS and remote sensing with artificial intelligence and machine learning to create data products that can be used by different stakeholders. We have made data products that are currently being used by the Panvel Municipal Corporation, New York Universities and many more agencies to study cities. These can be used by small to midsize businesses, NGOs, educational institutions, think tanks etc as well as individuals, researchers, media and advertisers. Any business that needs geospatial data for customer segmentation, customer acquisition, analytics, business investment decisions etc can use our platform. In addition, Government agencies, international organizations, municipalities and planning authorities can also use our platform to make informed decisions about infrastructure, nature and resource conservation, disaster mitigation etc.

Mr. Bijon Roy
Principal Lead Product Manager- Microsoft

Bijon is a lifelong learner in technology innovation. He is currently a leader building product in the cloud and AI space for Microsoft. In his two decades of career, he has played multiple roles starting with a developer, a delivery manager, a seller, a startup incubator to currently a manager of product managers. He wants to be the best team player with strong individual contribution and spread positivityaround in all situations. Apart from technology, he is passionate about history, philosophy, and anthropology. If you want to know how to measure your "maturity", he can help you assess yourself with his tips.

Title: How to survive in the age of ChatGPT

Abstract: In a rapidly changing world, it is natural to be anxious. As per a Goldman Sachs report, more than 300 million jobs will be obsolete in the next decade. World Economic Forum says that 40% of working hours will be impacted by AI. You will surely see a lot of people in different professions rendered jobless in your first phase of career. So, you have reason to be worried.

Being a history buff, I looked at the history. When the automobile industry was taking off in the first half of 20th century, think of the millions of people working in horse breeding, stables, agriculture of fodder, factory workers building horse carts, to even the steam engine workers. Where did they go? When computers were taking over the world in the second half of the 20th century, millions of people again lost jobs. So much so, that few of our Indian leaders were against the IT industry due to the fear of job loss. Where did these people go? I remember in my childhood beggars coming to our home saying that they lost jobs due to factory shutdown. When I started my career in 2002, you had to use a textpad to write java code, deploy in production through scripts and write an equal number of lines of code if you wanted to automate testing. So, naturally we never wrote those test cases and my code would bomb in production. When I was in the US, my nights would go to troubleshooting issues and days would be reserved to manage screaming customers. If there was a fine of $1 per bug, I would be a negative billionaire today.

Panel Discussion

Mr. Sunil Pote
Executive Director (Operations), Mahapreit - Government of Maharashtra (Undertaking)

Mr. Nikhil Mahadeshwar
Cybersecurity Expert, Digital Forensics Investigator & Tech Innovator

Mr. Bhavesh Mehta
Deputy General Manager – Engineering Design, Reliance Industries Limited, Navi Mumbai

Valedictory Session

Chief Guest: Dr. Debdatta Ratna
NMRL

Dr Debdatta Ratna has been working as a scientist in Naval Materials Research Laboratory, Ambernath, India, for last 14 years. He did his MSc in Chemistry, MTech in Materials Science and Engineering and PhD in Polymer Science at the Indian Institute of Technology, Kharagpur. He was a visiting scientist to Monash University, Australia on a BOYSCAST fellowship in 2000, sponsored by DST, India. He has been awarded the Alexander von Humboldt fellowship in 2006 to carry out research work in Germany. He has visited several Universities in Australia, United States of America and Germany and delivered many lectures. His areas of interest are toughening of thermosetting resins, composites, nanocomposites, adhesives, vibration damping materials, nonlinear optical polymers, and shape memory polymers. He has worked extensively on chemical modification of epoxy resin for the development of high performance fibre-reinforced composites and shock-resistant adhesives. He has published more than 50 papers in reputed international journals and is a referee for several international journals.

Oral Contributed Papers

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ABSTRACTS

ORAL CONTRIBUTED PAPERS

PAPER#HT032001

KEYPAD AND SMARTPHONE BASED DIGITAL DOOR LOCK
Anand Unnikrishnan**,** Anto Sen, Astitva Anant, Ahmed Uzair, Ruchi Harchandani
(Fr. C Rodrigues Institute of Technology, Navi Mumbai, India)

Abstract: This paper presents a low-cost digital door lock system that is controlled by a microcontroller. There is a need for a secure system that is hard to tamper within these times where robberies and thefts are increasing in homes and shops. The proposed door lock can be accessed by both a keypad and an Android smartphone. The microcontroller used is the Atmega328P (found in Arduino UNO) and interfaced with the smartphone via a Bluetooth module. The door lock can be operated through keypad if bluetooth module is not working. A double lock system consisting of a solenoid lock and a servo motor has been used in the system, which adds to the security. A buzzer is added to alert the person accessing the door and the nearby people if the input password is incorrect. The simulation of the complete system has been performed on Autodesk TinkerCAD.

Keywords: Digital, Smartphone, Bluetooth, Keypad.

PAPER#HT039003

SIMULATION OF ROBOT ARM FOR PICK AND PLACE OPERATION OF AMPOULES USING VACUUM GRIPPER
Akshay Sonar, Ajay Gangrade
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Abstract: Pharmaceutical industry demands for high speed and reliable packaging systems to provide solutions for quick packaging of products with safety standards. Industry is looking for advanced systems which may be useful to increase output speed and quality of products. Some products are difficult to handle during the feeding process owing to their small size and delicate nature. These products may suffer physical damage during manual feeding process and lead to transporting of damaged product to the end consumer. One of the most crucial operations in packaging process is to accurately position the product into required place. Incorrect placement of product leads to physical damage of product in subsequent packaging and transportation process. Such type of problem is more frequently observed with manual feeding of small sized products at desired location. A fully automated and reliable system needs to be implemented to eliminate this problem by working with accuracy on the exact required path. Present work proposed to implement a robotic arm in existing system to ensure accurate pick and place operation by simulation of path of robot used for the accurate positioning of product. Present work also combines selection criteria of suitable robot arm and gripper for pick and place operations of pharmaceutical products. Those are appropriate for handling small and light weight products. Suggested method may be useful in pharmaceutical industries for high speed, accurate, safe and reliable systems for packaging large quantities of delicate small sized products.

Keywords: Robotics, Healthcare, Packaging, Pick and Place

PAPER#HT053004

EXPERIMENTAL INVESTIGATION OF ADVANCED SMART CONCRETE CURING BY APPLICATION OF INTERNET OF THINGS (IoT) TECHNOLOGY

Sheetal Zambare, Karthik Nagarajan, Raju Narwade
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Abstract: The major issue today is a lack of fresh water. For the combination and curative of concrete in production, drinkable water is necessary. It takes 28 days to complete the curing process. So there is a huge need for water in the construction industry for curing purposes. Potable water is becoming less and less available every day for a number of reasons. Therefore, a substantial sum of money must be spent on the purchase of water. Advanced technology must be used to utilize water in a forbidden way in order to reduce the amount of water wasted throughout the healing process. As a smart concrete curing system (SCC), it is known. A moisture sensor is used to design the smart concrete curing system, which would automatically supply water for curing based on the amount of moisture present in the concrete and the ambient temperature. Utilizing Wi-Fi, the scheme will be linked to the internet. The concrete building's current moisture content level and the status of the pumps will be uploaded to the cloud. This data will be accessed via a mobile app in the cloud. In order to monitor the curing process for jute bags, IOT devices, and water. Results have demonstrated that the strength of the cube after 7, 14, and 28 days with a SCC system is greater than the strength of the cube after curative through an IOT device.

Keywords: Concrete, IoT, Compressive strength, water

PAPER#HT061005

DESIGN AND CONTROL OF LORENTZ FORCE MICRO ACTUATOR

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Abstract: In this current paper LabVIEW based PID control system, DAQ Modules, L298N Motor Driver and Potentiometer Feedback Device is used to control the linear motion of voice coil motor in micron. All the program and control logic is written in LabVIEW software, which gives controller signal/data to DAQ module. DAQ systems are bridge fulfilling the gap between the LabVIEW software and other hardware. Different DAQ Module like NI 9401 is used to drive VCM in forward and backward direction, NI 9269 DAQ Module is used to control PWM signal and NI 9205 DAQ Module is used to acquire Potentiometer data. Motor Driver L298N is used as amplifier for our Voice Coil Motor. Potentiometer is used as feedback device, which gives current positional data to controller system. A mathematical model of VCM is proposed by assuming some of its characteristic and its dynamics behavior and linear response is observed under different conditions.

Keywords: VCM, PID Controller, Linear Motion, LabVIEW, DAQ Modules, L298N Motor Driver, Linear Potentiometer.

PAPER#HC010001

NISCHETHANA SAHAYAK- APP FOR PEDIATRIC ANAESTHESIA
Madhura Gangaiah, Brinda P, Niharika Shailendra, Ashutosh Kumar Jha, Charan Sri Hari,
Shivangi Gupta
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Abstract: Paediatric Anaesthesiology is the advanced science and clinical practice concerned with paediatric anaesthesia which focuses on the management of pain in children and peri-operative care through flow of research, education and quality augmentation. Because infants and young children have different needs and requirements than adults, Paediatric Anaesthesia has evolved as a speciality. Their physiological, anatomical, pharmacological, emotional, and social characteristics vary. The app provides a user-friendly design, and interface and presents a trove of valuable clinical information regarding Paediatric anaesthesiology. The application includes a quick drug dosage calculator for most Paediatric Anaesthesia and critical care medications including antibiotics, sedatives and local anaesthetics. The app is clearly meant to be used by doctors practicing Paediatric Anaesthesia at the point of care for rapid information retrieval in a true paediatric emergency.

Keywords: Paediatric Anaesthesia, Drugs, Vitals, Muscle Relaxant, Opioids, Airway Related

PAPER#HC012002

FINITE ELEMENT ANALYSIS OF FEMUR BONE UNDER TRANSIENT LOADING CONDITIONS
Mayur Sunil Kharade, Richa Agarwal
(Pillai College of Engineering, Navi Mumbai, India)

Abstract: The present study is based on the use of a 3D simulation technique to determine the forces exerted on the femur bone during walking and further using it to carry out finite element analysis of femur bone. The simulation was done taking into consideration the effect of body weight, all thigh muscles and all contact forces at the hip, patella- femoral and knee joints. The results showed that the maximum forces were found between 0.75 sec (40%) and 0.95 sec (60%) of the posture phase, while the moments of highest twisting were immediately following heel strike. The study also found that muscle activity can reduce the internal loads on the femur bone by up to 24%. The findings of this study provide valuable insights into the forces exerted on the femur bone during walking. The obtained dynamic forces acting on the femur was further used to perform finite element analysis of the femur. The appropriate material selection and boundary conditions was used and the transient structural analysis was performed using ANSYS package. This approach resulted in more accurate results as compared to applying a static load depending on the body weight on the femur. The findings contribute to the understanding of femur loading dynamics and have implications for the development of interventions and treatments targeting femoral-related pathologies.

Keywords: Femur bone, Dynamic loading, FEA

PAPER#HC018004

IMPLEMENTATION OF PREPROCESSING IN DIABETIC RETINOPATHY DETECTION

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Abstract: Diabetic retinopathy, a severe complication of diabetes mellitus, is a leading cause of blindness worldwide. Early detection and accurate diagnosis of diabetic retinopathy are critical to prevent vision loss and initiate timely treatments. Preprocessing of retinal images is an essential step in the development of robust and efficient computer-aided diagnostic systems for diabetic retinopathy detection. This research focuses on exploring various preprocessing techniques applied to retinal images to enhance the quality of input data and facilitate the detection of diabetic retinopathy features like Region of Interest (ROI) such as blood vessels, macular region and optic nerve segmented from retinal fundus images. The research methodology begins from collecting the fundus images. These image are resized and normalized to ensure uniformity and numerical stability during model training. Contrast enhancement method is applied to emphasize relevant features, making them more discernible for subsequent analysis. Then, noise reduction techniques Gaussian blurring and median filtering, are implemented to eliminate image artifacts and enhance feature extraction. To concentrate on the critical retinal region, cropping or region of interest (ROI) selection is performed. Additionally, illumination normalization techniques address variations in image brightness, a common issue in retinal imaging datasets. To promote the generalization of machine learning models, data augmentation methods are applied to increase the diversity of the training dataset. Diabetic Eye Disease features are further used for classification in pre-trained models.

Keywords: Gray mapping, Deep Learning Neural Network, Segmentation.

PAPER#HC037005

DETECTION OF DIABETIC RETINOPATHY USING SWISH ACTIVATION FUNCTION

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Abstract: Diabetic retinopathy is a chronic condition in- flicted as a result of uncontrolled diabetes. If not treated on time, it can lead to complete blindness. Therefore, it is important to diagnose and treat diabetic retinopathy early to prevent its dangerous side effects. Ophthalmologists currently spend a lot of time manually diagnosing diabetic retinopathy, which can be painful for patients. A system could be useful for automating this process, allowing diabetic retinopathy to be diagnosed quickly and easily, followed by treatment to prevent further damage to the eyes. A deep learning based aproach is presented in this paper to classify diabetic retinopathy using a binary classifier and decoding three properties: hemorrhages, exudates, and microaneurysms. The proposed approach has the potential to be a valuable tool for automating the diagnosis of diabetic retinopathy. It is fast, accurate, and can be used to detect the three most common signs of the disease. This will help to improve the early detection and treatment of diabetic retinopathy, which could prevent blindness in millions of people. The model has a 95% accuracy rate on test data, which is a significant improvement over previous method.

Keywords: Diabetes, Diabetic Retinopathy, Eye Disease, Detection of Disease, Swish Activation Function

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PAPER#HC049007

REVIEW OF DIGITAL TWIN DEVELOPMENT SYSTEM OF HUMAN BODY PART

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(Pillai College of Engineering, Navi Mumbai, India)

Abstract: The primary focus lies on exploring their respective scopes, levels of model complexity, applications, significance, experimental validation, anticipated trajectories, and overall contributions to the realm of research. The analysis encompasses five distinctive paradigms, each encapsulating a unique facet of cardiovascular dynamics and heart modeling. By doing so, the investigation accentuates the manifold ways in which these modeling strategies enrich the comprehension and enhancement of cardiac function, along with their implications for pertinent medical applications. Additionally, the paper concludes by discussing contemporary technological advancements in the domain of cardiac dynamics, notably encompassing the development of computationally efficient models through the utilization of artificial neural networks.

Keywords: Mathematical modeling, cardiovascular research, digital twin, reduced-order model.

IMPROVEMENT OF WATER PERMEABILITY WITH DATE PALM REINFORCEMENT IN COMPOSITE MEMBRANES

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Abstract: There is no living organism on earth that can exist without water, but water issues and the subsequent loss of sanitation pose a serious problem. A study claims one child dies every two minutes due to water problems. Enhancing water quality can reduce the risk of death to some extent. Clean, safe water is a fundamental right of every individual. A great deal of interest exists in low-cost and easy water filtration solutions. This research explores the idea of creating potable water using a composite membrane containing date palm leaves. Polysulfone (PSF) was used as the base material, N-Methyl-2-Pyrrolidone (NMP) as a solvent, Polyvinylpyrrolidone (PVP) as the pore former, and date palm leaves powder as additive. Water permeability and contaminant removal are affected by membrane pore size. Dope solutions were prepared in five concentrations with 0.05%, 0.1%, 0.15%, 0.2%, and 0.25% additive powder weight. These portions were calculated as a percentage of the entire dope solution. A membrane's water permeability test was conducted at 2bar pressure and room temperature. It was found that membranes containing 0.15% wt of additive powder had the best water permeability. Approximately 718.52 Litres per square meter hour (LMH) of water could pass through this membrane. Water permeability, measured by ansys analysis, was 786.59 LMH.

Keywords: Composite Membrane; Ansys Analysis; Natural Material; Water Permeability

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A STUDY OF THE MICROSTRUCTURAL PROPERTIES OF IN718 PROCESSED THROUGH LASER DIRECT ENERGY DEPOSITION AND CONVENTIONAL CASTING

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Abstract: Inconel 718 finds its application in high temperature applications because of its better weldability and high temperature mechanical properties. Almost 50 % of the jet engines parts are manufactured through nickel superalloy. This works provides the comparison of the microstructural properties between additively manufactured (AM) Inconel 718 (IN718) and conventionally cast IN718. Laser Direct energy deposition (L-DED) route of AM with wire as a feedstock material to produce IN718 samples have not been explored much. Three interlayer rotation angles: 0o, 67o and 90o are used to produce IN718 coupons. Primary columnar dendrites and secondary phase such as Laves phase are present in L-DED parts. Laves phase are the intermetallic structure formed during micro-segregation of alloying elements such as Nb, Mo during solidification. This work sheds important insights on the structure and properties of L- DED parts and its comparison with conventional manufactured parts.

Keywords: Additive Manufacturing, Inconel 718, Direct Energy Deposition, Microstructure.

PAPER#MT020003

DETERMINATION OF SIZES OF Fe₃O₄ NANOPARTICLES: RESULTS OF COMPARATIVE X-RAY DIFFRACTION (XRD) AND SMALL ANGLE X-RAY SCATTERING (SAXS) STUDIES

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Abstract: X-ray Diffraction is a standard method for determining sizes of nanoparticles. However, this method does not give size distributions of particles if there is a polydispersity in particle sizes. XRD provides an average size for the particles. Small Angle X-ray Scattering (SAXS) is another technique for determining sizes of nanoparticles. This technique provides not only mean size, but also size distribution of particles. This paper reports results of XRD and SAXS experiments on indigenously synthesized Fe3O4 nanoparticles.

Keywords: Nanoparticles, Iron Oxide, Size Distribution, XRD, SAXS.

PAPER#MT029004

OPTIMIZATION AND MODELLING OF MANUFACTURING PROCESSES: A REVIEW

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Abstract: The optimum choice of process variables is critical for assuring product quality, lowering machining costs, and enhancing manufacturing process efficiency. This research paper introduces the application of contemporary optimization techniques to optimize advanced manufacturing processes and enhance their machining performance parametrically. It focuses on mathematical modeling to achieve these improvements. The discussion includes neural network-based methods, genetic algorithms, particle swarm optimizations, teaching-learning-based optimizations, simulated annealing, Ant colony optimizations, fuzzy optimizations, artificial bee colony algorithm, and harmony search. The main objective of this paper is to comprehensively present the diverse range of modern optimization methods and their applications.

Keywords: Optimization technique, Ant colony optimizations, Particle swarm optimizations, neural network-based methods.

Degradation of Polycaprolactone (PCL) based composites used in biomedical applications

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Abstract: A degradable biomaterial is used in a broad range of medical applications like bone plates, bone screws, stents and balloons, contraceptive reservoirs, drug delivery vehicles, tissue engineering scaffold etc. The degradable biomaterial doesn't need removal or surgical intervention as it breaks down, absorbed or is excreted. The degradable polymer polycaprolactone (PCL) possesses crucial characteristics like biocompatibility, processability, cost efficacy, due to which its use in biomedical application has enjoyed significant growth. Due to good rheological and viscoelastic properties, PCL renders a platform to design and fabricate long term degradable implants, which may be manipulated chemically, physically, and biologically to tune the mechanical properties, degradation kinetics and cell adhesion to suit a specific anatomical site. PCL-based composites are utilized in conjunction with other polymers or ceramics to improve the compound bone grafting material's tailored functional qualities. Bioactivity, mechanical qualities, degradation, and other functional features have been discussed in this article. PCL is used as a base material with polymers or ceramic as secondary materials to produce the required breakdown rate adjustable with the healing tissue. This paper provides an overview of the effects of fabrication methods and scaffold architecture on the functional properties of PCL composites utilized in biomedical applications.

PAPER#ST002001

GIS AND REMOTE SENSING AS A DECISION SUPPORT TOOL FOR ANALYSIS AND RECOMMENDATIONS IN URBAN FLOODING: A CASE STUDY OF VASANA WARD OF AHMEDABAD

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Abstract: In recent years, urban flooding caused by heavy rainfall has become a pressing global issue, including in Indian cities that face challenges such as high population density, rapid development, and resulting encroachment on natural resources. The process of urbanization has significantly altered the natural characteristics of cities, such as green spaces, water bodies, and topography, replacing them with densely built areas and increasing the proportion of impermeable surfaces. This transformation has disrupted the natural drainage patterns and reduced the ability of the soil to absorb water. Consequently, urban areas with high imperviousness experience more frequent and severe flooding events, disrupting social life, ecological balance, and economic activities. The primary objective of this research paper is to explore the potential of Geographic Information Systems (GIS) and Remote Sensing as a tool for analysis and recommendations in Urban Flooding in Municipalities of fast-growing cities. The study focuses on the Vasna ward of Ahmedabad city, systematically investigating its current conditions using GIS and remote sensing, and proposing strategies to prevent future flood occurrences by incorporating sustainable urban drainage (SUDS) principles into the planning framework of the city.

Keywords: Urbanization; Impervious surface, Urban flood; GIS, Sustainable urban drainage systems (SUDS)

PAPER#ST004002

NestAid - GPS-based Community Service Application for Donating Food, Clothes, and Shelter

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Abstract: The proposed app is designed to deal with the demanding situations confronted with the aid of donors and receivers in terms of locating and gaining access to vital sources together with meals, clothing, and refuge. The app presents a platform that simplifies donating and receiving those sources by supplying a streamlined and person-friendly interface. Through the app, donors can without difficulty sign up and offer their donations of food, garb, and refuge. Donors can imply the forms of assets they're willing to provide and their availability. The app additionally presents a simple and steady price system that lets donors make financial contributions to the purpose. On the other hand, receivers can access the app to find donors in their region. By using the app's place-primarily based offerings, receivers can quickly pick out close-by donors who have the assets they need. Receivers can then initiate touch with the donors via the app to set up the pickup or shipping of the donated sources. The app's use of technology performs an essential function in simplifying the donation and receiving technique. By leveraging region-based total offerings, the app allows connecting donors and receivers in real-time. Additionally, the app's user-pleasant interface and steady charge machine make the technique of donating and receiving assets convenient and efficient. Overall, the app's goals are to make a contribution in the direction of the betterment of society by means of enhancing admission to vital assets and fostering a sense of network engagement. By offering a platform for donors and receivers to connect and work in the direction of a commonplace cause, the app allows for bridging the space between the ones in need and those who are willing to assist.

Keywords: Resource Allocation, Location-based Services, Streamlined Interface, Community Engagement

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POGIL DATA ANALYSIS EMPLOYING J48 DECISION TREE, K NEAREST NEIGHBOR, RANDOM FOREST TREE, AND LOGISTIC REGRESSION ALGORITHMS TO EXAMINE STUDENT PERFORMANCE

Sahil Parab, Priyanshu Singh, Anjali Yeole, Maya Bhatt
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Abstract: Education is the basic and most fundamental necessity which improves the potential of each person. Everyone is unique and elevates the person academically, significantly, and passionately. It is significant for achieving life realization and for self-improvement. This study uses the classification techniques of data mining to mine data of students of Vivekananda Education Society Institute of Technology, Chembur, Mumbai to ascertain if there is any pattern between the grades where Students learned with POGIL and without POGIL. POGIL (Process Oriented Guided Inquiry Learning) is a cooperative learning method that integrates Guided Inquiry into a cyclical system of concept generation, investigation, and application. Final the test revealed an enhanced score among the students learned using the POGIL method

Keywords: J48 decision tree, K-nearest neighbour, Random Forest Classifier, logistic Regression, WEKA.

DEEP ARCHITECTURE FOR DIAGNOSIS OF PNEUMONIA IN THORACIC IMAGES

Kanchan R. Dabre, Satishkumar L Varma
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Abstract: Pneumonia is a deadly thoracic disease caused by a bacterial infection in the lungs. A routine diagnostic test to detect pneumonia is a chest radiography. Radiologists or expert physicians help to localize and diagnose pneumonia clouds in the chest X-Ray. Radiology practice is error-prone due to the limited number of experts, increasing patient volumes, and the subjective nature of human perception. The existing computer aided pneumonia diagnostic techniques face issues like imbalanced pneumonia dataset, limited quality of chest radiograph, pathological deformities, X-Ray imaging inhomogeneities, gross background noise, overlapped patterns of opacities and anatomical alterations caused due to misaligned body positioning. In this work Computer-aided deep learning based pneumonia detection from a given chest radiograph is utilized to reduce the number of diagnostic flaws and to ease the task of radiologists. Spatial features learned on publicly available large-scale datasets by pre-trained CNN models like DenseNet201, Inceptionv3, VGG16, VGG19 and Inception_Resnet_V2 are used to classify healthy and pneumonia affected chest X-Rays. The statistical findings from the demonstrations support the analytical selection of the best pre-trained deep network models to be used, specifically for the identification of pneumonia. This research work also suggests suitable preprocessing and augmentation techniques before extracting the global and local statistical features. The VGG16 architecture exhibited a high accuracy of 92.95% in classifying pneumonia from thoracic images whereas DenseNet201 exhibited poor validation performance over prediction accuracy.

Keywords: pneumonia, deep learning, computed tomography, deep convolutional neural network, chest X-Ray diagnosis.

PAPER#ST019006

RECOMMENDATION FOR JOBS AND RESUME ANALYZER USING NLP

Jasmit Gharat, Prof Nikhita Mangaonkar
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Abstract: Nowadays companies use ATS to scan resumes of the applying candidates. Thousands or even lakhs of candidates apply to the same position every time. With the help of ATS the company shortlists some candidates based on their relevant skills. Now the HR or the Recruiting team has to manually look at these resumes. This can be a tedious job for an HR after all he or she is also a human being. This system can be used to overcome this tedious task. Hr can just upload the resumes and this will extract all the relevant skills or data of the candidate and after which the HR can choose the best candidates suitable for the position. This will save a lot of time of the recruiting Team and can seriously eliminate the additional headache of reviewing the resumes manually thereby increasing the efficiency of the company.

PAPER#ST034010

MOBILIAR: AN FURNITURE BUYING ENVIRONMENT WITH THE HELP OF AUGMENTED REALITY AND 3D VISUALIZATION

Reeya Patra, Ishwari Garge, Keertana Pradeepkumar and Vanita Mane
(Ramrao Adik Institute of Technology, Navi Mumbai, India)

Abstract: Every household has a need of furniture, to make the house utilitarian and make living easier. In India, we still depend heavily on the traditional furniture buying methods i.e., going to furniture marts, looking for the furniture we like, estimating if the furniture would fit in the desired spot, and buying the furniture solely based on a hunch of whether it would fit and match the rest of the house's interior design. This proves to be a big problem when the furniture has already been bought and it doesn't fit or look good in the desired spot. Taking the fact that buying without trying is a difficult choice to make, we decided to develop a system that would help the user visualise the furniture, and get an ease in buying the desired furniture. The system is implemented as a mobile application. The technology used behind this is Augmented reality (AR), which is an advanced and efficient solution for connecting and visualizing the 3d models in any own environment. This is possible by using Unity gaming engine with the blender 3d software for building the models and a google provided package AR Foundation for android tools. We hope to create a better environment of AR technology platforms for everyday users and sellers. We are able to achieve the goal of saving time and hassles by the use of AR.

PAPER#ST035011

A COMPREHENSIVE RESEARCH ON EMOTION DETECTION TECHNIQUES FOR PURE AND CODE MIXED INDIAN REGIONAL LANGUAGES

Neha Ashok, Sharvari Govilkar
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Abstract: Research on emotion detection in Indian regional languages is crucial due to India's diverse linguistic landscape. Detecting emotions in regional languages has numerous applications, including sentiment analysis, customer service, and mental health assessment. Various approaches exist for this task, such as rule-based systems, machine learning, and deep learning. Among these, machine learning is the most commonly employed method, wherein a model is trained on annotated texts containing emotional information like happiness, sadness, anger, fear, and others. However, several challenges hinder emotion detection in regional languages. Annotated datasets are predominantly available in English or other widely spoken languages, necessitating the creation of regional language datasets. Additionally, the complexity of regional languages poses dificulties in accurately discerning emotions. To address these challenges, researchers are actively exploring new approaches. Despite the challenges, progress is being made in the development of ef ective techniques and tools for emotion detection in Indian regional languages. This paper is trying to do a comparative survey of dif erent techniques used for emotion detection in pure and code mixed Indian Regional languages.

Keyword: NLP, sentiment, emotion detection, classification techniques, challenges, features, machine learning, deep learning, Indian regional Languages

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PAPER# ST036012

COMPARATIVE ANALYSIS OF NAMED ENTITY RECOGNITION IN INDIAN LANGUAGE TEXTS: MONOLINGUAL AND CODE-MIXED LANGUAGES

Anasooya Dutta, Sharvari Govilkar
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Abstract: Following the start of the internet, we can see the rise in the use of many social media platforms where people propagate their thoughts in their own language. Also, we can see mixing of two different languages while conveying messages on the web. Thus, making it difficult to perform name entity tasks. This is one of the main challenges of name entity extraction. The complexity of linguistic mixing in code-mixed text poses an additional challenge for Named Entity Recognition. Employing NER techniques can assist in determining the linguistic origins of code-mixed text. In social media posts and comments, code mixing is a common occurrence where individuals use both their regional language and English, which further complicates identifying the language base. The aim of named entity recognition (ner) is to identify and label the words such as person, place, location, etc. This survey paper discusses and compares algorithms used by past researchers on name entity extraction for pure and code mixed Indian languages by considering the most relevant tools, and methods like Convolutional Neural Networks (CNNs), Bidirectional Long Short Term Memory, Transfer learning approaches, and numerous other methods being used lately.

Keywords: NLP, Entity extraction, techniques and methods, challenges, lexical resources, features, machine learning, lexicon based.

PAPER#ST043013

SYSTEMATIC LITERATURE SURVEY ON OVERVIEW AND APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN MACHINE FAULT DIAGNOSIS
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Abstract: Sensor technology has exponentially increased the quantity and quality of data extracted from manufacturing processes. Artificial intelligence (AI) replicates human intelligence in machines to make them capable for problem-solving and decision-making like the human brain. Machine Learning (ML) is a one of the techniques of Artificial Intelligence (AI) which constructs analytical model. Machine Learning and Artificial Intelligence (AI & ML) consist of algorithms that can update automatically because of pattern recognition, technical experience and data analysis. ML algorithms are not explicitly programmed, instead of that it gets trained through a sample data which is known as training data. Algorithm training in ML algorithms is used in various applications, like biotechnology, biomaterial, e-mail filtering, speech recognition, prediction, and robotics. A significant aspect of Industry 4.0 is automation, digital interconnectivity, and a high degree of flexibility that allows all systems involved to self-reconfigure independently. AI & ML has a significant role in Industry 4.0. In Mechanical Engineering AI algorithms can upgrade manufacturing space, streamline supply chain management, predict failure of machine components, automated driving, etc. Machine maintenance keeps the mechanical facility in working order by periodic servicing, repairing, and replacing worn out/nonfunctioning parts. Machine maintenance is a crucial activity, which affects the productivity of manufacturing plants. Machinery fault diagnostics and machine health monitoring are significant. AI & ML techniques are recent and reliable tools in Predictive Maintenance (PdM). This paper is focused on the overview of the significance of machine learning in predictive maintenance of mechanical machinery.

Keywords: Predictive maintenance (PdM), Artificial Intelligence (AI), Machine learning (ML), Industry 4.0.

PAPER#ST046014

EFFECTIVE ROAD SAFETY FOR FUTURE CITIES: AN IN-DEPTH CASE STUDY USING GIS AND REMOTE SENSING FOR ACCIDENT ANALYSIS IN NAVI MUMBAI
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Abstract. Employing Geographical Information System (GIS) and Remote Sensing (RS), this study focuses on enhancing road safety in Navi Mumbai. By analyzing accident data and traffic patterns, the research identifies accident-prone areas and proposes effective traffic management strategies. Spatial analysis using GIS and RS uncovers accident hotspots and traffic congestion zones. On-site investigations provide insights into underlying road safety issues, leading to practical solutions for each location. These solutions range from signal optimization to infrastructure enhancements. The study's results offer actionable insights for traffic management authorities, ensuring safer and more efficient urban spaces. The research serves as a model for leveraging GIS and RS in enhancing road safety in urban areas.

Keywords: Geographical Information System (GIS); Remote Sensing; Traffic Congestion; Traffic Accident; Road Safety; Navi Mumbai.

PAPER#ST048015
PERFORMANCE ANALYSIS OF ENSEMBLE OF REGRESSION MODELS

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Abstract: Smart things are those that take the best possible solution into consideration for solving a problem. Cities can only be called smart if they have smart transportation. Smart bus service requires knowledge of bus arrival time. This paper addresses the problem of bus arrival time prediction. Machine learning is the technique that learns from the given data and prepares a mathematical model based on its characteristics. It is always better to compare different methodology and algorithm performances for selection of optimal solution. Various algorithms that can be applied for solving a regression problem are Random Forest, Lasso, Ridge, Gradient Boosting and XG Boosting. In this paper 30 combinations of these five algorithms are applied to solve the regression problem of bus arrival time prediction. For combining these algorithms ensemble technique is used. Performance evaluation of these models is done considering six evaluation metrics over a standard dataset. It is found that random forest algorithm performs the best among all the combinations.

Keywords: ensemble, random forest, lasso, ridge regression, xgboosting, gradiant boosting

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PAPER#ST051016
DOCUMENTATION OF HISTORICAL MONUMENTS USING PHOTOGRAMMETRY- A REMOTE SENSING APPROACH

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Abstract: India has a rich historic culture which is depicted through the present remains of the Historical Monuments and statues all over the country. These monuments and statues were constructed years ago and those have been destroyed recently or during a span of time due to various reasons both man-made disasters such as wars, Industrial growth, human negligence and natural disasters like earthquakes, climate changes, floods etc. If these destructions continue further at the current pace the coming generation won't be able to witness the cultural importance and history of the country. Hence, Conservation of the Historical Monuments in India is a topic of at most priority in the current situation. Many latest technologies with high accuracy and modern tools and equipment can be used to solve this problem. The Modern technology of Non-Destructive Testing (NDT), to identify the structural damages can be used on these monuments but with some limitations. The internal damages can be identified up to some extend using NDT. The external can be identified using some Visual methods. Photogrammetry, an approach from Remote Sensing and GIS the latest technologies that allows us to create 3D models with the help of Photographs as a data set, using many 3D generation software. In this paper we are dealing with the Photogrammetry technology for the process of preserving the Heritage structures. Yarhoung Gyi pagoda in Bagan, Myanmar was taken as the case study for Aerial Photogrammetry which data set was created using a camera mounted Drone (Unmanned aerial Vehicle- UAV), two statues from Baijnath Temple in Himachal Pradesh, India and Forest Research institute building structure, Dehradun, India were taken as case studies for close range photogrammetry in which data set were generated using normal mobile camera and DSLR camera (GPS fitted camera) respectively. Two different software were used to generate the required 3D model outputs to find the suitable software for each research work and the comparison between the both. The paper also shows a comparison between different methods of photogrammetry, the various hardware and software used for the same as well as how photogrammetry can solve some of the modern problem.

Keywords: Unmanned Arial Vehicle, Aerial Photogrammetry, Close Range Photogrammetry, Heritage Structure, 3D Modelling, structural damage, Non-Destructive Testing.

PAPER#ST055017

INDIAN SIGN LANGUAGE RECOGNITION USING HAND-POSE KEY POINTS AND TRANSFER LEARNING

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Abstract: We want world class facilities like good infrastructure, transportation, housing, healthcare etc. in Indian cities. These ultra-modern cities should be well equipped and friendly for everyone including Divyangjan-differently abled people. One of the challenges is to facilitate Divyangjan, especially the people who are deaf and mute(unable to speak). People with speaking abilities convey their thoughts, ideas and share their experiences by getting vocal while interacting with the people around them. Vocal language is one of the primary media of communication used by the human. However, the people who are unable to speak and hear they use sign language to convey their views and emotions. But majority of the people have trouble in understanding sign language. This creates a barrier in the communication process. To fill this gap, the projected system converts the alphabets signs' of ISL(Indian Sign Language) into text. In ISL, some alphabets have single way of representation while some have two or more ways of representing gestures. For example, alphabet 'A' has single gesture while alphabet 'E' can be sign using three different ways. The primary objective of a communication system is to convey the message that a person wishes to express. To implements this, the proposed system makes uses of the concept of keypoints of hand gesture and transfer learning techniques. The suggested solution provides validation accuracy of 99.97% and is also appropriate for situations encountered in daily life. Additionally, we advise installing kiosks in smart cities with interpreting software set up at various significant locations to have cordial conversation with them.

Keywords: Indian Sign Language(ISL), Machine Leaning, Computer Vision, Deep Leaning(DL), Hand Gesture Recognition(HGR), Convolution Neural Network(CNN)

PAPER#ST056018

BLOCKCHAIN-ENHANCED AUTOMATION IN CONSTRUCTION: INDUSTRY 4.0 AND SMART CROWD FUNDING CONTRACTS

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Abstract: This research introduces a new way to improve crowdfunding using blockchain technology. Crowdfunding is a popular method for supporting projects, but there are concerns about how funds are managed. To solve this, we propose a system that uses blockchain from Ethereum, along with smart contracts. These smart contracts help project creators and investors work together in a fair and secure way. Our main goal is to make crowdfunding better for everyone involved. With smart contracts, creators can set rules for how funds are used, and investors can have a say in decisions. This gives investors more control over their money. This blockchain-based system brings benefits like clear transactions, protection against fraud, and better accountability. By using Ethereum, we ensure that all transactions are secure and easy to track. Smart contracts also speed up tasks like giving out funds and making decisions. We built a prototype using Ethereum's tools to show how this can work. Through real examples, we show that blockchain can make crowdfunding more trustworthy and efficient.
In conclusion, our research offers a fresh solution to the problems in crowdfunding. By using blockchain and smart contracts, we can reshape crowdfunding to be fairer, more secure, and more effective. This work contributes to the ongoing conversation about blockchain's impact and provides a real solution to improve crowdfunding for everyone.

Keyword: Block Chain, Smart Contract, Ethereum, Meta-mask, Construction Industry, Crowd Funding.

PAPER#SY003002

TWO-WHEELER STABILITY CONTROL SYSTEM

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Abstract: Many times, people face difficulties while riding motorcycles at slow speeds or in traffic or in congested parking areas. At slow speeds, the rider has to constantly touch their feet to the ground in order to maintain balance. In this process of balancing the motorcycle sometimes the rider might get bruised or might suffer from sprained leg. Even if no injury is dealt, it is anyways exhausting to travel in traffic in today's busy lives. Thus, a solution to eliminate or reduce the impact of this problem is required, so that motorcycle commuters can experience a better ride quality. A solution to this problem is proposed in this report. Wherein, the motorcycle is automatically stabilized using a stand type mechanism.

Keywords: Speed sensor, Arduino Uno, Two-wheeler stability system.

PAPER#SY007003

SMART UTILITY BASKET: DESIGN, CODING, AND FABRICATION OF A SMART ROBOTIC SYSTEM

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Abstract: The Smart Robotic System (SRS) is a simplified version of an Automated Human Follower (AHF) primarily used in industrial settings and warehouses for efficient goods transportation. This research paper focuses on the development of a Smart Utility Basket, a human-following robot designed for efficient navigation and interaction in various environments. Employing image processing via OpenCV, this robot can accurately identify and track a designated human in real time. The main image processing technique used in Smart Utility Basket is Template Matching, which is a basic method for detecting a template (Logo) within a large image. With precise control through PWM motor drivers, robot smoothly follows the human. Ultrasonic sensors ensure a safe distance is maintained, enhancing user safety. However, challenges include image quality limitations due to camera clarity, processing delays, and adapting to complex environments. Despite these challenges, this project highlights the promising future of human-following robots in revolutionizing human machine interactions in diverse industries. Further advancements and enhancements could expand their utility and impact, where seamless human-robot collaboration is pivotal. With continue refinement and advancement, this technology promises to revolutionize human-robot interactions across various domains.

Keywords: Autonomous, Raspberry-pi, Robot, Image Processing, OpenCV, etc

PAPER#SY013005

A Generic Approach to Eliminate Child Labour in Mica Mining

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Abstract: Geologically, mica minerals are a category of phyllosilicate sheet silicate minerals that are created by an amalgamation of heat, pressure, and chemical reactions that occurs in the outermost layer of the planet's crust. India serves as one of the world's top exporters of mica, and the majority of the country's mica reserves are in its eastern and north-eastern geographical regions. Various industries utilise mica in a variety of ways. It serves as insulation for capacitors, wiring, and electrical apparatus in the electrical sector, as well as being used in construction materials as an additive to improve the durability and heat resistance of substances like paint, plaster, and cement. Mica is a mineral that is also used in the cosmetics industry to give beauty products shine and lustre. In India, the illegal practise of mica mining frequently entails unregulated and risky procedures, including the employment of child labour, hazardous working conditions, and a lack of supply chain transparency. In this research paper, child labour elimination in mica mining can be aided by recommending companies and industry organisations practise ethical sourcing and encourage transparency across the mica supply chain with the help of appropriate technological solutions, i.e., cost-effective machinery that will eliminate child labour in mica mining.

Keywords: Mica Mining, Child Labour, Cost-effective machineries, Ethical Sourcing, Supply Chain Transparency

PAPER#SY021007

Artificial intelligence and machine learning in CNC machine tools: A review

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Abstract: Machine learning (ML) and artificial intelligence (AI) are significant advancements in computer science and data processing systems that can be utilized to improve almost all technology-enabled services, goods, and industrial applications. Machine learning is a branch of artificial intelligence and computer science that focuses on using data and algorithms to mimic the learning process of machines and improve system accuracy. To extend the life of the cutting tools used in machining operations, machine learning algorithms can be used to forecast cutting forces and cutting tool wear. In order to improve productivity during the part manufacturing processes, optimized machining parameters for CNC machining operations can be obtained by applying cutting-edge machine learning algorithms. Furthermore, to increase the quality of machined parts, surface quality of components can be forecasted and enhanced utilizing cutting-edge machine learning systems. Machine learning is applied to prediction approaches of energy consumption of CNC machine tools in order to analyze and minimize power usage during CNC machining operations. The use of machine learning and artificial intelligence systems in CNC machine tools is examined in this paper, and future research projects are also suggested in order to offer an overview of the most recent studies on these topics. As a result, the research field might advance by looking over and analyzing previous accomplishments in papers that have been published to propose creative concepts and methods in applications of artificial intelligence and machine learning.

DEVELOPMENT OF SOLAR DRYER

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Abstract: —The preservation of agro-products is one of the main problems faced by many countries. By the method of Solar Drying, we can preserve the nutritional values of the product by reducing its moisture content. Solar Photovoltaic Panels which are used for generating electricity start to lose their overall efficiency when the temperature of the Solar Panel starts increasing beyond 25oC [1]. The efficiency of solar panels reduces by 0.27% to 0.77% with an increase of 1oC in the panel temperature [2]. In this paper, we have discussed a method of forced convection to cool the overheated solar panel by passing air under the panel with the help of DC fans. To utilize the waste heat coming out of the solar panel we used the outlet hot air for drying spinach. Hence combining the concepts of Solar PV and Solar Thermal to increase the total power generated by the solar panel and to dry agro products.

Keywords: Dryer, Solar Cells, Efficiency, Forced Convection Drying, Solar Thermal, Agroproduct drying

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DESIGN AND DEVELOPMENT OF A TURBINE FOR WASTE HEAT RECOVERY SYSTEM

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Abstract: The world's energy consumption, which is steadily rising, is linked to a high rate of environmental harm. This leads to the need to safeguard the environment. To meet these expectations transmission and new vehicle systems like hybrid electric vehicles are being designed to achieve maximum energy savings which results in less fuel consumption. In hybrid vehicles, IC engines are the main power source to charge the battery but most of the power produced is released into the environment in the form of exhaust gas. This energy can be conserved by harnessing the energy in the exhaust gas. A turbine coupled to a generator/alternator can be used to extract electrical energy from the exhaust gas which can be stored in a battery unit and used to run the turbocharger unit of the vehicle as and when required. In this process, the design of a turbine blade plays a very important role in increasing the performance of this system. So, it is necessary to design and develop a turbine that can be used to recover the energy from engine exhaust gases in the form of electrical energy. The paper consists of designing a turbine blade based on certain calculated parameters which is analyzed against the pressuregradient of the exhaust for the required output. Later, with the necessary improvements the manufacturing of the prototype is done. Testing of the prototype shows electrical power outputs corresponding to the RPM of the turbine blade when different air pressures were applied to it. After testing, the efficiencies were calculated and it was found that the aerodynamic efficiency was higher ascompared with the overall efficiency of the turbine. The study provides technical knowledge that can be used to further improve this system to help recover waste exhaust gas energy in the form of electricalenergy.

Keywords: Turbine, Waste heat recovery, Turbocharger, Turbogenerator, Turbine Design, Ansys, LabVIEW.

MULTI CRITERIA DECISION MAKING IN SUSTAINABLE SUPPLY CHAIN

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Abstract: Supply chain management involves the multi entity flows of material, information cost and services in a network consisting of customers, suppliers, manufacturers, and distributors. It begins with raw materials, continues through internal operations, ends with distribution of finished goods. Nowadays, sustainability in the supply chain is one of the major issues. Sustainability can work better in the collaborative environment with the vendors. In the sustainable supply chain, vendor evaluation is playing a key role. Vendor evaluation is one of the most important activities of purchasing departments. This importance is increased even more by new strategies in sustainable supply chain; because of the key role vendors perform in terms of financial sustainability, quality and carbon emission. This paper suggests that the key to survival in these changed conditions is through sustainability particular by the reduction of carbon emission. Vendor evaluation is a multiple criteria decision- making problem in which the objectives are not equally important. Analytical Hierarchy Process (AHP) is employed for evaluation of vendors on the basis of various criteria and sub-criteria. The aim is to encourage more efforts in this domain for wider benefits.

Keywords: Multi Criteria Decision Making (MCDM); Analytical Hierarchy Process (AHP); Sustainable Supply chain, Vendor Selection

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DEVELOPMENT OF SINGLE AXIS SOLAR (PV) TRACKER AND ITS THERMAL ANALYSIS.

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(Pillai College of Engineering, New Panvel, India)

Abstract: This paper presents study of 'Design, Development and Thermal Analysis of Single Axis Solar (PV) Tracker' and their potentials in solar energy applications. The paper provides an overviews of the design parameters, structure, types, and drive system. In recent studies, two primary types of solar tracking systems have been discussed, namely a single axis solar tracking system and dual axis solar tracking system. We have addressed the parameters related to single axis tracker only by making use of MPPT. This study involves the use of SolidWorks, and IoT analytics platform to design and fabricate experimental model. The research also validates the experimental data (temperature) of photovoltaic panel with ANSYS Workbench R15 Simulation software. The maximum temperature recorded by experimental setup is 54.1 °C and ANSYS solar panel simulation temperature is 55.97°C, which is temperature of 1.87 °C higher as compared to experimental setup. As per comparison of experimental data and ANSYS simulation result we found, maximum 6.96% increases in the simulation result.

Keywords: LDR, MPPT, Solid works, IoT, ANSYS Workbench R15.

PAPER#SY047013

ENERGY SIMULATION OF A HIGH SCHOOL BUILDING USING eQUEST: A CASE STUDY

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Abstract: Urbanization has increased the Building energy demand significantly where energy consumption in space cooling is a matter of concern. Around the globe, researchers are attempting to simulate the energy behavior of building using numerous types of simulation tools. In this study, yearly energy consumption of a high school located in the humid subtropical climate region in Indiana is done using e-Quest software. Space cooling requirement of the said building provided by the water-cooled chiller, is done using e-Quest software and baseline model is created in compliance with ASHRAE 90.1. Effect of four building orientations on energy utilization is investigated. An impressive change in building energy requirement is observed which turns out to saving in annual energy consumption up to 20%.

Keywords: eQUEST, Building energy, ASHRAE, energy simulation

PAPER#SY050014

SMART MULTI-PURPOSE DISASTER MANAGEMENT KIT CONFIGURED

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Abstract: Disasters can occur due to natural causes, human actions, or phenomenon that adversely affects life, property, living things, structures, or industries that often lead to lasting changes in human societies, ecosystems, and the environment. While it may not be possible to completely avoid disasters, it is possible to plan ahead and allocate time to minimize their impact on the health, safety, and property of a family. Disaster preparedness is an ongoing and integrated program that comes from a variety of activities and resources like increasing efficiency, effectiveness, and impact of emergency response measures at community, national, and organizational levels. Now everyone saw a flood situation in Maharashtra. In such an emergency, the right supplies must be on hand. The Disaster Management kit can help people survive after a disaster occurs. Disaster Management Kit is invented first time in India. This innovation will replace the locally available kit with a manufactured smart multi-purpose disaster management kit. The Disaster Management Kit is the concept of various higher Disaster Management Authority. At the time of designing examine the time succeeding the disaster, the character of the disaster, and the severity of the disaster. Disaster Management kit is an innovative bag to accumulate more than 13 no's compartments. Kit has one fully water-tightened compartment for keeping documents safe. This kit is tracked by using a GPS at any time at any location in the World. Disaster Management Kit is a lightweight and compact kit for multipurpose use during a disaster. This kit perfectly analysis the volume and the load concerning a person carrying the load, distributing the weight evenly across the body is key to finding a backpack that is comfortable to carry. During an emergency, it can be crucialto have your hands free. The Disaster Management Kit offers this benefit, allowing you to focus on important tasks without being hindered. The first aid box is covered with advanced tablets and medicine.

Keywords: Disaster kit, emergency preparedness, Multipurpose kit.s

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PAPER#SY052015

DESIGN AND DEVELOPMENT OF VORTEX EXHAUST ROCKET PROPULSION ENGINE

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Abstract: Aim of this project is to design a Rocket propulsion system with modified Convergent Divergent Nozzle which can improve the efficiency with comparatively higher exhaust velocity and thrust from the engine. This will have a propellant and oxidizer combustion, and a swirl surface inserts will be machined to achieve vortex flow. Design of basic Convergent- Divergent nozzle is referred from standard design techniques available from various sources, with the modification a solid model will be prepared out using CATIA V5. Static Structural, Thermal, and Computational Fluid Dynamics (CFD) analysis will be carried out using Ansys Workbench and Fluent v16. This project will help us to understand and learn Thermodynamics and Aerodynamics involved in the aerospace product designing and computer simulation-based analysis of structural strength and fluid flow analysis. Manufacturing of the components will give us a broad idea of recent Manufacturing technologies related to it.

PAPER#SY059018

GREENING URBAN SPACES: SPIRULINA-INFUSED LIVE PANELS FOR SUSTAINABLE AIR QUALITY IMPROVEMENT

Sayuri Kolekar, Jivitesh Vagal, Pranay Shikhre

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Abstract: The rapid growth in power, industrial, and transportation sectors nationally, along with growing planned and unplanned urbanization in India presents a cause for concern. Air pollution has been recognized as the world's largest single environmental health risk. The objective of this paper is to develop a sustainable solution to this colossal and exponentially increasing issue. We use spirulina platensis, which is an algae responsible for effective CO_2 absorption levels. This algae will be made in a cultural media which in turn will be stored in the live panels. The concept of live panels is such that, it provides a passage of airflow interacting with spirulina resulting in the reaction of CO_2 with spirulina. This paper shows the potential of Arthrospira platensis (spirulina) to the extent to which it can help reduce the intensity of pollution caused by myriad of vehicles.

Keywords: Arthrospira platensis (spirulina), Pollution, Live panel, O2 sensor

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ABSTRACTS

POSTER CONTRIBUTED PAPERS

EV BATTERY MONITORING AND RANGE PREDICTION USING MATLAB

Saurav Shrikumar Parappurath, Mayur Sunil Musale, Harishankar Radhakrishnan Nair, Nishant Santosh Gaykar, Amey Pramod Marathe
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Abstract—This work deals presents a comprehensive investigation of the battery system within the Hyundai Kona electric vehicle (EV), with a specific focus on sustainable transportation for future cities. The study employs MATLAB-based models to assess the battery's performance, conducting a detailed analysis of the battery system's behavior at a smaller scale. Valuable insights are derived concerning battery health monitoring, management systems, and precise State of Charge (SoC) estimation for the Hyundai Kona EV. The primary objective is to enhance the understanding of the Hyundai Kona EV's battery management system, thereby contributing to the development of sustainable transportation solutions for future urban centers. By leveraging MATLAB resources to delve into the intricacies of the battery system, this work aims to improve the reliability and efficiency of electric vehicles, aligning with the sustainable mobility goals of future cities. The insights gained from this study shed light on battery management and health monitoring systems, opening avenues for advancements in the design and development of more efficient and effective EVs. This work lays a robust foundation for future investigations on EV batteries, driving range, and battery life, crucial factors in achieving greater sustainability and reliability of EVs in real-world scenarios. The outcomes of this work will significantly contribute to the ongoing efforts of creating technology-driven future cities, where electric mobility plays a central role in building cleaner, healthier, and more environmentally conscious urban environments.

Keywords—EV Battery, battery health monitoring, SoC Monitoring, Range Prediction, Charge discharge of battery, Dashboard, Smart Mobility.

ENHANCED SKIN CANCER IMAGE GENERATION USING AUTO REGRESSIVE MODEL PIXEL CNN

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Abstract—A timely and accurate diagnosis is essential for treating skin cancer, which is a major health risk. For proper interpretation, image enhancement is essential to improving the quality of skin cancer images. Using Auto Regressive Density Estimation (ARDE) models with sub pixel CNN work presents a unique method for improving skin cancer images. The ARDE models with sub pixel CNN capture intricate spatial patterns, which makes them perfect for overcoming the particular difficulties presented by photos of skin cancer. A Pixel CNN is a generative model that uses autoregressive connections to modify the image pixel by pixel, A specific ARDE architecture with pixel CNN was created and trained on a large dataset of thermoscope skin cancer pictures. Comparative studies showedthat our Neural auto regressive density estimation methodology outperformed conventional enhancement methods in terms of picture quality and diagnostic precision. The method's effectivenessin assisting lesion identification and early detection, potentially enhancing patient outcomes, was proven by dermatologist reviews. This study emphasizes how ARDE models may be used to enhanceskin cancer images, which will lead to better medical imaging procedures.

Keywords—Machine Learning, Skin Lesion, Deep Neural Networks.

PERFORMANCE ANALYSIS OF MACHINE LEARNING METHODS FOR KIDNEY DISEASE PREDICTION

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Abstract—Kidney disease detection (KDD) describes the gradual loss of kidney function over a period of several months or years. The kidneys filter wastes and excess fluids from blood, which are then excreted in the urine of an individual. Chronic kidney disease usually gets worse slowly, and symptoms may not appear until your kidneys are badly damaged. Kidney failure occurs in the later stages of KDD. It gives symptoms that are caused by waste and extra fluid building up in the human body. KDDis extremely difficult to detect in the early stages. In this work, a method of detecting KDD in its early stages with the help of supervised learning algorithms is proposed. In this work, the kidney functions failure is detected by applying the classification algorithms on the test result obtained from the patient's medical report using algorithms such as Random forest, Support Vector Machine (SVM), Naive Bayes, Logistic regression, K-Nearest Neighbor (KNN), Decision Tree. The model is trained using different standard dataset with predefined features to predict the risk of kidney disease. Feature selection is done with the help of a correlation matrix, the important features are extracted and used to train the models. The model's accuracy is evaluated with the help of the confusion matrix, all the models trained are used in the web application to give the predicted output. The model with the best accuracy is taken into consideration. The aim of this work is to reduce the diagnosis time and to improve the diagnosis accuracy using classification algorithms.

Keywords—Kidney Disease Detection, Decision Tree, Support Vector Machine, Random forest, Naive Bayes, K-means clustering, Logistic regression, Machine Learning.

PAPER# MT042007

3D Printing & Moulding of Engine Block

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Abstract—An engine block can be produced using a variety of techniques. Traditional techniques like sand casting take a long time, have a limited amount of design intricacy, and demand post-processing. Die casting and permanent mold casting are expensive and provide little in the way of design flexibility. Lost foam casting may be costly and demands careful management. For complicated shapes, CNC machining is wasteful and expensive. In contrast, 3D printing's additive manufacturing capabilities get over these constraints. It enables complex designs, personalization, shorter lead times, a variety of material choices, less waste, and quick prototyping. In light of its ability to offer design flexibility, customization, and efficiency, additive manufacturing is therefore revealed to be the most effective technique for producing engine blocks. In this work, an engine block is printed in three dimensions using PLA. Finding an appropriate design required examining various STL files. The following three crucial factors were chosen: 40% infill density for strength, 60 mm/s printing speed, and 0.2 mm layer thickness for a compromise between printing speed and surface quality. Utilizing 4.6 meters of PLA, the engine block was printed in 3 hours and 41 minutes. For five to fifteen minutes, an acetone bath increased surface polish. After that, a mould was designed in CAD software for the production of the engine block with other materials.

Keywords—Moulding, 3d Printing, Engine Block, Ultimaker Cura, Ultimaker2 Extended.

PAPER# PG045001

The Power of Practicing Interview Skills – Easing Stress and Boosting Confidence for Engineering Students

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Abstract—Navigating the transition from academia to the professional world is a pivotal phase for engineering students. Among the myriad challenges they face, job interviews stand out as particularly daunting, often triggering stress and anxiety. This article explores the significant benefits of practicing interview skills in reducing stress and anxiety while concurrently enhancing confidence levels among engineering students. By delving into the reasons behind interview-related stress and the effectiveness of skill practice, we shed light on a holistic approach that equips students with not only technical prowess but also the mental fortitude required to excel in their careers.

PAPER# PG058002

ROLE-PLAYING A PEDAGOGICAL TOOL UNVEILS ENGINEERING STUDENTS TO SOCIAL FACTORS AND ENHANCING COMMUNICATION - AN ANALYTICAL STUDY

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Abstract—This analytical study presents the realms of engineering practices, role playing, and case studies, with a focused exploration to the social factor and improved communication. Four distinct research studies underscore the transformative potential of role play in different educational contexts, each shedding light on its unique impact. The overarching theme revolves around the broader implications for communication enhancement and language development and the pivotal role that the social dimension plays in shaping educational outcomes.

Keywords—Engineering practices, role playing, case studies, explores, social factor, improve communication

PAPER# ST028009

A COMPREHENSIVE SURVEY OF SEMANTIC TEXT SIMILARITY METHODS: HIGHLIGHTING THE NEED FOR A HINDI-ENGLISH TEXT SIMILARITY SYSTEM

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Abstract—With the exponential rise of textual data in the digital era, text similarity has become critical. This in-depth investigation investigates numerous strategies for assessing semantic text similarity and emphasizes the need for a specialized system to compare Hindi and English texts are available. This research examines the available literature, focusing on critical methods. A real-coded genetic algorithm technique for Hindi, similar to multi-model fine-grained nonlinear fusion Text summarization, as well as Word2Vec research in several languages. It also investigates the usage for predicting semantic textual similarity using Siamese CNN and LSTM models, as well as the Cross-lingual plagiarism detection system. Despite past study, there are gaps, notably in Text similarity analysis between Hindi and English. This paper tries to fill these gaps by investigating the efficiency of the models (Word2Vec, LSTM, NMTScore, Bert)and paving the way for enhanced text similarity systems with applications in various NLP domains. The foundation for developing precise text similarity systems in the changing digital environment is laid out in this survey.

Keywords—Text similarity, Semantic similarity, Cross-lingual processing, LSTM ,Word embeddings, NLP

PAPER#ST060019

CONTENT BASED VIDEO RETRIEVAL SYSTEM USING DEEP LEARNING
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Abstract: Searching for a particular video manually in a huge and varied collection of videos using textual information is quite challenging. The paper discusses the challenges of searching for specific videos in vast collections using textual information and proposes a solution using deep learning techniques. It implements keyframe extraction, feature generation, and category prediction using a clustering algorithm and InceptionV3 neural network. The Content-Based Video Retrieval (CBVR) system allows hassle-free retrieval of similar videos based on query keyframes/images from a large dataset. The result is evaluated using precision and MAP parameters. The precision of the proposed method in identifying the top 10 videos related to a given query video is 86.67%. For the top 20 videos, the precision is 73.33%, and for the top 30 videos, it is 65.33%. The Mean Average Precision of the model is 58.67%.

A RESEARCH ON NOISE MITIGATION & ENERGY CONVERSION THROUGH THE STRUCTURAL DESIGN AND ACOUSTICAL STUDY OF PARAMETRIC NOISE DAMPENING BARRIERS IN DENSE URBAN CONTEXT

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Abstract— Studies suggest noise originating from transport in urban context takes up about two thirds of the total noise pollution in the area. Noise is an environmental nuisance that affects people's well-being which is a known by-product of urbanization and industrialization. Transport is a major source of environmental pollution, consisting of noise and polluted air. Acoustics is rarely considered to mitigate traffic noise despite being an important performance criterion for architecture. As far as acoustics are concerned, distance if the most effective unit of measurement. Individual properties' architectural treatments also play a part in effectively reducing noise through landform elements like cuttings and mounds. Most widely recognized form of noise mitigation are noise barriers. They are especially practical and efficient in metropolitan locations given the restricted space, hence must be designed carefully. Digital tools present the opportunity for incorporating performance analysis into the design process. The emergence of sophisticated digital tools in the field of architecture has prompted designers to reconsider how we visualize streets in the possibility that technology may radically alter how they function. Hence a lookout for an alternative insight. This insight should be as much about enhancing the experience of traveling on the highway as it is about reducing sound pollution and its effect on the context. The scheme venerates the infrastructure of the city, creating a responsive structure that accelerates through the urban fabric. The city's infrastructure and road system are in turn closely related to the traffic volumes. This research intends to investigate creating a highperformance sound barrier system that is responsive to the traffic and is aesthetically compelling and visually dynamic. A noise barrier that can be an interface between the road space and city space leading to an overall reduction in noise levels of the dense urban environment. The design of the barrier should take into consideration various aspects, such as determining the acoustical characteristics of the barrier, such as transmission loss, choice of material, placement, size, and shape. Special attention to the integrity of the structure, aesthetics, and nonacoustical aspects. Micro-ambiances can be created adjacent to the noise barrier's trajectory using material(structure) and immaterial(sound) methods to improve the acoustical quality of its surroundings.

Keywords—Acoustics, Noise, Pollution, Conversion, Barrier, Geometry, Parametric, Dampening.

PAPER# SY008004

Enabling Energy Efficiency: An IoT-Based Smart Metering Model for Consumer Empowerment and Energy Conservation in Smart Megacities

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Abstract— In the recent era of IoT-based intelligent devices, the evolution of smart homes, societies, communities, and metropolises has taken a center stage. Smart megacities, in particular, prioritize the establishment of an intelligent electricity management infrastructure known as the smart grid. Central to this infrastructure are bidirectionally communicating smart meters—a necessity rather than a mere accessory. These advanced iterations of traditional energy meters empower consumers by furnishing them with enhanced insights and control over their energy usage and appliances. From real-time consumption data to remote control of household devices, these features offer new dimensions of interaction. However, the implementation of such capability is dependent on the use of reprogrammable microcontrollers such as the Arduino Uno and NodeMCU. These microcontrollers help manufacturers adjust gadgets to change market expectations, maintaining long-term relevance. Smart meters, which are the core of Smart Grids, orchestrate seamless online device operations, regulate energy use efficiently, and advocate for major energy conservation. In line with this viewpoint, we present a novel IoT-based smart metering paradigm. This empowers consumers by sending them real-time energy use statistics across 24-hour cycles via SMS, while also archiving these data for calculating monthly electricity bills. This comprehensive strategy not only empowers consumers to control their electricity consumption but also creates a culture of energy saving, which is an urgent need in our time

Keywords—IOT, GSM, SCT, ZMPT 101B, LCD, GUI

PAPER# SY030010

Feasible CFD applications in Buildings and other Sectors

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Abstract— Feasible applications of CFD (Computational Fluid Dynamics) in the building and other sectors are enumerated in this Paper. Heating and cooling is greatly affected by air flow as also occupant comfort and productivity. These can be analyzed using CFD. The design of airflow systems is outside the purview of much of architectural design practice; but by making the use of advanced digital tools, the task of integrating air flow into buildings design can be successfully accomplished. In recent times during SARS-CoV-2 it has been clearly noticed that air flow plays very important role in maintaining a good human health. It was also evident during the global pandemic that an in-depth understanding of how air flows through space is the need of the hour. This Paper reviews some of the important aspects as well as real time applications of CFD tool in various sectors. A case study of a pharmaceutical warehouse is also covered as a real-time example. By using CFD a number of feasible projects in building and industrial work analysis can be investigated. As the computational hardware and software resources get more advanced, the scope for this opportunity will further develop.

Keywords—CFD, Air flow, Building design, SARSCoV-2, digital tools, Building and industrial work analysis, computational resources

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PAPER# SY054016

AUTOMATING MANUFACTURING: REVOLUTIONIZING INDUSTRIES THROUGH CNC MACHINES, 3D PRINTERS AND BEYOND

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Abstract—The state of modern manufacturing has substantially been renovated by the automation of machines such as the CNC machines, 3D printers, Laser printers, etc... This article delves into the profound impact of automation on industries, focusing mainly on these three innovative technologies. Computer Numerical Control (CNC) machines revolutionizes precision manufacturing by means of translating digital designs into automated precise control of tools, presenting accuracy and repeatability. 3D printers, on the other hand, enable additive manufacturing, creating entities layer by layer based on digital designs. Laser machines excel in cutting and engraving with unparalleled accuracy. These technologies have redefined industries by enhancing precision, speed, design flexibility, and decreasing unwanted wastes of materials. Despite initial challenges, the integration of AI and machine learning holds potential for further advancements. As automation continues to evolve, industries have got to embrace these technologies to remain competitive and innovative in a swiftly changing landscape.

PAPER# SY057017

USE OF SMART SAFETY TECHNOLOGIES IN CONSTRUCTION SAFETY

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Abstract—This report presents a comprehensive study on the application of wearable smart safety technology in the construction industry. The rapid advancement of technology has opened new possibilities for enhancing safety and improving productivity in construction sites. Wearable smart safety technology, such as smart helmets, vests, and wristbands, integrates sensors, communication capabilities, and data analytics to monitor workers' vital signs, detect hazards, and provide real-time feedback. Risky construction practices, particularly in underground tunneling, pose significant safety challenges to workers. Accidents, cave-ins, and exposure to hazardous substances are common in such environments. To mitigate these risks, smart sensing suits have emerged as a promising solution. These suits incorporate advanced sensing technologies to monitor vital signs, detect potential hazards, and provide real-time feedback to workers. This work explores the potential of smart sensing suits in enhancing safety during underground tunneling operations. This report explores the potential benefits of wearable smart safety technology, addresses the research gaps in the field, and proposes a methodology for evaluating its effectiveness. The expected results of this study aim to contribute to the adoption and integration of wearable smart safety technology, ultimately improving worker safety and overall construction industry standards.

Keywords—Wearable technology, Smart safety, Construction industry, Worker safety, Sensors.