Proceedings of

SPICON 2022

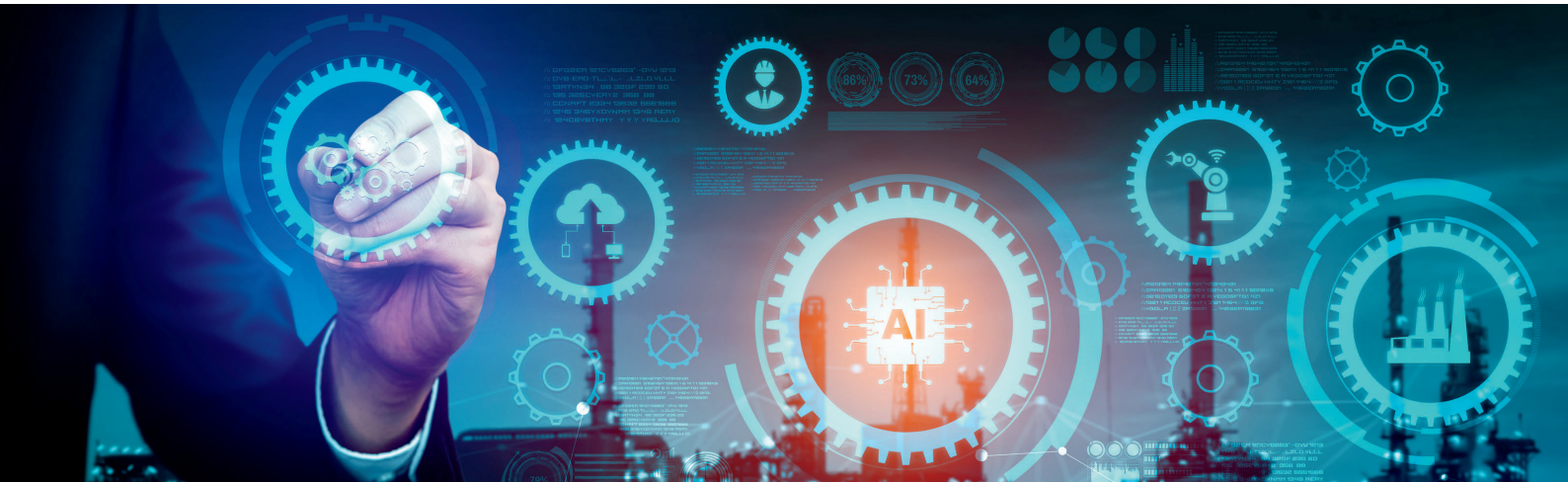
SERB, AICTE, CSIR, IIIE Mumbai Chapter, Turnitin and Apex Subscription Sponsored

Sardar Patel International Conference

on

"Industry 4.0 - Nascent Technologies and Sustainability for 'Make in India' Initiative"

- ***Industry 4.0***
- ***Sustainability***
- ***Make In India***



SPICON 2022

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Sponsored

Sardar Patel International Conference

on

"Industry 4.0 - Nascent Technologies and Sustainability for 'Make in India' Initiative"

Proceedings of

SPICON 2022

Date: 22nd & 23rd December 2022

Venue:

Offline-

Bhartiya Vidya Bhavan's

Sardar Patel College of Engineering, Mumbai
&
Sardar Patel Institute of Technology, Mumbai

Online –
Google meet

Dr. Santosh B. Rane
Conference Chair

Dr. Kiran Bhole
Program Chair

Prof. Kiran Talele
Program Chair

Preface

It brings me great joy to present the proceedings of the Sardar Patel International Conference on Industry 4.0 - Nascent Technologies and Sustainability for 'Make in India' Initiative (SPICON 2022) which will be held at Sardar Patel College of Engineering, Mumbai , on 22nd and 23rd December 2022.

SPICON-2022 is sponsored by SERB, AICTE, CSIR, Indian Institution of Industrial Engineering –IIIE Mumbai Chapter , Turnitin, Apex Subscriptions and is in association with Sardar Patel Institute of Technology, Mumbai, Capgemini, SAE India-WS, Institution of Engineers, Federation for Educational Leaders and Administrators Foundation (FELA). Further SPICON-2022 has technical collaboration with American Institute of Physics (AIP) and IEEE Bombay Section for publishing proceedings of the conference.

The aim of this conference is to provide an interdisciplinary platform for leading and young researchers, engineers, academicians, industrialists and practitioners working in the domain of Industry 4.0 - Nascent Technologies and 'Make in India' Initiative and Atmanirbhar Bharat. The conference also emphasis on sustainability and is also in alignment with 17 sustainable goals of United Nations.

The conference would enable participants to disseminate their innovations and contemporary research in the field of Civil Engineering, Electrical Engineering , Mechanical Engineering, Electronics and Telecommunication, VLSI and Signal Processing, Mechatronics, Information Technology, Computer Science and Engineering (AI, ML and Data Science) and related fields.

The conference will feature paper presentations and keynote speeches by eminent speakers who will focus on state-of-the-art development in the field of industry 4.0 like, green technology, lean manufacturing, Supply chain, innovative business processes, cloud deliver, network virtualization, network security, big data analysis, machine learning and prediction analytics, IoT, Blockchain and their recent trends in various verticals of engineering.

This conference also includes Conference Tutorials and Panel discussion to open new avenues to achieve these goals. The scope of conference will provide a common virtual platform where researchers, engineers, academicians and practitioners' confluence and cherish their research and innovations and deliberate upon futuristic research. The conference is going to be joined by participants from countries including USA, Korea, Oman, and Malaysia and India. We have received an overwhelming response in the form of more than 330 research papers nationally and internationally. SPICON 2022 acknowledges and appreciates the contribution of the editors and reviewers. They have made a significant contribution to improving the quality of the manuscripts included in the proceedings. We would also like to express our gratitude to the members of the organizing committees for their efforts in supporting the event and extending their cooperation in making this event a grand success.

We are thankful to Management of SPCE, All organsing committee members, Faculty Members, Advisory Committee members, Conference core committee members, Supporting Staff, Sponsors, Student Committee members, Suppliers for making this conference as a grand successful event.

Dr. Santosh Rane
Conference Chair
Sardar Patel International Conference
SPICON 2022

SPICON 2022

LIST OF OUR SPONSORS

1. Science and Engineering Research Board (SERB), New Delhi, Delhi
2. All India Council for Technical Education (AICTE), Delhi
3. Council of Scientific and Industrial Research (CSIR), New Delhi, Delhi
4. Indian Institute of Industrial Engineering (IIIE) MUMBAI CHAPTER, Mumbai
5. TURNITIN SOFTWARE, New Delhi, Delhi
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SPICON 2022

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Sponsored

Sardar Patel International Conference

on

"Industry 4.0 - Nascent Technologies and Sustainability for 'Make in India' Initiative"

Chief Guest

Dr. S K Saraf
Chairman
BOG , IIT Bombay

Guest Of Honor

Dr. Arvind Ankalikar
Exe. Vice President
LTI Mindtree
Navi Mumbai

Special Guest

Mr. Sanjeev Gupta
Vice President
Capgemini, Mumbai

WE WELCOME YOU !

to

This Prestigious Conference

SPICON 2022

Dr. Kiran Bhole
Programme Chair,
SPICON 2022

Dr. Santosh Rane
Conference Chair,
SPICON 2022

Dr. B.N.Chaudhari
Principal,
SPIT, Mumbai

Dr. M. M. Murudi
I/C Principal,
SPCE, Mumbai

Message

Dr. S. K. Saraf
Chairman
BOG, IIT Bombay

I am indeed delighted to know that Sardar Patel College of Engineering is organizing an International Conference on Industry 4.0- Nascent Technologies and Sustainability for "Make in India" Initiative - SPICON – 2022 on December 22 nd and 23 rd , 2022. The conference will provide the ideal platform for discussions and the exchange of unique perspectives on this crucial area of research.

The Fourth Industrial Revolution is opening the way for profound changes in how we live and dramatically altering nearly every industry with its storm of technologies like AI, IoT, AR, VR, etc. An international conference to promote research in Industry 4.0-Nascent Technologies would be an excellent idea at this moment to boost the performance of the manufacturing and service industries.

Combining sustainability and its goals with industry 4.0 is a brilliant step towards shaping a better tomorrow. Reliable, high-quality, segmented, and timely data are crucial for achieving the sustainable goals outlined by the UN, which is a call to action to find solutions for pressing social, economic, and environmental concerns worldwide. Recent advancements in autonomous and networked digital devices, together with the data they collect, have made it possible to track and monitor the Sustainable Development Goals (SDGs) as well as to combat climate change, improve human health, track infectious diseases, and more.

The Make in India initiative, launched by the Indian government to promote startup companies and generate jobs, would be aided by novel ideas presented at the conference by aspiring researchers. Through new research concepts and experiments conducted by youthful scientists and researchers, a number of smart and innovative products are anticipated to be promoted.

I convey my best wishes to organizing committee, scholars, researchers, delegates and speakers for their huge success and impactful contribution.

Message

Dr. Arvind Ankalikar
Exe. Vice President
LTI Mindtree
Navi Mumbai

At the outset, I would like to congratulate SPCE Team for organizing Prestigious International Conference on Industry 4.0 - A Technology driving today's industries at such interdisciplinary platform. Industry 4.0 has revolutionized the engineering industries, and business. It has redefined manufacturing and service industries by integrating new technologies viz. Internet of Things (IoT), Cloud Computing and Big Data Analytics, Artificial Intelligence and Machine Learning

In 21st Century, factories of Indian engineering giants have become even smarter as they are equipped with advanced sensing and actuating technologies, embedded softwares and intelligent robotic systems etc. Information from the production facility is being combined with operations leading to a higher value creation. These high-end technologies give these industries a new level of visibility which not only helps improve and optimize process to an all-new level of efficiencies but also developing responsiveness to customers that was not previously possible. This is surely leading towards sustainability.

Today India needs sustainable innovations. We are at catastrophic situation, struggling to maintain the GDP. Indian currency continuously falling against US dollar. But world bank has said that Indian economy has a higher resilience to ups and downs in the market. With Make in India movement in force, it is a great opportunity for the engineering industries to enter dynamic industrial environment and gain momentum. I foresee that this international conference will surely give young engineers, researchers, academicians and industrialists the best platform to discuss, deliberate and bring out their researches as a solution to global issues at the international level

I wish splendid success for this grand event and hope such events will happen in future many times.

Message

Mr. SANJEEV GUPTA
Vice President
Capgemini, Mumbai

I am extremely happy to know that Sardar Patel College of Engineering is organizing an International Conference on Industry 4.0- Nascent Technologies and Sustainability for "Make in India" Initiative - SPICON – 2022 on December 22nd and 23rd, 2022. The conference will provide an excellent platform for the exchange of Ideas and unique perspectives on this crucial area of research.

The Fourth Industrial Revolution has already touched majority of dimensions of Human Life. It has also transformed the business operations in Manufacturing and Service industries. The Convergence of Technologies like IOT, IIOT, AI, ML, AR,VR, 3D printing, Simulations, Cyber Securities, Cloud Computing will change the user experience dramatically in coming future.

An international conference SPICON 2022 will promote research in Industry 4.0 for Sustainable Practices in alignment with United Nation's Sustainability Goals and Make in India Initiative of Government of India.

Combining United Nations sustainability goals with industry 4.0 and Similarly Make in India initiative and Industry 4.0 are a brilliant steps towards shaping a better tomorrow. Recent advancements in Smart digital devices have made it possible to track and monitor the Sustainable Development Goals (SDGs) to combat climate change, improve human health, track infectious diseases, and many more.

Government of India's Make in India initiative to promote startup companies and generate employments, would be facilitated by Research Ideas, cutting edge research publications presented at this prestigious conference.

I convey my best wishes to SPICON2022 Team for making this conference as a Grand Successful Event.

Chief Patrons		
DTE, Maharashtra	**BoG, SPCE**	**Bharatiya Vidya Bhavan**
Dr. Abhay Wagh, Director	Dr. Sesha Iyer, Chairman	Shri. H. N. Dastur Executive Secretary
Dr. Pamod Naik, Jt. Director	Adv. Asif Mulla, Member	Shri. Jagdish Lakhani Jt. Executive Secretary

SPICON 2022 – Core team		
Sr. No.	**Name of Member**	**Portfolio**
1	Dr. M. M. Murudi	I/c Principal SPCE
2	Dr. B. N. Chaudhari	Principal SPIT
3	Dr. Santosh Rane	Conference Chair, Mechanical Engineering Track Chair
4	Dr. Kiran Suresh Bhole	Programme Chair, Mechanical Engineering Track Chair
5	Prof. K. T. Talele	Programme Chair, Electrical Electronics and Communication Engineering Track Chair
6	Dr. Sangeeta Daingade	Programme Co-Chair
7	Pravinchandra Gaikwad	Programme Co-Chair
8	Dr. Anupa Sabnis	Dean (Academics), SPCE, Mumbai
9	Dr. Rahul Dahatonde	Dean (Finance and Administration), SPCE, Mumbai
10	Dr. R. S. Maurya	HoD (Mechanical Engg.), SPCE, Mumbai
11	Dr. Sudhir N Dhage	Computer Science and Engineering, (AI,ML and Data Science) - Track chair,
12	Dr. Deepak Karia	Electrical, Electronics and Telecommunication Engineering -Track chair
13	Dr. Sangeeta Daingade	Electrical Engineering -Track chair
14	Dr. Hansa Jeswani	Civil Engineering - Track Chair
15	Dr. Megha Nagrale	Mechanical Engineering - Track Chair
16	Dr. Prasenjit Bhavathankar	Information Technology, VLSI and Signal Processing - Track chair
17	Dr. Aarti Karande	Publicity Chair
18	Dr. Sujata Kulkarni	IEEE Publication Chair
19	Dr. Amol Deshpande	IEEE Publication Co-Chair

SPICON 2022 – Advisory Team		
Sr. No.	**Name of Member**	**Name of Organization**
1	Dr. Placid Ferreira	Professor, University of Illinois Urbana Champaign, United States
2	Dr. Shankar S Mantha	Former Chairman AICTE, Former Chancellor K L University, A P., Adjunct Professor NIAS, Bangalore
3	Dr. Johnson Samuel	Associate Professor, Rensselaer Polytechnic Institute, USA.
4	Dr. R.K. Pandey	Professor, IIT Delhi, India.
5	Dr. Ramesh Singh	Professor, IIT Bombay, India.
6	Dr. Deepak Marla	Professor, IIT Bombay, India.
7	Dr. B. S. Nagendra Parashar	Vice Chancellor, Bahra University
8	Dr. Tabrez Ahmad	Vice Chancellor, GD Goenka University, New Delhi
9	Dr Sandeep Sancheti	Provost (Vice-Chancellor), Marwadi University, Rajkot, Gujarat
10	Dr. Abhay Kumar	Vice Chancellor, Pratap University, Jaipur
11	Dr. Chattar Singh	Vice Chancellor, RTU Bangalore
12	Dr. Guruprasad Kuppu Rao	Director & Mentor at Imaginarium India Pvt. Ltd.
13	Dr. Tanveer Ul Islam	Researcher, Eindhoven University of Technology, Netherlands.
14	Dr. Kedarnath Rane	Scientist, National Manufacturing Institute Scotland, UK.
15	Dr. Parvinder Singh	Vice Chancellor, Rayat Bahara University, Mohali Chandigarh, CEO, FELA.

SPICON 2022 – Advisory Team		
Sr. No.	**Name of Member**	**Name of Organization**
16	Mr. D. V. BHAGAT	Chairman, Indian Institution of Industrial Engineering.
17	Mr. Sanjay Nibandhe	Chairman, SAE India WS.
18	Mr. Ramesh Pasarija	Executive Director, SAE India WS.
19	Dr. Nitesh P. Yelve	Assistant Professor, IIT Bombay, India.
20	Dr. M.M. Joglekar	Associate Professor, IIT Roorkee, India.
21	Dr. Dattatraya Parle	Founder & Technology Expert, Simulation Centre-Founder & Technology, India.
22	Dr. N C Shivaprakash	Ex-faculty, IISc, Bengaluru, India.
23	Dr. Sunil Bhirud	Director & Professor at Veermata Jijabai Technological Institute
24	Dr. Elammaran Jayamani	Faculty Member, Mechanical Engineering, Swiburne University of Technology, Malaysia
25	Dr. Rajeev Agarwal	Associate Dean R&D, MNIT Jaipur
26	Dr. Premanand Chauhan	Director, Sushila Devi Bansal College, Indore
27	Dr. Ravi Dwivedi	Professor & Head of Department, MANIT, Bhopal
28	Dr. Y. S. Rao	Dean of Academic and Research, SPIT Mumbai
29	Dr. Pooja Raundale	Dean of Quality Assurance, SPIT Mumbai
30	Dr. Reena Sonkusare	Head – Electronics & Telecommunication
31	Dr. Anupma Agarwal	Symbiosis University of Applied Sciences, Indore
32	Dr. Suraj Rane	Professor, Govt College of Engineering, Goa
33	Dr. S. M. Khot	Principal, Fr. C. R. I. T., Mumbai, India.
34	Dr. V. K. Sunnapwar	Principal, L. T. C. E., Mumbai, India.

SPICON 2022 – Advisory Team		
Sr. No.	**Name of Member**	**Name of Organization**
35	Dr. Bhushan Patil	Professor & Dean Research, F.C.R.I.T., Mumbai, India.
36	Dr. S. A. Mastud	Associate Professor, V.J.T.I., Mumbai, India.
37	Dr. Suhas P. Deshmukh	Associate Professor, Government College of Engineering, Karad, India.
38	Dr. Y. Ravi Kumar	Associate Professor, NIT, Warangal, India.
39	Dr. Dattatraya Parle	Founder & Technology Expert, Simulation, India.
40	Dr. G. T. Thampi	Principal, T.S.E.C., Mumbai, India.
41	Dr. Vilas R. Kalamkar	Professor and Head, V.N.I.T., Nagpur, India.
42	Dr. Faruk Kazi	Dean R&D, V.J.T.I., Mumbai, India.
43	Dr. K. K. Sangle	Dean R&D, V.J.T.I., Mumbai, India; Professor, Dean Academics, V.J.T.I. Mumbai.
44	Dr. R. N. Awale	Professor, Registrar, V.J.T.I, Mumbai
45	Dr. Julfikar Haider	Professor, Department of Engineering, Manchester Metropolitan University, UK
46	Dr. Sanjay Bokade	Principal, Rajiv Gandhi Institute of Technology, Mumbai
47	Dr. Nitin Gulhane	Associate Professor, MED, V.J.T.I., Mumbai
48	Dr. Vikas Phalle	Associate Professor, MED, V.J.T.I., Mumbai
49	Dr. P. M. Karande	Associate Professor, MED, V.J.T.I., Mumbai
50	Dr. Pradeep Jadhav	Professor, Bharati Vidyapeeth College of Engineering (Deemed to be University) Pune
51	Dr. Lalit Singh	Scientist, BARC, Mumbai

List of Conference Tracks

1. Track :Advances in Mechanical Engineering

1. Manufacturing Technologies
2. CAD / CAM / CAE
3. Automation and Robotics
4. Quality and Reliability
5. HVAC
6. Heat and Mass Transfer
7. IC Engines and Electrical Vehicles
8. Sustainable Manufacturing
9. Logistics and Supply Chain Management
10. CRM and ERP
11. Nano Technologies
12. Smart Materials
13. MEMS
14. Renewable and Non-Renewable Energy
15. Non-Destructive Testing
16. Industrial Engineering and Management
17. Composites
18. Additive Manufacturing
19. Computational Fluid Dynamics

2. Track :Advances in Civil Engineering

1. Structural Engineering
2. Geotechnical Engineering
3. Transportation Engineering
4. Environmental Engineering
5. Water Resources Engineering
6. Town Planning and Infrastructure
7. Construction Engineering
8. Metro Engineering

3. Track :Electrical, Electronics and Telecommunication Engineering

1. Circuits and Systems
2. Analog Circuits

3. Digital Circuits
4. Mixed Signal Circuits
5. Nonlinear Circuits and Systems
6. Sensing and Sensor Networks
7. Filters and Data Conversion Circuits
8. RF and Wireless Circuits
9. Photonic and Optoelectronic Circuits
10. Low Power Design and VLSI Physical Design
11. Biomedical Circuits
12. Assembly and Packaging
13. Test and Reliability
14. Advanced Technologies
15. Computers and Information Technology
16. Computer Architecture
17. Computational Biology and Bioinformatics
18. Knowledge and Data Engineering
19. Learning Technologies
20. Multimedia Services and Technologies
21. Mobile Computing
22. Parallel/Distributed Computing and Grid Computing
23. Pattern Analysis and Machine Intelligence
24. Visualization and Computer Graphics
25. Communication Systems
26. Communication Theory and Information Theory
27. Antenna and Propagation
28. Microwave Theory and Techniques
29. Modulation, Coding, and Channel Analysis
30. Networks Design, Network Protocols and Network Management
31. Optical Communications
32. Wireless/Mobile Communications & Technologies

4. Track:Computer Science and Engineering (AI, ML and Data Science)

1. Smart factories
2. Smart Logistics
3. Smart manufacture
4. Smart Manufacturing
5. Support System for Industry 4.0
6. The industrial internet of things (IIoT)
7. The internet of things (IoT)

8. Vehicular Networks
9. Virtual Reality
10. Wireless Sensor Networks
11. Computer Vision
12. Context-aware Pervasive Systems
13. Cross-layer Optimization and Control
14. Cyber-physical Systems
15. Cyber-physical systems (CPS)
16. Data Center Networking
17. Data Mining
18. Deep Learning
19. Delay Tolerant Networks
20. Ecosystem & Infrastructure
21. Expert Systems
22. Game Theory in Networks
23. Geographic Information Systems
24. Hybrid and Nonlinear system
25. Inductive Learning
26. Industrial Big Data
27. Industrial Internet of Things
28. Industry 4.0 Factory
29. Intelligent and Knowledge Based System
30. Intelligent Control
31. Internet of Services
32. Internet of Things (IoT)
33. Intrusion Detection
34. Localization and Location-based Services
35. Machine Learning
36. MIMO-based Networking
37. Mobile Cloud Computing
38. Mobile Computing
39. Natural Language Processing
40. Network Management
41. Network Measurement and Analysis
42. Predictive Analytics
43. Quality of Service and Resource Management
44. Advance Robotic and Automation
45. Signal Processing
46. Smart Cities
47. Smart Communications Systems

48. Smart Devices and Products

5. Track :Information & Computer Technologies

1. Artificial Intelligence
2. Neural Network
3. Bioinformatics and Scientific Computing
4. Big Data and Smart Cities
5. Computer Networks
6. Software Engineering and Testing
7. Multimedia Systems
8. Data WareHouse and Data Mining
9. Cloud Computing
10. Ios Technology
11. Network Security and Cyber Security
12. Next Generation Networks
13. Usability Engineering
14. Biometrics / Forensic / Disaster Recovery and Management

6. Track :VLSI & Signal Processing

1. Wireless Technologies
2. Antennas and Microwaves
3. Optical Communication
4. Simulation Tools
5. MEMS
6. Embedded Systems And VLSI
7. Nanotechnology
8. Control and Instrumentation
9. Power Electronics
10. Solid State Devices
11. Image and Speech Processing
12. Biomedical Signal Processing
13. Sensors and Imaging
14. Detection and Estimation
15. Signal Processing
16. Radar and Satellite Communication

SPICON2022
Tutorial Invitation

Dear Sir/Madam
Warm Greetings from Bharatiya Vidya Bhavan's Sardar Patel College of Engineering(SPCE), Mumbai !!

Sardar Patel College of Engineering, Andheri is completing its 60th year in 2022. In this 60th year Jubilee, the institute is organizing **Sardar Patel International Conference on Industry 4.0 - Nascent Technologies and Sustainability for the 'Make in India' Initiative (SPICON 2022)** on 22nd -23rd December 2022.

SPICON-2022 is sponsored by AICTE, CSIR, Indian Institution Industrial Engineering, Turn it in and Apex Subscriptions.

SPICON 2022 is in association with Sardar Patel Institute of Technology, Mumbai, Capgemini, SAE India WS, FELA, Institution of Engineers, and Indian Institution of Industrial Engineering. Further SPICON-2022 has technical collaboration with the American Institute of Physics (AIP) and IEEE Bombay Section for publishing proceedings of the conference.
SPICON-2022 presents you the series of tutorials planned on 22th Dec 2022. These tutorials are honoured with a list of distinguished personalities from various industries and academics like FWD, Microsofts, ReBIT and VJTI. Taking into consideration today's need, these tutorials provide you a glimpse of valuable information in the various domains of Cloud Computing, Blockchain, Artificial Intelligence and Cyber Security.

One tutorial session complementary for primary authors but pre-registration is mandatory.

So please book your seat and enjoy this wonderful learning journey.

Note: If there are parallel sessions at the same time, you can only attend one of them.

Please visit https://www.spce.ac.in/conference.php for complete details.

Abstract for the tutorials can be found at : https://www.spce.ac.in/conference.php

Registration link: https://forms.gle/QG5hLTvc5Lbm1LwGA

Dates for registration of tutorial: 2nd Dec to 20th Dec 2022

For inquiries or concerns, please contact:
Tutorial Chair -Dr. D. R. Kalbande (9820383928)
Tutorial Co Chair- Dr. Aarti Karande (9920625758)
Tutorial Executive- Renuka Pawar (9833928631)

Encl: PFA of the Tutorial Flier for your reference.

Warm Regards
TUTORIAL AND SPONSORSHIP TEAM
SPICON-2022

AICTE & CSIR SPONSORED
VIRTUAL CONFERENCE

SPICON 2022

SARDAR PATEL INTERNATIONAL CONFERENCE

Tutorials

Track 1 - Cloud security - Hands-on using AWS

You will Learn
- Good understanding of fundamental AWS cloud security concepts
- Industry best security practices
- Security services and tools offered by AWS

Mr. Milind Karande,
Sr. Cloud Architect, SRE-FWD,
Sr. Program Manager-KGISL, Malaysia

Track 2 - Blockchain Tokens and Crypto currencies

You will Learn
- Foundations of cryptocurrency
- Foundation of crypto Tokens
- Types and standerds of Tokens
- Demonstration of how to define your own token

Prof. Dr. Mahesh Shirole
Professor V.J.T.I., Mumbai

Track 3 - Technologies Behind AI

You will Learn
- Introduction to NLP.
- Get started with NMT.
- NLP v/s NLU.
- Introduction to Computer Vision.
- Computer vision applications.

Sarah Gawde
Microsoft, Bangalore

Track 4 - Next Gen Cyber Security Operations - Issues and Opportunities

You will Learn
- NextGen SOC necessity and threat landscape
- NGSOC Architecture
- Solutions, Integration, and Use cases
- Sample Tool demo for CTI ,SAM and Darkweb Monitoring

Dr.Nareshkumar Harale
ReBIT-Mumbai

Conference Chair: Dr. Santosh Rane

Program Chair: Dr. Kiran Bhole

Tutorial Chair :Dr. Dhananjay Kalbande

Tutorial Co-Chair :Dr. Aarti Karande

REGISTRATION LINK:
HTTPS://FORMS.GLE/QG5HLTVC5LBMILWGA

THURSDAY- 2.30 PM - 22 DEC, 2022

www.spce.ac.com/conference.com

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Online Panel Discussion on Technology in Education

Dr. Vanita Bhoola

Panelist - Asst. Dean, SP Jain School of Global Management, Mumbai

Dr. Debmallya Chatterjee

Panelist - Chair Professor, SPJIMR, Mumbai

Dr. Ravindra Baliga

Panelist - Alumni Head, Somaiya Institute of Management, Mumbai

Asst. Prof. Satish Barot

Panelist - Coordinator Assistant Professor & COE, SPCE, Mumbai

Dr Sangita Dahotre

Panelist - Prof. & Head - Physics, Dr Babasaheb Ambedkar Technological University, Lonere

Kunal Dani

Moderator Serial Entrepreneur

DATE : 22ND DEC 2022 **2 TO 3 PM**

Dr. Kiran Bhole
Programme Chair, SPICON 2022

Dr. Santosh Rane
Conference Chair, SPICON 2022

Dr. B.N.Chaudhari
Principal, SPIT, Mumbai

Dr. M. M. Murudi
I/C Principal, SPCE, Mumbai

SPICON PANEL DISCUSSION

INVITATION

Sardar Patel College of Engineering, Mumbai is completing its 60th year in 2022.

In this 60th year Jubilee, SPCE in association with SPIT Mumbai is organizing Sardar Patel International Conference on “Industry 4.0 – Nascent Technologies and Sustainability for ‘Make in India’ Initiative- SPICON 2022 on 22nd and 23rd December.

SPICON 2022 is sponsored by SERB, AICTE, CSIR, IIIE Mumbai Chapter, Apex Subscriptions.

We have collaborations with Capgemini, SAE India WS, AIP, IIIE Bombay section, IEI, FELA, IIIE.

We have organised an online Panel Discussion on Technology in Education as a part of SPICON 2022.

Date : 22nd December,
Time: 2 to 3 pm
Venue : Google Meet
Meet Link - https://lnkd.in/dwebK6H7

Registration link
https://lnkd.in/duAhR3VA

We have Eminent panelists as under.

- Dr. Vanita Bhoola
- Dr. Debmallya Chatterjee
- Dr. Ravindra Baliga
- Prof. Satish Barot
- Dr. Sangita Dahotre

Moderator: Mr. Kunal Dani

Certificates will be provided to all participants after attending event and submitting feedback

SPICON 2022

SERB, AICTE, CSIR, IIIE Mumbai Chapter, Turnitin and Apex Subscription

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on

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Presentation Guidelines for SPICON2022

- ***Paper presentation is a mandatory activity for including the paper in the Scopus index proceedings.***
- ***There are no Rescheduling facilities for any paper presentation in any case.***
- The presentations can be done in Offline/ Online mode. For offline presentation it is mandatory to submit the offline option form.
- Each oral presentation of Research Paper would be for 8 minutes followed by a 2 minute question answer period.
- It is suggested to keep Max. 10 slides of presentation.
- Delegates should ensure that presentation is completed in given (8+2=10 Min), Hence it is better to avoid the video in the presentation.
- Delegate will ensure that each presentation is officially submitted to track chair. Each Presentation must be officially submitted to Track Chair.
- For offline presentation the conference will be equipped with a LCD projector and a computer that is connected to the projector.
- The presentation should be compatible with Microsoft Office 2016.
- Since your computer may have sophisticated fonts (such as special equation symbols) that the conference computers may not have, it is suggested that you save your presentation under the option 'embed true type fonts' which minimizes the font incompatibility problems.
- We suggest that you save a copy of your presentations in .ppt and .pdf format and then upload it in either of the formats at the link given on the website, by (DATE-18-12-2022). This link will be created by Track Chair.
- The offline session rooms will have a screen for 4:3 presentation format. Make the letters on your slide BIG ENOUGH. Suggested minimum font size is Calibri 16-18.
- To ensure that session starts on time, delegates should be present online / offline at the presentation venue online/ offline at least 15 minutes prior to the scheduled time of session.
- If a question requires a lengthy reply, we suggest that you and the person asking the question meet after the presentation. Then take the discussion out of the meeting room.

- There will be no rearrangement of paper presentations within an oral session to accommodate absences or cancellations. The time assigned to an oral presentation within the oral session is fixed.

- The presentation PPT can be labelled as Paper ID_ Track Name_Presenter Name-Mobile Number.

  For example 1234_Mechanical_Kiran_9999999999

- All presentations should be submitted to Easy chair and respective trackchair by **18th Dec 2022.**

  Please refer following email id

- Trackchair Civil – hansajeswani@spce.ac.in

- Trackchair Mechanical – mjanbandhu@spce.ac.in

- Trackchair Electrical – sangeeta_d@spce.ac.in

- Trackchair CSE / IT- sudhir_dhage@spit.ac.in

- Trackchair Electronics – kiran.talele@spit.ac.in

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Paper Code: 207 **Track:** Civil Engineering

TECHNO-ECONOMICAL ASSESSMENT FOR UTILIZING COTTON STALK BY BRIQUETTING AND MUSHROOM CULTIVATION

Shravika Jamnik, Vedant Singh, Shruti Sheth, Prashant Limaye, Janhavi Patil and Reshma Raskar-Phule
Sardar Patel College of Engineering, Mumbai

ABSTRACT

India is the second largest agro-based country with high crop production, the agricultural waste generated is of a commensurate amount. Agricultural waste holds immense potential to be utilized as an economically viable and sustainable byproduct by adopting various innovative processes such as biomass briquetting, manufacturing of paper, corrugated boxes, mushroom cultivation, etc. Cotton is cultivated in large quantities in Maharashtra which in turn leads to cotton stalk being generated, a waste by-product creating significant issues for its disposal as it serves as a habitat for insects when stored and creates a lot of air pollution due to burning. The feasibility of cotton stalk, to be used as an asset by analyzing two major processes which are biomass briquetting and mushroom cultivation is evaluated. A Techno-economic cost analysis for both methods, where the initial capital cost, which included machinery cost, office space cost, and other requirements for the year 2020 is mentioned. An in-depth analysis shows that though the transportation cost, which has a major impact on the total cost, is the same for both the methods, briquetting of cotton stalks generates almost negligible or zero waste, thereby closing the loop, which is difficult in the case of the mushroom cultivation process, as the cotton stalk spawn after the mushroom production is difficult to dispose of due to its chemical contamination because of fertilizers used.

Keywords - Techno-Economical Assessment, Cotton stalk, Briquetting, Mushroom Cultivation

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Paper Code: 894 **Track:** Civil Engineering

LIGHT WEIGHT NO-FINES PERVIOUS CONCRETE EXPERIMENTAL STUDY FOR WATER FILTERATION

Deoyani Joshi[1] and Hansa Jeswani[2]
[1]NMIMS University's Mukesh Patel School of Technology Management and Engineering Mumbai,
[2]Sardar Patel College of Engineering, Mumbai

ABSTRACT

The Planning Commission, Government of India has estimated the water demand increase from 710 BCM (Billion Cubic Meters) in 2010 to almost 1180 BCM in 2050 with domestic and industrial water consumption expected to increase almost 2.5 times. The trend of urbanization in India is exerting stress on civic authorities to provide basic requirement such as safe drinking water, sanitation and infrastructure. There is a need for finding alternative to the traditional rapid sand filters employed in various cities for filtration purpose. Presently sand is being used as the filtration media which is limited resource. This paper discusses the use pervious concrete with specific aggregates as filtration device. Twelve concrete mixes were used to identify an optimum mix for treating turbidity effectively using lightweight expanded clay aggregates (LECA) considering the properties of w/c ratio and size of LECA and finding their impact on density, Infiltration rate, void ratio and removal of turbidity. It was observed that lower w/c ratio of 0.35 gave a higher density. The void ratio, infiltration rate and turbidity removal for LECA of size 10 mm and w/c ratio 0.4 gave the optimum results.

Keywords - Filter, Pervious Concrete, Lightweight Expanded clay Aggregates, Turbidity, Water Filtration

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Paper Code: 910 **Track:** Civil Engineering

DAM FAILURE ANALYSIS USING HYDRAULICS SIMULATION MODEL- A CASE STUDY OF CHASKAMAN DAM

Shweta Patil and Ajaykumar Kambekar
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Though the construction of barriers across a flow of water is the best method for providing sustainable water supply, irrigation, etc., its failure is hazardous for properties, the environment, and mainly lives downstream. Therefore, its failure analysis plays a vital role. In the current study, the dam breach analysis of the Chaskaman dam uses the hydraulic simulation model. The study involves estimating breach parameters, dam inline structure breach out-flow hydrograph, maximum flow, and generation of flood inundation maps in terms of maximum water surface elevation. A probable maximum flood (PMF) hydrograph is simulated for unsteady conditions for two types of failure-1) Overtopping and 2) Piping. Maximum flow corresponding to the failure mode of overtopping is 21695 m3/sec and 20911 m3/sec for piping failure. The estimated dam breach outflow out-flow hydrographs are routed using HEC-RAS for the complete dynamic wave method. Furthermore, different breach parameters estimated from five empirical methods are simulated using the HEC-RAS hydraulic model, and the results are compared. The model is calibrated using sensitivity analysis. Generally, it is observed that overtopping failure is dominant over piping failure marginally. Furthermore, the stage and flow hydrographs are developed for critical locations downstream of the dam. The local authority shall use the study to prepare EAP and develop flood mitigation measures in an emergency.

Keywords - Dam Breach analysis, HEC-RAS, Flood inundation map, Sensitivity analysis

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Paper Code: 1737 **Track:** Civil Engineering

DATA ANALYSIS AND INTERPRETATION OF OCCUPATIONAL HEALTH AND SAFETY PARAMETERS FOR A CONSTRUCTION PROJECT

Shreyas Patil and Hansa Jeswani
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Advancement in construction Projects in India have created several opportunities for Contractors. This also translates into more workers on site and more chances of accidents. For this study. a 5-point Likert scale questionnaire is prepared for carrying out survey, responses were collected by personally interviewing workers about the questions and recording the response. Data analysis is carried out for the questionnaire survey carried out on a sample of 52 workers from various urban and rural sites. The analysis would include carrying out a reliability test, and creating a Relative Importance Index (RII) for ranking the various occupational health and safety parameters, this is followed by carrying out Spearman's rank correlation between various occupational health and safety parameters. Interpretation of these parameters would be based on the significant correlations identified and would reflect on parameters which predominantly affect the health of workers.

Keywords - Occupational Health, Occupational Safety, Data Analysis, RII, Cronbach alpha

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Paper Code: 1494 **Track:** Civil Engineering

GeoXR: GIS AND XR INTEGRATION FOR SUBSURFACE PIPELINE VISUALIZATION IN AR ENABLING FIELD ASSET MANAGEMENT

S Bala Subramaniyam[1], Siva Sankar[1] and Reshma Raskar-Phule[2]
[1]University of Madras, Chennai, Tamil Nadu, [2]Sardar Patel College of Engineering, Mumbai

ABSTRACT

Oil and Gas are transported through railways, trucks, tankers, vessels and pipelines. The method used to transport this oil is determined by the amount being transported and the destination. Till date pipelines have been the most preferred mode of transportation for petroleum products. It is more economical than other modes of transportation. Major petroleum pipelines such as West-East Gas Pipeline of China – 4000 Km, ESPO pipeline – 4800 Km, Keystone XL Pipeline – 1897 km, and Druzhba Pipeline (Russia, Ukraine, Poland, etc.,) - 4000 Km travels more than 1000kms. So regular maintenance and servicing work becomes hectic. So, advanced technologies are needed for maintenance work. It is essential that any facility management staff have access to the 3D model of the subsurface pipeline system and the data supporting the model prior to performing any maintenance work, as digging in the ground without a clear understanding of the location and size of underground conditions such as incognizant gas lines can cause disaster. Many businesses have vast volumes of geospatial data that they use on a daily basis for city asset visualization, maintenance, analysis, and a number of other purposes. But how are geographic data is being sensed? Usually on our computers, laptops, and even mobile devices, or even on paper. Maps are wonderful, but they lack context in the real world. The maps can be used to figure out what assets are present, where the pipes are, and what properties they have. But it doesn't give a real picture of the location. When augmented reality is being deployed to visualize 1:1 scale geospatial data. The viewer receives a sense of the neighborhood as well as a thorough context for our data. The viewer can move around and explore objects through the lenses of our mobile devices, even if they are hidden underground. The present project seeks to visualize and investigate the underground spatial data in Augmented Reality (AR) using open-source and free-source software and services. A demonstration of the existing workflow is done for University of Madras (Guindy Campus) sewer system. It showed how the visualization of geospatial data can be improvised by enabling interactive AR visualization.

Keywords - Utility management, Augmented reality, Pipeline, location-based AR, AR map

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Paper Code: 1633 **Track:** Civil Engineering

ANALYSIS OF 150M LONG WIND MAST USING INDIAN CODE, U.S. CODE & EUROCODE

Lavkush Tiwari, Ankit Asher, Akshata Deshpande and Mohan Murudi
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Wind Masts are long towers laterally supported by guy wires and are used to collect Wind data to facilitate for optimum use of Wind Energy. This document covers applicable loading and design of Mast towers, Guy Wires using Indian Standard, U.S. Standard and European Standard.

Keywords - Wind Mast, IS 875 part, ASCE 7, EN 1991-1-4

Paper Code: 2082 **Track:** Civil Engineering

USING ARTIFICIAL INTELLIGENCE & AUGMENTED REALITY FOR STRUCTURAL ENGINEERING

Abhijeet Patil and Abhinandanakumar Bage
Sardar Patel College of Engineering, Mumbai

ABSTRACT

The ability to realize real time view (augmented view) of construction components before using the actual resources to construct them has been of main interest in structural engineering over a long period of time. This has been partially achieved with the help of virtual reality. Even though if virtual reality helps us in designing, viewing and drawing the plans, the question of actual reality still arises. To shorten the gap between the real and virtual environments, this study highlights the use of Artificial Intelligence (AI) & Augmented Reality (AR) in all the areas of structural engineering. On the construction site, the designs are still represented as line-based 2D paper drawings or projections on portable displays. A technology that can integrate real and computer-generated information and situate it in real time, place and context is called as augmented reality. This study aims at utilizing concept of Augmented Reality to accomplish objectives of easiness of work, Accuracy, structure positioning, reduction in time, faster work, interactive 3D modelling, economy, efficiency of work, etc. Augmented reality helps in understanding of project documentation which can even be utilized in future project planning. In order to build 3D interactive model first effective planning has to been done of the presented structure with the help of various software such as Autodesk, autocad, android studio, wikitude, artoolkit, AR Core (computer vision). In this project, AR is also being considered as a new design approach for designing work, where a user can view virtual columns, beams, furniture and communicate with 3D virtual environment using a dynamic & flexible user interface. This study focuses over the contributions of mobile technology in AI & AR for the purpose of positioning, measuring, plumbing, RCC work, excavation, repairs and maintenance. One of the main recommendation of this study is to take a fresh and integrated look on how to use AI & AR in various applications of construction field and also for the purpose of monitoring and documenting the progress of construction site, ultimately helping in future error reduction. The concept of augmented reality helps in reducing, or rather eliminating errors that creep in during construction process due to humans and other technical reasons. An attempt has been made through our project to evaluate the potential of using artificial intelligence & augmented reality in different domains of structural engineering field for more effective work completion.

Keywords - Augmented reality, Artificial Intelligence, Open GL, Computer Vision, Tracker, Structure Positioning, Digital Measurements

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Paper Code: 3838 **Track:** Civil Engineering

LINEAR ELASTIC SEISMIC PERFORMANCE OF RCC BUILDINGS WITH IRREGULAR PLAN

Ankit Asher and Dr. Mohan Murudi
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Due to various constraints, it is not always possible to have a regular configuration of a building. This leads to different irregularities in the building. In this study, a set of RCC buildings having irregular plan configuration have been studied using response spectrum method of seismic analysis. The effect of stiffness modifiers of the framing elements on the seismic performance of the buildings has been also studied. The buildings have been designed as per IS 456 and IS 1893. The seismic performance has been evaluated in terms of storey displacements, storey drift, base shear, storey shear and time period for various values of irregularity in plan.

Keywords - Plan irregularity, Stiffness modifier, IS 1893

Paper Code: 2348 **Track:** Civil Engineering

FEASIBILITY OF MATERIALS USED FOR THREE-DIMENSIONAL PRINTING IN CONSTRUCTION SECTOR

Mayank Bothra and Reshma Raskar
Sardar Patel College of Engineering, Mumbai

ABSTRACT

The technological processes used in the construction industry have significantly advanced recently, moving in the direction of automation, standardization, and digitization. However, Covid-19 has had a significant negative influence on both the global standard of living and the expansion of the building industry. Automation and digitization might be quite helpful in such pandemic situations to solve the problems. These will lead to less human interaction, less dependence on labor, increased productivity, and increased worker safety. The application of robotics and other emerging technologies is one of the ways to accomplish these aims in the construction industry. The current work outlines the general methodology that will be used for three-dimensional printing in the construction industry. Innovative and selective 3D printing techniques are used to cast and test materials, and then their feasibility is examined by analyzing extrudability, flowability, buildability, open time, and layer adhesion the general characteristics properties of material mix. It focuses primarily on the sector of construction materials by creating a concrete mix that is acceptable for 3D printing. After performing multiple tests to confirm its characteristics, the appropriate mix for this function is discovered. As a result, mix T5 with the binder ratio (Cement, fly-ash and silica fume) as 7:2:1, binder to sand ratio as 1:1 and w/c of 0.4 was discovered to have excellent extrudability, flowability with a flow rate of about 72%, workability, and pumpability qualities as well as exceptional buildability with up to 10 layers stacked on top of each other with slump height of 20mm therefore regarded as the best mix out of all the testing mixes.

Keywords - 3D Printing, General methodology, characteristics properties, Material feasibility, Concrete mix

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Paper Code: 2615 **Track:** Civil Engineering

INVESTIGATING THE EFFECT OF ELECTRODE AREA TO VOLUME RATIO ON THE PERFORMANCE OF LOW-COST SINGLE CHAMBER MICROBIAL FUEL CELLS

Anil Ghadge[1], Shrutakirti Mahajan[1], Vinayak Bachal[1] and Dipak Jadhav[2]
[1]Sardar Patel College of Engineering, Mumbai, [2]College of Ocean Science and Engineering, Busan, South Korea

ABSTRACT

In this research, effect of electrode surface area to volume ratio (Aan/V) on the performance single chamber MFCs was investigated. Four single chamber MFCs were fabricated using clay ware cylinder and stainless-steel scrap (SS) anode with varying surface area. The findings of this research reveals that there is exists a linear relationship between Aan/V ratio and power output of MFC. The maximum power density of 337.5 mW m-3 and coulombic efficiency of 23% observed in MFC-4 with Aan/V of 0.052 ratio is among the best values reported in the literature with low cost MFC. However, higher voltage drop was noticed in MFC-1 with Aan/V of 0.013 m2 L-1 which indicates the inability of anode to generate current due to power overshoot. Thus, while designing MFC, it is necessary to ensure the adequate surface area is available to harness more electricity. The lower internal resistance and higher pollutant removal (70-80%) demonstrates the efficacy of proposed MFC system for wastewater treatment along with energy recovery. The major bottleneck to make MFC practicable is finding economical electrodes materials for energy recovery present in the soluble organic matter. In the present research, use of scrap steel anode and ceramic separator found to be effective to replace the costly electrode materials shows new direction for scaling of MFCs.

Keywords - Coulombic efficiency, Microbial Fuel Cell, Power Overshoot, Chemical Oxygen Demand, Wastewater

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Paper Code: 2756 **Track:** Civil Engineering

FEASIBILITY STUDY OF CHARGING STATIONS FOR PUBLIC TRANSPORT-ELECTRIC VEHICLES (EVS) USING GEOGRAPHIC INFORMATION SYSTEM (GIS) FOR BARAMATI CITY

Shriya Jadhav and Reshma Raskar-Phule
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Conventional fuel vehicles exhaust emissions and sound are having an adverse effect on the environment. On the other hand, the fuel price is rising continuously and fuel supply is also a big problem. Therefore, it is a need to find a new travel mode which is energy-saving and convenient. Electric Vehicle (EV) is the quite answer and the future of the automobile industry. India is the third largest market for the automobiles. However, less than 1% of total automobiles on-road in India are EVs, one of the reasons is being the lack of charging infrastructure in India. Good research is done on the costing of EVs and the type of chargers to be used, however, strategies to find the optimal location for charging facilities are urgently needed in order to further assist the development of EVs. From the study of the available literature and articles, to promote a shift to the use of Electric public transport in urban areas, India has set a target of 80% three wheelers conversion into electric once by 2030. Thus, in the present paper, existing public transport vehicle data for Baramati city will be collected and the forecasting will be done for conversion of current public transport into E-mobility. Based on forecasted public transport vehicle data and the predictions made by Ministry of Road Transport and Highways (MoRTH) and Bureau of Energy Efficiency (BEE) on future of EV's in India by 2030, minimum number of charging stations required for the forecasted E-mobility public transport vehicles will be worked out. Further location optimization using Spatial Grid based analysis in Geographic Information System (GIS) will be done for making decision whether to provide fast and/or slow charging stations by forming a grid network of the targeted study area. Finally, the conclusion of this research will showcase Electric Vehicle Charging Station (EVCS) locations along with its capacity on map using GIS software.

Keywords - Electric Vehicle (EV), Electric Vehicle Charging Station (EVCS), Spatial Grid based Location Optimization Analysis Geographic Information System (GIS)

Paper Code: 3218 **Track:** Civil Engineering

EXPERIMENTAL AND ANALYTICAL STUDY ON SOFT STOREY CONDITION OF FLOATING FRAME RESTING ON TRANSFER GIRDER

Neelkanth Joshi, Mohan Murudi, Ankit Asher and Amar Shah
Sardar Patel College of Engineering, Mumbai

ABSTRACT

In December 2016, Bureau Of Indian Standards adopted I.S. 1893: 2016 (Part 1) (Sixth Revision). The code defines, soft storey is one in which the lateral stiffness is less than that in the storey above. Thus, equal or higher lateral stiffness of lower storey as compared to immediate upper storey is proposed than that were allowed in I.S. 1893 Part 1: 2002. To create column free spaces to provide clear drive way and parking movability, under scarcity of land, development rules regarding open spaces and parking, multi-storey and high-rise structures are constructed with transfer girders. Using 28 different experimental models made of mild steel, the present experimental & analytical model comparative study concentrates on effect of variation in stiffness of transfer girder on the lateral stiffness of the frame floated from it under lateral load. The results show that, the soft storey condition of a floating frame remains unaltered, irrespective of the change in stiffness or end support conditions of the transfer girders or its placement on transfer girder.

Keywords - Soft storey, IS 1893, Transfer girder, Storey stiffness

Paper Code: 3088 **Track:** Civil Engineering

APPLICATIONS OF GIS AND BIM FOR UTILITY INFRASTRUCTURE MANAGEMENT: A REVIEW

Umesh Jadhav and Anil Ghadge
Sardar Patel College of Engineering, Mumbai

ABSTRACT

This study reviewed the research work on applications of modern tools like Geographic information systems (GIS) and Building information modeling (BIM) for the utility infrastructure management. In urban centers, where land is a precious resource, it is important that the utilities required for powering the city with electricity, telecommunication signals, water, gas, sewers, etc. are essentially delivered via underground channels of varying dimensions and at varied levels. In most cases, maintenance of these infrastructure services requires digging, which leads to unintentional damage to facilities. Thus, the utility repair or relocation often gets delayed, primarily due to lack of precise utility data availability. Furthermore, with the growing sizes of metros, the construction of underground metro-rail services is a must, for which the diversion of certain utility lines becomes imperative. Thus, having a well attributed digital database of utility lines network, spread throughout a city is the need of the hour. Integrated GIS and BIM offer a platform to build up a strong digital database, thus aiding in multi-dimensional modelling. This Reviewed paper presents the categories, approaches, and applications of various technologies in tabular form to provide readers with an overview of the current state of GIS-BIM integration for Utility infrastructure management. The project life cycle stages of utility infrastructure services are highlighted in the study as a crucial feature that cannot be handled by GIS alone. For this reason, a BIM must be integrated into the research activity, as well as other digital technologies like GPR, Web-GIS, AR, and Machine Guidance Systems. Such a system will not only help in administrative records, but also will assist in having lower operations and maintenance costs throughout utility service life, thus supporting decision making for planning and management of utilities, preservation of natural resources, minimum or no disruption to transportation facilities, along with several other tangible and intangible benefits.

Keywords - Geographic Information System (GIS), Ground Penetrating Radar (GPR), Building Information Modelling (BIM), Road Information Modelling (RIM), Augmented Reality (AR)

Paper Code: 3612 **Track:** Civil Engineering

ELASTO-PLASTIC BEHAVIOUR OF SQUARE PLATES WITH HOLES USING SHEAR DEFORMATION THEORY

Shailendra Singh[1], Vijay Rode[1] and Hemant Vasaikar[2]
[1]Shri G. S. Institute of Technology & Science, Indore, [2]Bharatiya Vidya Bhavans Sardar Patel Institute of Technology, Mumbai

ABSTRACT

The plates are major load carrying structural elements in building, automobile, aerospace structures, etc. The situations like mat foundations, manholes in tank, certain machine parts, ships, submarines, etc, make it necessary to provide a hole in the plate. There is a concentration and complex distribution of stresses around the openings upon loading even though the material is elastic. These stresses get redistributed as the material starts being plastic and plasticity progresses with increasing loads. An accurate prediction of behaviour of plate not only improves the safety and economy of these elements, but also the safety and economy of the whole structure. This study intends to model such plates for loads and stresses ranging from elastic to plastic behaviour using a higher order shear deformation theory (HOSDT), which accounts for warping of the cross section. In the Elasto-Plastic analysis, the structure is designed beyond the yield stress, which allows a redistribution of stresses beyond elastic limit, thus increasing the load carrying capacity. An incremental iterative finite element method has been used for the analysis of such plates. The square plates with clamped and simply supported edges have been studied for a central square hole. Von Mises yield criterion has been considered. The progress of plastic zones under uniformly distributed load (UDL) or point load (PL) is plotted and studied for the elasto-plastic material used.

Keywords - Elasto-Plastic, Higher Order Shear Deformation Theory, Square Plate, Plastic Zone

Paper Code: 3850 **Track:** Civil Engineering

APPLICATION OF QGIS AND MSP FOR ENERGY ASSESSMENT OF MULTI-STOREY BUILDING

Anil Ghadge and Snehal Panchakshari
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Large amount of materials, equipment's and other resources are required to complete the construction project. Thus, a facility to be constructed consumes of lot of energy from the construction to the operation and maintenance phase. The engineering community has been striving to design more sustainable buildings to reduce energy use and environmental impact during all phases of design, construction and operation. It is essential to measure the energy consumption of different buildings and model it. The present study deals with the measurement of energy consumption of a residential building by the integration of QGIS and project management software to model energy consumption. It involves analysis of various construction materials and methods used for calculation of energy consumption of residential building. The outcomes of this research demonstrates the successful application of this tool which enables the project manager to observe the graphical representation of a construction activity along with the energy consumption. The most useful features of this technique is the quick availability of information about resources, cost, construction method and associated energy. Thus, the results of this study helps the project manager to take a decision to minimise the energy consumption by effective planning to build a more energy efficient buildings.

Keywords - Energy efficient, sustainable construction, Project management, Planning, QGIS

Paper Code: 3926 **Track:** Civil Engineering

SUSTAINABLE ROADS: A LITERATURE REVIEW ON UTILIZATION OF PLASTIC WASTE IN ROAD CONSTRUCTION

Arpit Vyas[1] and Dr. Anil Ghadge[2]
[1]Thakur College of Engineering & Technology, [2]Sardar Patel College of Engineering, Mumbai

ABSTRACT

Plastics became a part of our daily lives due to their low cost, durability, and functionality. Non-biodegradable nature of plastics is a menace to the environment and decades of efforts to effectively recycle plastics have been unrewarding since repeated recycling deteriorates quality of plastic and the cost of collection, sorting, cleaning and recycling exceeds the cost of virgin plastic in developed countries whereas the developing countries lack infrastructure and awareness needed for effective recycling of plastic waste (PW). Significant research has established that un-treated PW is entering the food chain of marine species and can potentially enter human food chain as well. Disposal of PW in land fill has a threat of leeching of harmful chemicals into the environment and adverse effect on ground water recharge whereas incineration releases significant amount of greenhouse gases making PW disposal an unfeasible solution. The situation demands effective ways to upcycle PW and one of these ways is their utilization in construction of roads, Since the year 2001 PW is used in India for road construction, this has helped in creating circular economy to upcycle plastic waste and making roads sustainable. India alone aims to construct 34,800 km of national highways by 2025, projects of this magnitude will consume enormous amount of soil, aggregate and bitumen. This paper examines the performance of bitumen modified with PW to assess the suitability of PW modified bitumen as an effective, economical and sustainable alternative to bituminous mixes for flexible pavement construction.

Keywords - Upcycling, Plastic Waste, Modified Bitumen, Sustainable Roads, Greenhouse gas, Flexible pavement

Paper Code: 4118 **Track:** Civil Engineering

COMPARATIVE RESEARCH ON TUNED MASS DAMPER, TUNED LIQUID DAMPER AND TUNED PARTICLE DAMPER ON THE BASIS OF MASS RATIO ON A FRAMED MODEL

Mohammad Haris Saghir and Abhinandan Kumar Bage
Sardar Patel College of Engineering, Mumbai

ABSTRACT

The purpose of this study is to investigate the overall performance of Tuned Mass Damper (TMD), Tuned Liquid Damper (TLD) and Tuned Particle Damper (TPD) for changing the dynamic characteristics of a structure and reducing its vibration energy under Seismic excitation. For this purpose, a three-story structure framed model was fabricated and subjected to Uniaxial Shake Table tests. The TMD, TLD and TPD are installed at each floor separately at center and their response is evaluated. Tuned Mass Damper (TMD) is a type of passive control system which fundamentally consists of a secondary mass attached to a primary mass connected via a set of spring and damper. In the current investigation, a pendulum type tuned mass damper is considered. A Tuned Liquid Damper (TLD) is water restrained in a container, usually placed on top of a building that uses the sloshing energy of the water to reduce the displacement of the system when it is subjected to excitation. A Tuned Particle Damper (TPD) is a device that works by a combination of impact and friction damping. It dissipates the energy of a system by transferring it to a bed of particles. This bed is geometrically constrained to remain inside a container fixed to the vibrating system. A series of experimental observations are conducted on a scaled model of structure with various mass ratios and examined over different frequencies and are measured precisely using controlled uniaxial shaking table tests. The effects of positioning TMD, TLD and TPD on different storey levels are also explored. The response of the structure under all three dampers was experimentally determined and compared for different locations. The results showed that all three dampers had efficient control effects on the structure, but the control performance varied. Furthermore, the results of the scaled model test indicated that the vibration control performance of the TMD was superior to that of the TLD and TPD in terms of response reduction and efficiency. The sensor used in the experiment is an accelerometer that measures the acceleration of the structure when subjected to vibrations in the presence and absence of TMD, TLD and TPD.

Keywords - Damper, Seismic excitation, Mass Ratio

Paper Code: 4158 **Track:** Civil Engineering

INNOVATIVE STRATEGIES IN STRUCTURAL REPAIR AND SYSTEMATIC APPROACH IN PROTECTIVE TREATMENT

Ishwar Nimbhore
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Everyone have a dream to have his or her own house and it is truly been proved to stand in the society with self-respect. No one wants to be breakdown the sweet memories from their mind by demolishing their home. And hence "The Maintenance and Repair" term is introduced to keep these memories and the structure safe. In this study the term maintenance and repair are being studied in the detailed manner. The various root causes of the failure occurred in the structure, the preventive measure on that failure, anatomy of the structural repair, the exclusive facts related to innovative strategies and protective treatment and many more things will be discussed and presented in this project report. The objective of building maintenance to make the building and their related services are in the secure and protected condition, to give guarantee that the condition of building meets all legislative standards and requirement to perform the maintenance work indispensable to uphold the value of physical assists of the building and also to accomplish the work essential to maintain the superiority of the building maintenance.

Keywords - Sanjivani, Corrective Measure, Self-reliant Country

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Paper Code: 4271 **Track:** Civil Engineering

PILE FOUNDATION DESIGN ON BLACK COTTON SOIL

Momin Mohammed Adnan Sharifullah, Prof. Swapnil R Joshi and Prof. Dr Amol B Saner
Matoshri College of Engineering & Research Centre, Eklahare, Nashik

ABSTRACT

Constructing a foundation of building structure on black cotton soil is giving a very hazardous problem to engineers due to its volumetric changes with the change in atmospheric condition. It swells and shrinks according to temperature change. When we decide a building foundation on it, we have to take many precautions. The failures of structures are mostly due to the failure of foundations and failures of foundations is due to the bad selection of type of foundation, poor strength of soil and deformation characteristics of subgrade. Foundation is the most important part of the structure. The strength and durability of any structure depends upon the strength of its foundation. Mostly engineers prefer Pad Foundation, Pier Foundation and Under reamed pile foundation for black cotton soil bed. The main objective of this study is to design a suitable and practicable foundation for the black cotton soil for a G+2 structure using manual and software analysis.

Keywords - Pile Foundation Design Black Cotton, Soil Strength of Subgrade, STAAD Pro G+2 Building

Paper Code: 4340 **Track:** Civil Engineering

THE STABILITY ANALYSIS OF PREVAILING RETAINING WALLS VARIATION DESIGN IN DIFFERENT SLOPE

Ajit Garud, Rahul Kshatriya and Amol Saner
Matoshri College of Engineering and Research Center, Nashik, Maharashtra

ABSTRACT

One of the hazards that usually occur in slope is landslide. This disaster can occur due to various factors, such as soil material, load on the slope, and the presence of groundwater. Retaining wall is one of the reinforcements that can be applied in slope. This reinforcement is expected to overcome the landslide hazard that can possible to occur. For the conventional retaining wall in kind of gravity wall, the weight of structure influences the stability to retain the slope. Moreover, the weight of retaining wall is determined by its dimension. The assumptions of retaining wall dimension are determined by trial and error. If retaining wall is not enough to bear the load, the dimension of the retaining wall must be changed. In this study, analysing conventional gravity type of retaining walls with several variation designs in 3 meters vertical slope. As the limitation of this study, there are two layers cohesive soil behind the retaining wall. The retaining wall only relies on the weight of the structure as the basis of its design. Therefore, the relation between weight of retaining wall with stability of the structure itself can be known. Thus, the design of the suitable retaining wall that is used on the vertical slope in this study can be obtained. Results show that the greater the retaining wall, the value of the safety factor will increase. The design of the retaining wall with sloping wall on the front of the retaining wall gives greater safety factor than the design of the retaining wall with the slender shape.

Keywords - Stability Analysis, Soil, Retaining Wall, Slope

Paper Code: 4628 **Track:** Civil Engineering

INNOVATIVE BUS STOP SHELTER CONSTRUCTION USING SUSTAINABLE REINFORCEMENT

Mitushi Dalvi and Shilpa Kewate
Pillai HOC College of Engineering and Technology, Rasayani

ABSTRACT

One of the most popular amenities and pieces of urban furniture for residents is the bus stop shelter found on sidewalks in every city in the globe. These bus stop shelters are typically built from materials like metal (iron), stainless steel, and occasionally glass. When exposed to moisture like snow and rain, bus stops built of metal and steel are more susceptible to rust. Additionally, the concern associated with bus stops constructed of glass is that they could break because they are brittle. In Mumbai and around the country, stainless steel is used to construct the majority of bus stop shelters. Additionally, due to its great tensile strength, stainless steel/steel is the material that is used the most. However, this is incredibly expensive and has negative environmental effects as well because during production, enough carbon dioxide is produced to harm the ecosystem. As the production of steel results in an overuse of the natural resources needed for production, it also has an impact on the social and environmental conditions. In order to address this issue, precast lightweight concrete/concrete bus stop shelters are being used in place of the existing stainless steel bus stop shelters. Bamboo is being used in place of steel reinforcement in these new shelters. Additionally, the price of these bus stop shelters with sustainable reinforcement will be rather inexpensive. This study aims to replace the steel reinforcement with bamboo, a naturally occurring material that is highly renewable and strong in both compression and tension. It is possible to increase bamboo's efficiency for the numerous building industries by achieving suitable bond strengths that are as close to steel reinforcement as possible with the aid of various surface treatment techniques utilized by various researchers. This product will have a positive effect on costs and environmental factors. This kind of bus shelter can undoubtedly aid in environmentally friendly, sustainable development and the preservation of natural resources.

Keywords - Robotics and automation, Cooking robot, Robotic arm, Design Procedure

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Paper Code: 4650 **Track:** Civil Engineering

ANALYSIS OF PILE FOUNDATION IN LIQUEFIED SOIL WITH ENCASED STONE COLUMN

Pratik Divekar, Kshitija Nadgouda and Mohan Murudi
Sardar Patel College of Engineering, Mumbai

ABSTRACT

In this paper composite pile foundation with encased stone column is studied for loose sandy soil. Main reason behind the failure of the structure in sandy soil is due to the soil liquefaction caused by the earthquake occurs in that area. Stone column is one of the best techniques used in foundation system to mitigate the liquefaction of soil. In this study encased stone column with geogrid is used to improve the bearing capacity of soil and to reduce the settlement of structure. As a case study, the pile foundation system is designed for an RCC structure. This RCC building is modeled in ETABS and the loads transferred to the foundation system are calculated. The pile, pile cap and the stone columns are designed for this load as per IS standards. This composite foundation system is analysed using finite element analysis software ANSYS Workbench. Three different diameter of encased stone column with different lengths are considered for the study. The objective of this study to analyse the parameter such as total deformation, normal stress, strain energy and shear stress on pile in liquefiable soil. From the results it is observed that as the diameter and depth of the encased stone column is increased reduction in the settlement of the composite foundation.

Keywords - Encased Stone Column, Pile Foundation, Geogrid, Liquefaction

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Paper Code: 5056 **Track:** Civil Engineering

ANALYZING LAND USE/LAND COVER CHANGES AND ITS DYNAMICS USING GEOSPATIAL TECHNIQUES: A CASE STUDY OF COIMBATORE CITY, TAMIL NADU, INDIA

Sabirul Sk, S Bala Subramaniyam and Aneesah Rahaman
University of Madras

ABSTRACT

Changes of Land use land cover has extensively affected the environment of Coimbatore city due to the increasing rate of urbanization, industrialization, and population growth in the city. Remote Sensing and GIS is an effective tool for showing LULC change detection. Based on Remote Sensing (RS) and Geographic Information System (GIS) techniques, the study is an attempt to monitor the changes in Land-use/ Land-cover (LULC) patterns of Coimbatore City. In the present study Coimbatore city had been taken as a case study and explored the land use and land cover variation that took place over the last 32 years from 1990 to 2022. The LULC changes in the study area were studied using remote sensing techniques. Satellite images had been collected from the USGS Earth Explorer. Supervised classification was done to categorize the satellite imagery into different land cover classes after pre-processing them. The study area was categorized into five classes namely Water bodies, forest, agricultural, Built-up area, and Barren land. The accuracy assessment of classification obtained were 87.12%, 85.23%, 88.21% and 85.15%. From these results change detection analysis showed that Built-up area has increased by 14.28% to 68.46 %.

Keywords - Remote Sensing, GIS, LULC, Supervised Classification, Coimbatore, Change detection.

Paper Code: 5113 **Track:** Civil Engineering

IMPACT OF COVID-19 ON RISKS IN EXPRESSWAY PROJECTS

Hansa Jeswani, Nidhi Sonar, Aakash Munjani, Neha Joshi, Alin Halani and Manish Biyani
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Risk assessment and management has become an indispensable part of any project activity in recent times. A thorough research on the risks involved in the project and appropriate decisions taken for mitigation action of the risks helps to keep the project on track without an excess of resources spent on unforeseen situations. In the recent few months, this has been even more apparent due to the advent of Covid-19 pandemic which has changed the demographics of projects all over the world. It can be observed that amongst all the industries, the construction industry has been affected the most due to this social calamity. Wastage of materials, shortage of manpower are some of the issues faced by the industry. This paper aims to study all the risks involved in state expressway projects and changes in those which arise due to a pandemic. Using this data, we wish to establish a reference report which can be referred by such expressway projects and similar ones in future in case a situation such as this were to arise again. In this study, a questionnaire had been prepared consisting of various risk factors under the heading of five broad factors which helped us establish and identify major risks of high severity. These risks were analysed using Relative Importance Index, Paired T Test and Probability Impact Matrix. The major risks identified were Relocation, Material Prices, downsizing, lack of Communication, delay in Construction and change in Laws. A thorough risk management plan has been described to tackle these risks consisting of identification, assessment, alternative solutions and mitigation strategies.

Keywords - risk management, expressway, covid-19, risk analysis, infrastructure

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Paper Code: 5157 **Track:** Civil Engineering

EFFECT OF M-SAND AND CEMENTITIOUS MATERIALS ON PROPERTIES OF CONCRETE- A REVIEW

Jaydeep Chougale and Abhinandan Bage
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Sand is one of the primary components used in concrete. Use of river sand is banned/restricted due to environmental considerations. On the other hand, the rapid development of urban areas is increasing the demand of High Strength (HS) and High-Performance Concrete (HPC) for specialized constructions, like skyscrapers and other important structures. As a result, it is difficult to get River Sand (RS) in the required quantity. In concrete cement is the main binding material. Cement manufacturing plants are a substantial source of carbon footprint. The production of cement produces around seven percent of the global carbon dioxide emission. Likewise, the production cost of cement is high which results in the overall cost of the project. In view of above, it is necessary to look at use of materials which can replace the conventional materials used for concrete, especially for use in HS and HPC. The modern development necessitates use of new materials/ ingredients in concrete like cementitious materials, Manufactured Sand (M- Sand) that will enhance the concrete functionality. Utilizing M-sand along with cementitious ingredients such as Ground Granulated Blast Furnace Slag (GGBS), Nano Silica (NS) and Silica Fume (SF), etc. several studies have evaluated the durability and strength properties of concrete. This paper reviews the strength and durability characteristics of M-Sand, RS, cementitious materials used to create HS and HPC, which are evaluated using a variety of mechanical and durability tests.

Keywords - Strength, Durability, M-Sand, GGBS, Silica Fume

Paper Code: 5941 **Track:** Civil Engineering

AN INVESTIGATION INTO THE STRENGTH DEVELOPMENT OF CEMENT CONCRETE BLENDED WITH HYPO SLUDGE ASH

Sujata Ingale[1] and Dr. Pravin Nemade[2]
[1]Dr. D.Y. Patil Institute of Technology, Pimpri, Pune, [2]MVPS's KBT College of Engineering, Nashik

ABSTRACT

The aim of the study is to produce concrete by replacing various proportions of waste paper sludge ash with cement. Waste paper sludge ash contains magnesium oxide and calcium oxide. It can be tested as an innovative use as a cement replacement, giving a solution for traditional concrete. For this study, the various proportions of ash used are 5%, 10%, and 15% by weight of cement. The mix design carried out was as per the Indian standard code. The ingredients used for concrete making are cement, aggregates, hypo sludge ash (HSA), super plasticizer, and water. A test mix was carried out to check the behavior of a concrete mix, and its physical and hardening properties were checked. To check hardening properties, cube samples were cured for 3 days, 7 days, 14 days, and 28 days, and compressive strengths were taken for the same curing ages. From experimental analysis, it is observed that by replacing 5% cement with HSA, the strength results obtained are close to the reference concrete.

Keywords - Hypo sludge ash, ordinary Portland cement, strength

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Paper Code: 5942 **Track:** Civil Engineering

EXPERIMENTAL STUDY ON USE OF SUPPLEMENTARY CEMENTITIOUS MATERIAL WITH RIVER SAND, CRUSHED SAND AND PROCESSED SLAG SAND AS PARTIAL REPLACEMENTS OF FINE AGGREGATE

Neelam Petkar[1], Dr. Mohan Murudi[1] and Dr. Vishal Thombare[2]
[1]Sardar Patel College of Engineering, Mumbai, [2]Municipal Corporation of Greater Mumbai

ABSTRACT

The growing need for sustainability in every technology field is a big challenge for current times, which has given rise to a concrete that we term sustainable due to its various check parameters. For a material to be bearable, it should be a blend or tailored feature to meet different requirements of the time. The leading explanation for this trend has increased in many ways and trials using various cement substitutes in different combinations. There are many cementitious materials available in industry such as ground granulated blast furnace slag (GGBS), silica fume, fly ash, etc., which have justified their performance over the years with cement. Many researches show these substitutes are used in various proportions in terms of high-performance concrete to achieve the required parameters. But in this, the vital role of fine aggregates was uncalled for as its natural resource and can be turned out as recycled aggregate too. In times to come even this will have a constraint and a need to blend the cementitious material in the form of fine aggregate will arise. This paper emphasizes the use of cementitious materials with a variety of fine aggregate such as river sand, crushed sand and processed granulated blast furnace slag. The experimentation was carried out by proportioning silica fumes and GGBS with these fine aggregates in proportion of 5%, 10%, 15% and 30%, 40%, 50% respectively, to find the optimum mix. It was observed that as the amount of GGBS increased the mix became harsh to handle and less workable for it to be pumped. By analyzing the concrete trails of grade M60 and its results for compressive strength the optimum mix was finalized.

Keywords - high performance concrete, mineral admixture, compressive strength

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Paper Code: 6325 **Track:** Civil Engineering

EFFECT OF FERROCEMENT, FRP AND GFRP JACKETING ON STRENGTHENING OF RCC MEMBERS

Gauri Shinde and Atteshamuddin Sayyad
Sanjivani College of Engineering, Kopargaon

ABSTRACT

Reinforced concrete is widely used construction material. Many structures fails earlier than its intended life span because of poor overall performance of materials or workers, attacked by environmental agencies, slenderness of column or much less reinforcement provided than real requirements, much less depth/thickness of flexural members which in the end develops cracks. Jacketing is one of the desired techniques of retrofitting. Ferro-cement is one of the effective techniques, because of wider advantages such as fire resistance, low self-weight , water proof, durability, crack resistance and so forth makes it an perfect material. Fiber reinforced polymers (FRP) and Glass Fiber Reinforced Polymers (GFRP) extensively used to reinforce concrete columns. This paper gives the literature review of ferrocement, FRP and GFRP jacketing for restrengthening the concrete members.

Keywords - Restrengthening of RCC Members, Ferrocement Jacketing, FRP Jacketing, GFRP Jacketing

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Paper Code: 6334 **Track:** Civil Engineering

STRUCTURAL PERFORMANCE FOR RCC BUILDING WITH VARYING PLAN ASPECT RATIO AND SEQUENTIAL ANALYSIS

Ankit Asher, Gazanfar Ali Khan, Anup Kotekar, Anushka Mhatre, Shlok Joshi and Saddam Siddiqui
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Traditional methods of analysis consider the entire structure to be loaded at a single instant and thereby there is no consideration of a real-life staged construction in the traditional analysis methods. However, when a building is being constructed, the storeys are being erected in stages and thereby the application of dead load is sequential and not simultaneous. To consider this effect, sequential analysis is done for a G+24 moment frame + shear wall structure. The structures have varying aspect ratio in plan [1:1, 1:2, 1:3, 1:4, 1:5] are analysed and designed for seismic and wind loads as per Indian codes and the structural responses have been compared in terms of axial loads and displacements. The effect of sequential analysis is considered on the element forces.

Keywords - Sequential analysis, Plan aspect ratio, Wind performance

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Paper Code: 6349 **Track:** Civil Engineering

GENERATION OF P-M INTERACTION CURVES FOR HOLLOW CIRCULAR RC SECTIONS USING IRC: 112

Ankit Asher, Pratik Jaiswal and Mohan Murudi
Sardar Patel College of Engineering, Mumbai

ABSTRACT

The design of RC columns is an iterative process due to the interaction between axial load and moment. Availability of P-M interaction curves helps to reduce the effort and serves as a design aid for the same. This paper concentrates on developing P-M interaction curves for hollow circular RC columns as per IRC: 112-2020 rectangular stress block diagram. A spreadsheet program was developed to evaluate the axial load vs. moment capacity of various hollow circular sections. Sets of curves have been developed and normalized to be applicable for various ratios of thickness to outer diameter. The curves are applicable for yield strength of steel 500 N/mm2 and concrete grades less than M60. The curves can be used as a ready reference to determine or check the reinforcement in hollow circular column section.

Keywords - Hollow circular section, P-M interaction, IRC 112

Paper Code: 6544 **Track:** Civil Engineering

INVESTIGATING AND ANALYZING THE CAUSES OF ACCIDENTS – A CASE STUDY OF MULTISTOREY RESIDENTIAL BUILDING

Himani Barapatre, Anil Ghadge and Supriya Chavan
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Construction activity has experienced a major breakthrough in the last two decades due to the increased in development activities and public demand. Nevertheless, issues of safety and health protection at work have become the main concern of construction industry. Global societies and economies suffer financial and human losses due to lack of safety in the construction industry. However, if construction safety management is not systematically implemented, accidents will occur that affect the economic growth of the company. However, the impact is stronger in developing countries. The purpose of this study was to examine the key safety measures, and a detailed study of safety management practices at construction sites was also conducted. Data were collected from various site visits, from literature reviews, and from various building safety standards, including OSHA (Occupational Safety and Health Administration). This study focused on analyzing the various causes of accidents which are categorized into four groups; equipment related, material handling, lack of safety equipment's personnel protective equipment's (PPE) and inadequate training. Findings of this study demonstrates that; numbers of non-fatal accidents are more on the construction site as compared to fatal accidents. Therefore, to improve the safety performance at construction site, each and every activity should be carefully analyzed and closely monitored. A practical approach is proposed to find the critical factor which cause accidents during the construction of residential buildings project.

Keywords - Accidents, Construction industry, Hazard, Personnel Protective Equipment's, Safety

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Paper Code: 6582 **Track:** Civil Engineering

COMPARATIVE STUDY OF METHODS TO REDUCE EVAPORATION FROM LAKES AND PONDS

Aman Bodke, Prashant Limaye, Shruti Sheth, Janhavi Patil, Smital Meshram and Hansa Jeswani
Sardar Patel College of Engineering, Mumbai

ABSTRACT

The transportation sector is the largest consumer of fossil fuels and a major cause of pollution and greenhouse gas (GHG) emissions in the world. Being a non-renewable source and not so environment-friendly nature of fossil fuels, shifting our dependencies to other energy sources which are environment friendly and economically scalable is the need of the hour. New developments in the automobile industry are mainly focused on Electric Vehicles (EVs) of various types. As a consequence, Internal Combustion Engine Vehicles (ICEVs) are left behind in the race. EVs offer a great deal to overcome many problems in this regard, but they come with new challenges too. Amidst all this, there are still uncertainties regarding the sustainable option for mobility, specifically in India, as per the current scenario. The answer is very subjective and depends on various factors. This paper attempts to identify the best possible means of mobility for consumers among the available option of Battery Electric Vehicles (BEVs) and Hybrid Electric Vehicles (HEVs), accounting for the various technical, economical, and environmental factors in the Indian context. This will be achieved by analyzing the various facts and comparing them on an equal platform.

Keywords - Evaporation loss, lakes, physical, chemical, climate change

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Paper Code: 6708 **Track:** Civil Engineering

APPLICATION OF ROBOTICS IN CONSTRUCTION INDUSTRY

Devyani Shirule and Ajaykumar Kambekar
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Construction Industry in recent decades has seen some major advancement in technological processes and stepping towards automation, standardization, and digitization. But Covid -19 has severely impacted the growth of construction sector and the conventional practices of working worldwide. In such pandemic situation automation and digitization can play a vital role to overcome the issues. These will result in reduce the dependency on labour, less human Interaction, more efficiency, and safety of employees. For these one of the ways to achieve digitization goal is use of Artificial Intelligence and robotics in these sectors. Further, India is known for its growth in infrastructure, while strategies like "Make in India" and "Digital India" will help infrastructure to adapt advanced robotics and compete in the world. According to a research USD $ 13 Million has been invested under the initiative of "Make in India "for the construction of robots and has seen a growth of 12% in use of robotics whereas other countries have growth of 6.73% only. Indian Government is actively investing for the growth of infrastructure which will witness a high usage of robotics and automation in this upcoming period. This paper makes an effort to evaluate the effectiveness of robotics in construction utilizing techniques like estimating value, payback period, and return on investment. In Real-time construction projects can use robots to improve a variety of factors, including time, cost, and quality.

Keywords - Construction Industry, Robotics, automation, Safety, cost

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Paper Code: 6709 **Track:** Civil Engineering

IMPACT ANALYSIS OF COVID-19 ON CONSTRUCTION MATERIAL COST

Saurabh Shinde and Reshma Raskar-Phule
Sardar Patel College of Engineering, Mumbai

ABSTRACT

The COVID-19 has showcased the enormous impacts on the Architecture, Engineering, and Construction (AEC) industry, as most construction sites were closed during the lockdown period. It can be stated that since the pandemic began in November 2019, the economy fell hard. Positive and negative side of COVID-19 can be seen more efficiently. The projects with the potential to provide large-scale public works projects were on the verge of financial ruin, the rate of death reached an all-time high, and so on. However, good research on these topics is also done so that further ease or smoothness will achieve as soon as possible. Because the pre and post pandemic scenarios are so dissimilar, engineers and architects have been given new perspectives on their current design standards, material utilization, health, and safety practices. Due to the pandemic, a situation arises for projects such as cost and schedule overruns that require immediate attention. In this paper, a study of the change in inflation rate and a comparison of the annual change in construction material prices have been carried out. This paper presents the findings of an analytical study on the effect of inflation due to the COVID-19 pandemic on the prices of various construction materials and activities of a construction project. An impact analysis was carried out, which formed equations relating cost variances and cost prices of construction activities and materials. Also, mechanisms to deal with the particular inflation in order to control the budgeted cost of the project is presented in the paper.

Keywords - Pandemic, COVID-19, Cost Overrun, Impact Analysis

Paper Code: 6879 **Track:** Civil Engineering

PARAMETRIC STUDY TO DETERMINE WIND LOAD ON FOOT OVER BRIDGE

Nayan Chopada[1], Abhinandankumar Bage[1], Mangesh Anabhavane[2] and Sandeep Pattiwar[2]
[1]Sardar Patel College of Engineering, Mumbai, [2]Tech-tangent Solutions Private Limited, Thane, Maharashtra

ABSTRACT

Wind load is an important dynamic load while designing slender structures and foot-over bridges are one of them. Wind pressure and wind forces required for the design of foot-over bridges are calculated as per provisions of IRC 06:2017. They can also be calculated as per IS 875 (Part 3):2015. In this paper a comparative study of wind pressure and force values calculated as per IRC 06:2017 and IS 875 (Part 3):2015 is carried out. Wind pressure values given for plain terrain conditions in IRC are compared with values calculated by static and dynamic method for terrain category 1 of IS 875 and values given for terrain with obstruction in IRC are compared with values calculated by static and dynamic method for terrain category 4 of IS 875. Wind forces are also calculated and compared for the above cases and results are presented. It is evident from the comparison that wind pressure and forces calculated as per IRC 06 are constant at all wind speeds. The wind pressure values calculated using IRC 06 are more than those calculated using IS 875-static method for wind speeds ranging from 33 m/s to 50 m/s. The wind pressure values calculated using IRC 06 are less than those calculated using IS 875- static method for a wind speed greater than 55 m/s. The wind force values calculated using IS 875- static method are less than those calculated using IRC 06 for all wind speeds.

Keywords - Wind Pressure, Wind Force, Terrain Category, Static Method, Dynamic Method

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Paper Code: 7266 **Track:** Civil Engineering

COMPARATIVE STUDY FOR BRIDGE SUPER-STRUCTURE CURVED IN PLAN WITH DIFFERENT DECK TYPES

Suraj Shinde, Ankit Asher, Akshata Deshpande and Dr. Mohan Murudi
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Straight alignment bridge analysis, design and construction methods are pretty much explored. But with increased traffic volume and speed requirements the necessity of curved bridges in plan is also increasing, like construction of curved connecting flyovers. The behaviour of a bridge with the introduction of a curve in a horizontal plane change because the dead load, live load and bearing support reaction not acting in the same vertical plane. For the bridge to remain in equilibrium torsion gets induced in the bridge. Considering this the behaviour of a bridge curved in a plan with varying radius of curvature is studied. For this study two types of post tensioned deck bridges have been considered box type girder and straight I-girder with curved deck slab. Dimensions are checked with requirements given in IRC:18-2000. Study is carried out only for gravity loads i.e., dead load and live load. Gravity loading is considered using IRC:6-2017, along with IRC class 70R, class A loading behaviour under IRC special vehicles is also checked. Appropriate load combinations are also considered from IRC:6-2017. The uniform post tensioned system is designed considering the section as the class-1 type (no tension) using serviceability condition, with reference to IRC:112-2019 and IS:1343-2012. The behaviour under uniform post tension is studied for all the bridges with different radius of curvature. Parameters such as bearing support reaction, shear force, bending moment, torsion and combined longitudinal stress variation are studied. Analysis is done by creating line and grillage models in MIDAS Civil software.

Keywords - Curved Bridge in plan., straight I girder bridge with curved slab., FEM grillage model.

Paper Code: 7606 **Track:** Civil Engineering

EXPERIMENTAL ANALYSIS ON PRIMARY PROPERTIES OF ECOLOGICAL BRICK BY USING PLASTIC WASTE

Hitendra Navasare and Sudhir Gayake
Sanjivani College of Engineering, Kopargaon, Maharashtra

ABSTRACT

Due to rapid urbanization, industrialization and a growing population plastic waste is created and dumped in the garbage, but there are not enough methods to treat and recycle the plastic in the world. Large amount of plastic is being discarded or burned daily, which leads to contamination of the environment and air. The accumulation of plastic waste in the environment is hazardous to both animal and plant life. Hence, these plastic wastes are to be effectively utilized. Low-density polyethylene wastes were cleaned and added to standard brick to obtain high strength bricks that possess thermal and sound insulation properties to control pollution and reduce the overall cost of construction. This is one of the best ways to avoid the accumulation of plastic waste, which is a non-degradable pollutant. This alternative saves on the quantity of clay or sand. Brick is the primary essential material that is used in masonry construction. Generally, bricks are made of clay. In this study, plastic waste such as Low Density Polyethylene (LDPE) wastes were used for making Ecological Brick. Plastic waste, specifically LDPE, was collected, cleaned, shredded and then mixed to create the 19 x 9 x 9 cm ecological brick. The main objective of this study is to reduce the plastic waste, which is harmful to human life and the environment. Hence, in this study, Ecological bricks were obtained and these bricks were compared with standard brick. Several tests were performed to evaluate the properties of bricks, including water absorption tests, efflorescence tests and compressive strength tests and it was determined that compressive strength and water absorption increased with increasing percentages of LDPE waste.

Keywords - LDPE waste, Ecological brick, Water absorption test, Efflorescence test, Compressive strength test

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Paper Code: 7619 **Track:** Civil Engineering

COMPARATIVE STUDY OF EFFECT ON SOFT STOREY DESIGN ACCORDING TO IS 1893:2002 AND IS 1893:2016

Karan Yadav and Mohan Murudi
Sardar Patel College of Engineering, Mumbai

ABSTRACT

The rise in population in India has certainly made way for more and more high-rise buildings. Construction of such structures is a Herculean task for the construction workers as well as the structural designers as they must deal with load calculations of great complexity. But with a population of 1.4 billion and rising the demand for such structures is never going to stop. Also, with the increase in quality of life the number of vehicles in our country is also increasing. This poses a problem for parking facilities and therefore an open ground storey is provided for parking vehicles of the residents nowadays. Therefore, an open storey is provided in most buildings. Open ground storey buildings have infill walls in all the storeys except the ground storey. This storey is generally less stiff than the other storeys which may lead to failure due to soft storey effect. During the design process of such buildings, the infill walls are generally not modelled which means the stiffness and strength of the infills is ignored because it is believed that it is a conservative design. IS 1893:2002 suggested that the beams and columns of the soft storey shall be designed for 2.5 times the forces if infill walls are not modelled. This clause has been removed in the revision i.e. IS 1893:2016. The factor of 2.5 is certainly an empirical one and has been found out to be quite high according to previous studies. The objective of this study is to compare a bare frame model with a soft storey at the ground floor, 3rd floor, 5th floor, 7th floor and the 10th floor to a model with infills in all the storeys except the soft storey and to then find out an average multiplication factor for designing the beams and columns in the soft storey, The infills have been modelled using the equivalent strut method as mentioned in IS1893:2016. Linear time history analysis using 3 earthquakes El Centro, Altadena and Bhuj has been performed. The results have been tabulated and presented the "Results and Discussions" chapter of this thesis.

Keywords - soft storey, IS 18932016 drift, storey stiffness, multiplication factor

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Paper Code: 8042 **Track:** Civil Engineering

APPLICATION OF SIX SIGMA TO EVALUATE THE QUALITY OF THE RESIDENTIAL BUILDING PROJECT

Anil Ghadge and Mayur Khade
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Construction quality is considered as major concern for project managers and regarded as key factor for the successful completion of the project. Attainment of quality at various stages of construction depends on the various resources such as materials, equipment's, manpower, methods of construction and money. Hence measuring the degree of quality using statistical tool is crucial for the project managers. The present study appraised the quality management system of the residential project by applying the Six Sigma (6σ) methodology for evaluating the quality at Operation and maintenance phase. In this research Co-operative Housing Society taken and six sigma methodology has applied. Six Sigma uses the principle of DMAIC methodology (Define, Measure, Analyze, Improve, and Control). In this method, the defects per million opportunities (DPMO) are calculated and the corresponding sigma level is found. The findings of this research indicate that the observed sigma value of 2.55 was found to be very low suggests that the defects per million opportunities (DPMO) is 121,693 is very high. According to the standard quality Construction practices, this value expected to be 4. Further, the most common defects found in large numbers were cracks, reinforcement exposure, dampness, water leakage, water seepage, blistering, etc. The outcomes of this research helps the project manager to amylase and monitor the project performance using quality control charts defining upper & lower control limits are set. Based on this analysis remedial measures and causes of defects are suggested to improve the quality of construction. This research will help to improve the quality of construction using the Six Sigma technique and Quality Control Charts.

Keywords - Construction, Defects, Quality control, Six Sigma, DMAIC, Control charts

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Paper Code: 8307 **Track:** Civil Engineering

MICROBIAL INDUCTION OF CALCIUM CARBONATE PRECIPITATE FOR SELF-HEALING CONCRETE

Prafulla Padvi and Hansa Jeswani
Sardar Patel College of Engineering, Mumbai

ABSTRACT

It is known that concrete is brittle in nature. Its strength is good in compression but it is weak in tension. Various studies have been done in the past by using admixtures and other biological products to be used while mixing concrete to improve its strength characteristics. But even after that, concrete is still liable to cracking due to various reasons. Microbial induction of calcium carbonate precipitate can be the cure for this cracking problem in concrete. This biological process is brought into practice to enhance the strength parameters of concrete as well as give it the ability to heal itself after the generation of cracks by calcium carbonate precipitate. In this process, bacterial spores of Bacillus sp. Bacteria are induced in the concrete and it forms a calcium carbonate precipitate by reacting with calcium lactate and oxygen present due to moisture in the cracks. However, some challenges include inducing the bacteria in concrete which is highly alkaline in nature. Spores should be liable to live and adapt to the concrete environment till the generation of cracks. Only specific bacterial spores signify all the survival conditions to embed in concrete. In this paper, bacterial behavior after inducing it in concrete cracks is studied, and its ability to form the calcium carbonate precipitate and up to which extent and surrounding conditions are observed and reviewed.

Keywords - concrete, self-healing, NDT, Mass culturing, bacillus

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Paper Code: 8659 **Track:** Civil Engineering

DESIGN AND ANALYSIS OF SOLAR PANEL FOR UNIVERSITY HOSTEL

Kunal Zinge[1], Mayank Kamadi[2] and Dr Reshma Raskar-Phule[2]
[1]Rizvi College of Engineering, [2]Sardar Patel College of Engineering, Mumbai

ABSTRACT

The Solar energy modeling is very important and also economically significant for solving energy crises that nowadays we face in the big cities. Solar energy is a renewable and clean resource of energy that can be utilized to aid or assist individual or group of building`s electrical power. Implementation of photovoltaic system (PV) in urban cities is one of the best options to suffice the need for significantly increased energy supply. However, the space for the installation the solar panels is limited in urban areas, solution to this is adopting the façade or rooftops of the building for installation of panels. Main objective of this research is to analyze the potential and cost effectiveness of solar photovoltaic power plant for meeting the energy demands of the University hostel located in Mumbai (India) and also work on the design and sizing of the rooftop solar plant required for the same. Replacing non efficient appliances (e.g., bulb, tube light and fan) with efficient ones, the power consumption of the hostel with rooftop area of about 562.77 sq.m comes out to be approximately INR 26,000. Further the solar power plant details are calculated, which states that implementing it in a building can be proven economical and environmentally friendly.

Keywords - Solar energy, Renewable energy, Photovoltaic Power Plant

Paper Code: 8998 **Track:** Civil Engineering

COMPARATIVE STUDY ON DESIGN OF BRIDGE FOUNDATION ACCORDING TO IRC:78 – 2014 AND IRC:78 – 2020

Jayant Jadhav[1], Abhinandan Bage[1] and Mangesh Anabhavane[2]
[1]Sardar Patel College of Engineering, Mumbai, [2]Tech Tangent Solution Pvt. Ltd.

ABSTRACT

It's been around 15 years now that Indian Roads Congress (IRC) is trying to sync the codes of IRC associated to highways and bridge design to limit state methodology1. Consequential progress is already been processed in this regard. The code of Foundation and Substructure (IRC:78 – 2014) is still based on the Working Stress Method (WSM) of design and yet to be synced with the other codes of IRC using Limit State Method (LSM). There is still a misunderstanding between the transition phase from working stress methodology (WSM) to limit state methodology (LSM). IRC:78 is used by designers for various design considerations and construction of foundations and substructure for bridges. This code serves as guidelines for designers as well as construction engineers both. Inconsistencies between IRC:78 – 2014 which uses WSM, IRC:6 – 2017 and IRC:112 – 2019 that uses LSM are brought out in the new code draft that has been released with some explanatory notes documented as IRC:78 – Part 2 which is based on LSM. In this paper, an attempt is made to point out the differences and accordingly compare the results obtained from design of foundation from both the codes (i.e. IRC:78 – 2014 (Part – 1) and IRC:78 – 2020 (Part – 2)). A detailed calculation for the design of Isolated foundation and capacity of pile foundation is done in excel with required on-site inputs such as loads on the structure, characteristics of soil etc. Static loads of deck slab, pedestal, pier cap and pier are calculated manually based on the geometrical dimensioning. Analysis for moving loads on the deck slab model is created in commercially available software to obtain maximum bending moments and reactions.

Keywords - IRC:78 – 2020 (Part 2), comparison of IRC:78 – 2014 and IRC:78 – 2020, DIFFERENCE BETWEEN IRC:78 – 2014 and IRC:78 – 2020

Paper Code: 9328 **Track:** Civil Engineering

DAYLIGHTING: A PASSIVE SOLAR DESIGN STRATEGY

Sonal Deo, Sharvari Deshmukh, Riddhi Lachuriya and Hansa Jeswani
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Passive Solar design, an idea within the expanding field of green architecture, is an innovative technique to make use of the sun for heating and cooling purposes based on building design. As green buildings have gained popularity, numerous improvements have been made to our buildings' design and construction to make them more environmentally and financially sustainable. Our study is based on analyzing and recommending changes to a building in accordance with Daylighting and factors affecting it. A pre-existing flat in an apartment in tropical region of Nagpur (Maharashtra) was analyzed in accordance with its illuminance, orientation, shading by surrounding, offset and many other factors by modelling and simulating it in Revit. The advantage of passive solar energy over active solar energy or other forms of renewable energy is that maintenance costs are the same as those associated with regular building maintenance. As the green movement continues to develop and expand, passive solar techniques will be utilized more and more throughout the nations around the world.

Keywords - Passive solar design, Daylighting, Shading devices, Revit

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Paper Code: 9758 **Track:** Civil Engineering

RISK ANALYSIS FOR THE CONSTRUCTION OF AIRPORT PROJECT

Burhanuddin Saifee, Pranita Mahajan, Raj Choudhary, Vedant Singh and Anil Ghadge
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Risk Management is gaining more popularity from the scientific community globally and practitioners apply variety of tools and techniques to perform risk analysis. As no two construction projects are the similar and the nature of various projects itself is very complex. Construction projects are heavily interdependent and consequently the risks that arise are also correlated to each other. Thus, selecting appropriate techniques to carryout risk analysis become a risky and complex job in itself. This study aimed at providing a practical approach in the construction airport project and developed methodology to help project professionals in selecting a suitable risk managing technique to identify & categorize risk. A total of twenty-three risks were identified and bifurcated into seven major categories depending upon the nature of the risks. The findings of this study demonstrates that 14 risks found to be Severe in nature, 3 belongs to critical and 5 are categorised as moderate. Whereas only one risk i.e. inadequate project tenders and bidders response is found to be under Sustainable category as it forms the least possible combination of occurrence. Various suitable measures such as Risk avoidance, Risk acceptance, Risk sharing and Risk reduction were suggested to mitigate the risk. This case study would help the various stake holders to understand different methods of mitigating the risks that arise during the life cycle of the project and suggests suitable preventive measures that can be under taken to avoid or reduce the probability of occurrence of the risk altogether. Present research contributes to the existing body of literature as a practical tool that enables the project managers to choose suitable risk analysing techniques particularly for the construction of airport projects in the context of Indian construction industry.

Keywords - Risk management, Risk mitigation, Risk identification, Risk Avoidance

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Paper Code: 9794 **Track:** Civil Engineering

ARTIFICIAL INTELLIGENCE BASED ROAD EXTRACTION BY REMOTE SENSING

Amit Gudadhe and KTV Reddy
Faculty of Engineering and Technology, Datta Meghe Institute of Higher Education and Research (DU), Wardha, Maharashtra

ABSTRACT

In the older days, the remote sensing begins with aerial photography. Remote sensing is used to measure the radiation to find features on the earth surface and keep tracking of the same. Due to various changes in environment, need of new techniques are required to find different parameters. Extraction of Road from High resolution remote sensing imagery received by advanced technologies was increasingly used. Artificial intelligence is one of the latest technology which is applied in every field of Engineering. In this paper we are proposing the use of artificial intelligence for automatic road extraction by post-processing, road extraction from HSRRS, and road geometry in vector data.

Keywords - Remote Sensing, Road Extraction, Geographical Information System, Convolutional Neural Network (CNN)

Paper Code: 9966 **Track:** Civil Engineering

CONCEPTUALIZING GREEN RATING SYSTEM FOR HIGHWAYS

Hansa Jeswani and Akshaykumar Swami
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Sustainability is the need of the hour in construction industry. Various standards are available in India for developing sustainable townships, factories, institutions and individual homes, however sustainable highways have not been considered till now in various green building systems adopted in India. This paper is an attempt to consider sustainability in highways. The main aim of this research paper is to develop a rating system considering all aspects of sustainability which makes it easy to give a rating to highways. A green rating system for highways will help the designers and engineers to opt for sustainable approach for reducing risks, providing economic benefits, add competitive advantage, offer recognition and increase accountability. A review of similar studies in various countries was considered and a questionnaire survey was sent to green building auditors and based on that criteria like site selection & planning, sustainable method; water conservation, energy conservation, and environmental conservation were selected for development of green rating system. The sustainable green rating system was developed consisting of factors and sub factors having a weightage according to its contribution for green practice and importance in highway construction. These factors and subfactors were sent to the IGBC accredited professionals and a feedback in the form of points was received for each factor and subfactor. The points received from each professional were noted, averaged and then applied to each subfactor. The suggestion of adding environmental health and safety was added to the system. The proposed certification level consists of different levels such as platinum, gold, silver, and certified according to the points achieved after application of green rating system. The developed green rating system has a total of 100 points of which are maximum 18 points for site selection and planning (SP), maximum 12 points for sustainable method (SM), maximum 14 points for water conservation (WC), maximum 15 points for energy conservation (EC), maximum 16 points for sustainable material & material conservation (MC), maximum 13 points for environmental health & safety (EHS). The rating system was then applied to Hrudaysamrat Balasaheb Thackeray Maharashtra Samruddhi Mahamarg (HBTMSM) to give a rating to the under construction super communication expressway.

Keywords - Green rating system, sustainability, expressways

Paper Code: 773 **Track:** Electrical Engineering

ENERGY MANAGEMENT WITH A HYBRID ENERGY STORAGE SYSTEM IN A DC MICROGRID

Peter Miryala and T Hari Priya
VNR Vignana Jyothi Institute of Engineering and Technology, Hyderabad, Telangana

ABSTRACT

This paper describes the Energy Management system in a DC microgrid using a PV array based on the MPPT Technique. Variations in solar irradiation cause changes in PV power. As a result, an energy storage system is necessary to overcome it. A battery and a supercapacitor are employed as energy storage systems in this hybrid energy storage system. Energy management aims to achieve power balance in the DC microgrid. The presented topology is developed using MATLAB/Simulink software.

Keywords - PV Array, DC Microgrid, Energy Management, Hybrid energy storage system

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Paper Code: 1781 **Track:** Electrical Engineering

RELIABILITY AND SENSITIVITY CHARACTERIZATION OF PHASOR MEASUREMENT UNIT

Poonam Juneja[1], Rachana Garg[1] and Parmod Kumar[2]
[1]Delhi Technological University, New Delhi, Delhi, [2]Maharaja Agrasen institute of Technology, Delhi

ABSTRACT

This paper presents reliability and sensitivity characterization studies of Phasor measurement unit (PMU). The mathematical model of PMU and its modules are developed using Markov probability theory and dynamic fault tree taking into account the redundancy of the system. The failure and repair rate of all the sub-modules are assumed equal in order to simplify the computations. Comparative results of Markov probability theory with other reliability method is presented. Also, the Operating Cycle of a Stand- by Systems viz. a timing diagram of the failure rate and repair rate is drawn. Also, the simulation study is carried out to estimate the reliability of PMU using the given failure rate, repair rate, and a random number. The proposed model is simulated on Mat lab-10.

Keywords - Fault tree, Markov state space model, Phasor Measurement Unit, Reliability

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Paper Code: 1991 **Track:** Electrical Engineering

SIMULATION & ANALYSIS OF THREE PHASE GRID CONNECTED PV SYSTEM VIA INTERLEAVED BOOST CONVERTER

Shreyas Patil, Sangeeta Daingade and Badrinarayan Pimple
Sardar Patel College of Engineering, Mumbai

ABSTRACT

This paper presents the simulation and analysis of a three-phase grid-connected photovoltaic system via a DC-to-DC converter. To reduce ripple from PV module, interleaved boost converter proposed. The performance of interleaved boost converter over conventional boost converter is analyzed. For grid connection voltage source inverter with LCL filter is implemented. The control method for VSI is based on dq and PI control. Performance of PV module and VSI is simulated on MATLAB/Simulink. The effectiveness of the proposed system is based on the THD value.

Keywords - PV Module, THD, MATLAB, Simulink

Paper Code: 2174 **Track:** Electrical Engineering

ANALYSIS OF FAST CHARGING TECHNIQUES USING BUCK CONVERTER

Abhishek Bhatkar and Badrinarayan Pimple
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Unlike IC-based engines, the importance of electric vehicles is growing due to the depletion of coal and petroleum product supply. Furthermore, greenhouse gas emissions from the combustion process of IC-based engines have been linked to environmental challenges such as climate change, sea level rise, and polar ice melting. As a result, there is a considerable surge in research into electric car modifications and advancements, enabling for their widespread acceptance in the present market. The battery powers and provides the torque required to move the mechanical system, which includes axles, wheels, and so on, making it the engine of electric car. The battery technology that serves as the base for electric cars influences their development.

The longer charging time is the most major hindrance to the mainstream adoption of electric vehicles. A variety of charging solutions, such as constant voltage, constant current, constant current-constant voltage, multi-stage charging, pulse charging, reflex charging, and so on, have been developed to overcome this issue. In this study, all these methods are examined based on a range of charging criteria such as time required, converter topology used complexity, and temperature rise. Based on all these criteria, the appropriate converter topology will be picked and constructed to charge a small electric two-wheeler battery.

Keywords - buck converter, fast charging, electric vehicle, high power charging, reflex charging

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Paper Code: 3930 **Track:** Electrical Engineering

ENERGY MANAGEMENT OF HYBRID POWER GENERATION WITH ANFIS CONTROLLER

Akhil Kottola[1], Rami Reddy Ch[1], Kondalu Rao M[1], Ch Naga Sai Kalyan[2], P Srinivasa Varma[3] and B Nagi Reddy[4]

[1]Malla Reddy Engineering College, Hyderabad, Telangana, [2]Vasireddy Venkatadri Institute of Technology, Guntur, Andhra Pradesh, [3]Koneru Lakshmaiah Education Foundation, Guntur, Andhra Pradesh, [4]Vignana Bharathi Institute of Technology Ghatkesar, Telangana

ABSTRACT

The energy management of hybrid power generation with an intelligent Adaptive neuro-fuzzy inference system (ANFIS) is presented in this research article. To reach the power demand of the world, the integration of renewable energy sources (RES) is needed. For a few decades, the power-sharing of photo voltaic (PV) and the wind is growing high due to its inherent properties. The prime issue of the interconnection of these RES it needs PID controller-based power converters. Where the PID controller provides fixed performance and prohibited desired closed-loop response. To overcome this issue self-auto-tuning PID control techniques are adopted. This proposed ANFIS controller operates the voltage source converters (VSC) well and gives satisfactory performance. To extract more power from solar P&O maximum power point tracking (MPPT) approach is considered. The PMSG wind generator is employed to produce more power from wind energy.

Keywords - Hybrid energy system, Voltage source converter, Adaptive neuro fuzzy inference system

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Paper Code: 4171 **Track:** Electrical Engineering

DESIGN OF OFF BOARD CHARGER WITH INTERLEAVED FULL-BRIDGE LLC CONVERTER FOR ELECTRIC VEHICLE APPLICATIONS

Roopa Sree Varikuti, J Bhavani and T Nireekshana

Vallurupalli Nageswara Rao Vignana Jyothi Institute of Engineering & Technology, Hyderabad, Telangana

ABSTRACT

Electric vehicles are better solution for a greener, noiseless transportation. EVs such as bikes, cars, buses etc. are already seen on the road. As known, the need for higher power ratings, fast charging and low battery discharge are some of the criteria to be satisfied. An interleaved Full-bridge LLC resonant converter for an Off-Board Charger has been proposed in this paper by considering some of the requirements of a modern-day EV such as requirement of high power and fast charging. The control strategy is a combination of Pulse Width Modulation (PWM) and Pulse Frequency Modulation (PFM). This control technique helps in regulating the output voltage within a range of 40V – 110V. The model is designed so as to deliver a maximum output of 20kW. The proposed converter with the help of the control strategy proposed helps in achieving the stability, robustness. It is sensitive to the changes and is flexible enough to adapt to the required output voltages.

Keywords - Digital Off-Board Charger, Electric Vehicle Chargers, Interleaved, parallel LLC Resonant Converters

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Paper Code: 5017 **Track:** Electrical Engineering

A STATISTICAL METHOD FOR SIZING STORAGE FOR LARGE WIND FARMS

Sumbul Hasan[1], Himanshu Bahirat[2] and Prashant Navalkar[2]
[1]Sardar Patel College of Engineering, Mumbai, [2]Indian Institute of Technology Bombay, Powai, Mumbai

ABSTRACT

Energy storage technologies are being used in conjunction with renewable energy sources to mitigate its stochastic nature. The share of the wind generation is expected to become 12\% in Indian grid. Large scale integration of wind energy in the grid would increase the variability on the generation side. To ensure resource adequacy, storage should be deployed. In this paper a generic method for sizing of storage for a large grid integrated wind farm is proposed. This statistical method does not require wind speed time series. An approximate size of storage can be obtained based on the statistical parameter of wind distribution and aggregate load. Since, the size of the storage is directly related to wind speed measurement, if the wind distribution changes the new size of the storage can be estimated by using site specific measurements. In our study we have found for a 300 MW wind farm the optimum storage size of 25.05 MWh is obtained when the capacity factor of the wind farm is 37\%.

Keywords - Energy storage system, statistical method, reliability indices, storage sizing

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Paper Code: 5378 **Track:** Electrical Engineering

MODELLING OF GRID CONNECTED PV/WIND HYBRID WITH REACTIVE POWER CONTROL

Sidharth Dhamankar and Nandkishor Kinhekar
Sardar Patel College of Engineering, Mumbai

ABSTRACT

This paper implements the modelling of a solar/wind hybrid system made up of a photovoltaic (PV) generator, a wind turbine, a permanent magnet synchronous generator, a three-phase diode rectifier, and a chopper. Chopper is a boost converter specifically designed for PV array and it is controlled and commanded by maximum power point tracking method called perturb and observe method. By using the maximum power point tracking method it is ensured that maximum power is extracted from the PV cell with variations of input parameters such as irradiance and temperature. A static synchronous compensator or STATCOM is used for injecting and absorbing reactive power in order to control the transit of active power. STATCOM plays a significant function in assisting reactive power compensation whenever it occurs at the distribution side for various load conditions.

Keywords - PV Cell, Wind Turbine, Permanent Magnet Synchronous Generator, STATCOM

Paper Code: 5478 **Track:** Electrical Engineering

RENAL PELVIC URETERIC JUNCTION OBSTRUCTION (PUJ) - A CORRELATIVE STUDY OF RENAL TRACER PARAMETERS USING 99mTc-DTPA

Pradnya Gokhale[1] and B.R. Patil[2]
[1]Sardar Patel College of Engineering, Mumbai, [2]Vishwaniketan's Institute of Management Entrepreneurship and Engineering Technology, Khalapur, Maharashtra

ABSTRACT

Renal Pelvic Ureteric Junction (PUJ) obstruction states to a narrowing of the junction, which results in obstruction to the urine flow from the kidney to the ureter path. This condition is diagnosed with the help of renal nuclear imaging i.e. renal scintigraphy using 99mTc- DTPA ideal radiopharmaceutical. Renal obstruction level is determined by considering diagnosed renal parameters from the time activity curve (TAC) TMAX, T1/2 and GFR rate of diseased kidney. Finding the correlation status in between these parameters not only helps to understand effects of obstruction on renal functioning parameters but also to define corrective treatment and it is done by applying statistical correlation techniques and drawing out related analysis. We found that, correlations among T1/2-LK, T1/2-RK and LK-PUJ, RK-PUJ are linear as well as positively significant and that among GFR-LK and GFR-RK found to be strongly positive and they found to be affected due to LK-PUJ obstruction and RK- PUJ obstruction respectively. Applied Bland Altman plot's shows relations among GFR-LK and GFR-RK which helps to understand the effects of obstruction on renal parameters. For this study total 62 patient's data is utilized having diagnosis of PUJ obstruction and correlation is proved among renal parameters.

Keywords - PUJ Obstruction, Scintigraphy, DTPA, Correlation, TAC

Paper Code: 5481 **Track:** Electrical Engineering

GIS BASED TRANSMISSION SYSTEM PLANNING

Haripriya T, Ganesh Babu B and Poonam Upadhyay
Vallurupalli Nageswara Rao Vignana Jyothi Institute of Engineering & Technology, Hyderabad, Telangana

ABSTRACT

Transmission network plays a crucial role in electricity market. Due to increase in the number of uncertainties transmission system planning is becoming complex. The present work provides a new approach for automated transmission system expansion planning, using geographic information systems (GIS). Optimization of total cost and finding optimal branches to be added is obtained using interior point direct algorithm. Obtained optimal solution is displayed using ArcView GIS platform. GIS is used to represent maps as data layers that can be studied and used to perform analyses. The integration of GIS enables the representation of transmission system in more detail and provides the planner with a new way of looking at the transmission system. By using GIS the attribute data of the layers can be retrieved, modified and displayed with the graphics. Transmission expansion planning of both Garver's and Brazilian network has been visualized using ArcView GIS.

Keywords - Transmission Expansion Planning Problem, Geographic Information System, Brazilian Network

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Paper Code: 6193 **Track:** Electrical Engineering

GRID INTERACTIVE SOLAR PV BASED WATER PUMPING USING BLDC MOTOR

Uday Salikanti, Rami Reddy Ch and Kondalu M
Malla Reddy Engineering College, Hyderabad, Telangana

ABSTRACT

Bidirectional power flow here between renewable energy source (RES) and also the load is implemented in this work. Renewable energy (RES) is generated using solar photovoltaic (PV) cells and a BLDC motor load is linked to the water pump via a single stage bi-directional converter & voltage source inverter (VSI) in the system to power the water pump Fusing in the solar generating framework allows the solar power generation system to extract maximum power while reducing grid losses and enabling consumers to run their motors and loads at their maximum efficiency all day long. Adaptive neuro fuzzy interface system (ANFIS) in the Photovoltaic reduces switching costs, total harmonic distortion of the grid, etc. while preserving the system's power factor, quality of power, and system stability.

Keywords - BLDC Motor, PV system, Adaptive neuro fuzzy inference system, Power quality

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Paper Code: 6395 **Track:** Electrical Engineering

A PROTOTYPE OF SOLAR-BASED ELECTRIC VEHICLE - DESIGN AND DEVELOPMENT

Motepalli Siva Rama Ganesh[1] and S Sasikumar[2]
[1]Shri Vishnu Engineering College for Women, Bhimavaram, Andhra Pradesh, [2]Annamalai University, Chidambaram, Tamil Nadu

ABSTRACT

As the days pass on, global warming is increasing. The ozone layer is being depleted. Consequently, the shortage of our oil supply is becoming an issue, and we need a transformation. It is time to move on to renewable energy resources for reliable vehicle transportation that avoids pollution and global warming. Renewable energy is playing a significant role in present-day scenarios. Due to this, non-renewable energy sources would become sparse. The PV-based electric vehicles were a better move to conserve energy compared to the Non-renewable energy sources.

The solar electric vehicle operates to work while the battery is in charge mode. The energy has been stored in the battery from the PV panel during non-operating conditions. The Li-ion battery powers the DC Motor. The Motor acts like an engine and drives the belted power train to function in forward and reverse operations depending on the user preferences. The meaning of solar cars is they derive their power from the sun through solar panels. The more the rating of PV panel used, the more the capacity of power train will be increased. Solar energy has no Pollution; Maintenance-free and eco-friendly is an advantage compared to the conventional energy sources used for vehicles. Designing solar electric vehicles with rigid and lightweight components improves performance in extending the range and operating speed.

Keywords - Power Train, Solar, Electric Car, Li-ion Battery

Paper Code: 6660 **Track:** Electrical Engineering

PROTECTION OF SOLAR PV CONNECTED DISTRIBUTION AND TRANSMISSION NETWORKS: A REVIEW

Prajakta Joshi and Anupa Sabnis
Sardar Patel College of Engineering, Mumbai

ABSTRACT

The integration of solar photovoltaic (PV) in the distribution and transmission network is one of the Inverter Based Resources (IBRs) connection to the grid to fulfil the ever increasing electricity demand. Conventionally, the distribution network is radial and usually non-directional overcurrent protection schemes are implemented. The solar PV connection to the distribution network reduces reliability of protection scheme. The solar PV connection to the transmission network requires modified protection scheme due to different fault current characteristics as compared to synchronous generator based transmission system. The paper gives review of protection of solar PV connected distribution and transmission networks.

Keywords - Solar PV, adaptive protection, transmission network, distribution network, Inverter Based Resources

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Paper Code: 7792 **Track:** Electrical Engineering

A PROTOTYPE OF RTC BASED AUTOMATED FARMING

Vaisshnavi Kadiyala, Dude Sai Nandini, Bobbili Ekshitha Sai, Bavisetty Raga Chandrika and Motepalli Siva Rama Ganesh
Shri Vishnu Engineering College for Women, Bhimavaram, Andhra Pradesh

ABSTRACT

India is an agro based nation and also agriculture powerhouse for world. Agriculture has always imparted a lion's share in the economic development for the country. It is need for the country to increase the quality and productivity of the useful products in the agriculture. Basically, the farmers use manual method for watering the crops, this system is insufficient and also inefficient for all types of yields. By using the manual method, the possibility for over watering is high so it leads to damage for the yield. In order to reduce the watering issues, we can use automated watering system. Sensors such as temperature sensor and soil moisture sensor are remedies for controlling the watering system with the help of indication of water level.

Automated farming method is a boon for the country where power failure will occur in a frequent manner. The RTC (Real Time Clock) IC counts seconds with minutes and hours, months, Day of the week, and also Year. Project is designed mainly for the shortage of power in small urban areas. In most of the villages there is no power supply for more than 10 -12 hours. So, they face problem while protecting the crops with natural disasters. With the help of this technique crops get water at right time and with uniform amount.

Keywords - Arduino UNO, LCD Module, RTC Module, Keypad, Temperature Sensor, Soil moisture sensor, Water level indicator

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Paper Code: 9236 **Track:** Electrical Engineering

A REVIEW: COMPARISON OF THE DIFFERENT MPPT ALGORITHMS FOR EFFICIENT POWER TRANSMISSION BY THE PV SYSTEM

Mandar Vardam, Ayush Mishra and Jayant Shete
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Limitations to the sources of conventional resources of energy have forced today's world to move towards renewable sources of energy to cater to the ever-increasing demand of the growing population and inhibit the adverse effects of pollution and global warming. This paper aims towards the efficient use of this infinite source of energy through the use of the Maximum Power Point Tracking technique to maximize the output power delivered to the connected systems. Since many different algorithms are used for MPPT in the world, this paper aims in reviewing the study of popular algorithms and finding the efficient MPPT algorithm which can reduce the effective cost of PV systems and deliver the maximum output power at the maximum possible efficiency.

Keywords - Photovoltaic systems, Equivalent Solar cell model, MPPT, DC-DC converters, Perturb and Observe algorithm, Incremental Conductance method, Higher level controls

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Paper Code: 9567 **Track:** Electrical Engineering

SECURITY IMPROVEMENT USING SVC WITH TUNED PSS

Rushali Kapse and Vinod K Chandrakar
G H Raisoni College of Engineering, Nagpur, Maharashtra

ABSTRACT

The main aim of this paper is to design Static Var Compensator (SVC) for damping of oscillation, voltage regulation as primary function in multimachine system during large and sudden disturbances. The comparative damping performance of Power System Stabilizer (PSS) with SVC and without SVC is designed and tested under large and sudden disturbances. The PI based SVC parameter are tested under various system condition in MATLAB environment.

Keywords - SVC, PSS, Security

Paper Code: 9720 **Track:** Electrical Engineering

ELECTRICAL VEHICLE CHARGING STATION AND MONITORING ITS PARAMETER THROUGH IOT

Pranav Andhalkar and Vishal Dake
Sardar Patel College of Engineering, Mumbai

ABSTRACT

The global transportation industry is currently undergoing a revolution, moving from conventional fossil fuel powered vehicles to zero or extremely low tailpipe emission vehicles. To support transformation, A suitable charging station (CS) infrastructure, together with information technology, intelligent distributed energy generating units, and favorable government policies makes important of Electrical vehicle and charging stations. The motive of this Paper is modelling and analysis of IOT based EV Charging Station. The paper Focuses on Modelling and Analysis of IOT system for EV Charging Station. The System Emphasize on monitoring of voltage, Current, State of Charge (SOC), and location of charging of EV Station using IOT and embedded System. Monitoring and controlling of EV Charging Station is accomplished by proper selection of sensors, relays and controllers.

Keywords - EV Charging Station, IOT System, SMPS Circuit Buck Converter ESP 32 Controller Voltage Divider, Sensors Programing Codes

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Paper Code: 9958 **Track:** Electrical Engineering

POWER SYSTEM OSCILLATION MODES IDENTIFICATION USING TLS-ESPRIT AND OPTIMIZATION OF ITS PARAMETERS

Pooja Chaurasiya and Swati Lavand
Sardar Patel College of Engineering, Mumbai

ABSTRACT

This paper discusses a novel approach for monitoring power networks using frequency data derived from wide area measurement systems. A wide area monitoring system (WAMS) combines ICT (Information and communication technology) and power systems to provide real-time, high-quality, synchronized measurements from a central point and captures a continuous stream of data. The frequency measurements were used to determine the modes of oscillation in power systems. To find the oscillation modes, the TLS-ESPRIT (Total Least Square - Estimation of Parameter Using Rotational Invariant Technique) approach has been used. To make any inferences about the state of the power system, the raw observations data must be processed to get the quantitative metrics required. Finally, some real-world measurements are shown, along with our conclusions. Also, parameters are optimized by performing several experiments on the parameters.

Keywords - Power system oscillation, TLS – ESPRIT, WAFMS

Paper Code: 335 **Track:** Mechanical Engineering

EFFECT OF PHASE TRANSFORMATION ON SHIFT IN NATURAL FREQUENCY OF EPOXY-SHAPE MEMORY ALLOY COMPOSITE BEAM

Priyanka Pawar and Dr. Samir Kumbhar
Rajarambapu Institute of Technology, Rajaramnagar

ABSTRACT

The fibre-reinforced composite structural members play an important role in enhancing the strength-to-weight ratio of the structure. Smart reinforcing fibers like Shape Memory Alloy (SMA) provide an additional feature of adaptive stiffness to the structure. In this paper SMA wire reinforced epoxy resin composite is analyzed for change in natural frequency to reveal the change in stiffness concerning change in transformation temperature from martensite to the austenite phase. The numerical study is carried out by using FEA software and the experimental validation of the same is completed. The natural frequency shift is predicted by measuring the natural frequencies of the composite for free-free boundary conditions at different transformation temperatures. The significant change in the natural frequency of composite is observed during transformation temperature and the FEA results are close to experimental results with reasonable accuracy, thus the proposed composite provides ways to have adaptive stiffness.

Keywords - Shape Memory Alloy reinforcement, adaptable natural frequency, fibre reinforced composite

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Paper Code: 388 **Track:** Mechanical Engineering

DESIGN AND ANALYSIS OF HYDROGEN STORAGE PRESSURE VESSEL

Bhooshan Kamble, Nilesh Raykar and Dattatray Jadhav
Sardar Patel College of Engineering, Mumbai

ABSTRACT

The world as of today is found to be inclined towards the use of more renewable sources of energy. Hydrogen as a fuel has been in the limelight due to its immense applications to generate energy. But the storage of hydrogen is of concern as it is a very volatile substance which burns vigorously. And this gas is to be stored in its compressed form for various applications. This has led the scientific community to explore the various possibilities for its storage and transportation. Type IV hydrogen storage vessels are one of the most prominent contenders for hydrogen storage. This work is mainly focused on the design of a Type IV pressure vessel.

Keywords - hydrogen, pressure vessels, carbon-fibre filament

Paper Code: 429 **Track:** Mechanical Engineering

ON POTENTIAL APPLICATIONS OF MESO AND MICRO MESH-LIKE STRUCTURES DEVELOPED THROUGH HELE-SHAW CELL

Harshal Dhongadi[1], Kiran Bhole[1], Bharatbhushan Kale[2] and Sachin Oak[1]
[1]Sardar Patel College of Engineering, Mumbai, [2]Datta Meghe College of Engineering, Navi Mumbai

ABSTRACT

In order to get inspiration and find solutions to human issues, bio-mimicking is the act of copying the diverse patterns, models, and systems of nature. The human body's veins and arteries, as well as leaves and tree branches, exhibit mesh like fractal patterns. The procedure of replicating these structures is difficult. Utilizing a Lifting Plate Hele-Shaw Cell (LPHSC), this is possible. In the LPHSC, a non-Newtonian fluid is positioned between two flat plates that are barely separated from one another. The upper plate is carefully raised while the bottom plate is kept stationary. As a result, Saffman-Taylor instability or uncontrollable mesh-like pattern develops. Fractal-like shapes are produced when a low viscosity fluid interacts with a high viscosity fluid and attempts to displace the high viscosity fluid. To create micro and meso-sized passages for fluid movement, the produced mesh-like structures are further molded using PDMS. In-depth explanation of the conceptual paradigm for employing bio-inspired fractals for cooling in micro-electromechanical systems is mentioned. Micro mixing is the process of interacting and blending fluids at the molecular level. A crucial stage in microfluidic systems is micro mixing. In order to accomplish this effect, micromixers are employed. A crucial technique for improving sample mixing in a micromixer is microchannel layout design. This approach is being used to idealize the protein separation process.

Keywords - Bio-mimicking, Lifting Plate Hele-Shaw Cell, Saffman-Taylor instability, Micro mixing, Protein separation, Fractals, Microfluidic systems

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Paper Code: 585 **Track:** Mechanical Engineering

NANOBOTS IN MEDICAL FIELD: A COMPREHENSIVE REVIEW

Nupur Avasare, Rutwik Bhangale and Vinit Joshi
Dwarkadas J. Sanghvi College of Engineering, Mumbai

ABSTRACT

Over the past few years, the advancement in technology has led to the invention of Nanobots. The use of nanobots in the medical field has seen tremendous growth due to the various advantages it holds. In the medical field, nanobots seem to provide a better solution as compared to the traditional medical techniques which were followed over the past decades. The goal of this review paper is to explore the possible inculcation of nanotechnology, in the form of nanobots, in the medical sector as an integral part of numerous applications and the feasibility of its manufacturing along with future aspects. Nanobots are accompanied with several challenges like nanoscale manufacturing, high initial capital and so on. Since the onset of research into the field of nanotechnology back in the 1960s, numerous types of research work and sources are available through which theoretical as well as practical approach to the implementation of nanobots seems to be feasible in the near future. The review paper also highlights the advantages and disadvantages of using nanobots in the medical field. This review paper will address the need of researchers in the medical field giving a general overview of nanobots along with their applications and prove to be a source of further insight in this blooming field.

Keywords - Nanotechnology, nanobots, drug delivery, diagnosis, dentistry, mod-ern medicine, cancer treatment, dentifrobots

Paper Code: 807 **Track:** Mechanical Engineering

HARD TURNING OF HARDER METALS (45HRC) AT HIGH SPEED USING A SINGLE POINT CUTTING TOOL – A REVIEW

Sushil Ingle[1], D N Raut[2]
[1]MET Institute of Engineering, Nashik, [2]Veermata Jijabai Technological Institute, Mumbai

ABSTRACT

Hard turning, or single-point cutting of materials harder than 45HRC has been more popular since continuous roughing with contemporary ceramics and continuous finishing with cBN tools were first made possible. Due to its high productivity, the option for dry machining, increased surface integrity, and improved mechanical qualities of machined components, finish hard machining has been advantageous for the machining industry. It might take the place of expensive grinding processes.

Extreme requirements for tool stiffness and tool wear resistance are placed on finish hard turning due to the high hardness of the workpieces, strong cutting forces, and high temperatures at the tool-work piece interface. Cubic boron nitride (cBN), especially in polycrystalline cubic boron nitride (PCBN) compact and pointed (or brazed) form, has shown to be a technologically viable tool material for manufacturing precision parts in small to medium batches. To use a compact tool or tipped tool for a hard turning operation, however, requires economic justification due to the difficulty of compact cBN processing (high temperature and high pressure) and the high cost of PCBN tools as a result. As a result, the challenges for hard turning have shifted from technological feasibility to economical viability. Therefore, it is essential for further advancements in hard turning to find a way to dramatically lower the cost of application-specific tools without compromising tool performance or productivity.

Keywords - Hard Turning, Tool wear, Metals, Machining

Paper Code: 903 **Track:** Mechanical Engineering

INVESTIGATION OF VRM TO MINIMIZE GRINDING OIL LEAKAGE IN IRON ORE PELLETS MANUFACTURING INDUSTRY

Priya Bramhwanshi, Sagar Dhotare, Chinmay Rohekar
Vishwaniketan's Institute of Management Entrepreneurship and Engineering Technology, Khalapur, Maharashtra

ABSTRACT

A type of grinding device for cement, raw materials, cement clinker, slag, and coal slag is a vertical roller mill (VRM). It provides the benefits of simple construction and inexpensive manufacturing and usage costs. Its basic function is the same regardless of the shapes it takes. A roller (or its equivalent in roller grinding components) and a roller along the disc's path at the scale of rotational motion exacted by a peripheral grinding roller in the vertical loads on the disc on the material being the joint action of compression and shear, as well as to crush, are examples of these machine types.
Iron ore pellets are made by indurating iron ore fines in a furnace after they have been agglomerated into pellets. In order to produce steel, they are often put into a blast furnace or DRI facility.
The main aim of the investigation is to enhance the life of oil seal lagging due to repeated wear out of lagging by repetitive pressure of the oil. The main impact is to eliminate the leakage of lagging considering the cost factor. The goal is to increase the life of oil seal lagging from 2 months to 12 months in the Iron Ore Pellets manufacturing Industry.
This study shows the changes done in the design of the oil seal on the basis of cost which results in the low failure of the oil seal. Because of the low failure of the oil seal, there is an increase in the life of the oil seal. The main aim is to increase the productivity of the plant.

Keywords - Iron ore pellets, VRM, Quality Circle, Root & Cause Analysis

Paper Code: 916 **Track:** Mechanical Engineering

REVISITING SUSTAINABLE SUPPLY CHAIN FROM INDUSTRY 4.0 PERSPECTIVE

Gayatri Abhyankar[1,2], Santosh Rane[1], Milind Kirkire2
[1]Sardar Patel College of Engineering, Mumbai, [2]Finolex Academy of Management & Technology, Ratnagiri, Maharashtra

ABSTRACT

Supply Chains are the backbone of every company. Market demands for transparent and sustainable supply chains are increasing. Achieving Sustainability and Transparency is possible by use of Industry 4.0 technologies. One condition that can slow a company's growth is poor sustainability performance, as measured in environmental and social impact. Many authors have revealed the importance of Industry 4.0 for sustainable Supply Chains, but a Systematic Literature Review (SLR) uncovering the barriers faced during implementation of Industry 4.0 core technologies for Sustainable Supply Chain is missing. The study is based on 128 articles from 50 reputed journals. Systematic literature review presented in this paper uncovers barriers for implementation of several core technologies of Industry 4.0. Rather than providing aggregate implications, our SLR explores the challenges faced in implementing Industry 4.0 technologies for Sustainable Supply Chain.

Keywords - Industry 4.0, Supply chain, Digitization, Digital Technology, Literature review

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Paper Code: 1099 **Track:** Mechanical Engineering

PREDICTION OF TURBINE HOUSING JOINT MECHANICAL LOADING

Suresh Jadhav[1], Sharad Valvi[2], Kunal Patil[3], Haseen Shaikh[2], Jayram Gholave[2], Balwant Bhasme[2], Kiran Bhole[2]
[1]Veermata Jijabai Technological Institute, Mumbai, [2]Sardar Patel College of Engineering, Mumbai, [3]Government Polytechnic Vikramgad, Palghar, Maharashtra

ABSTRACT

Structural vibrations coming from the engine are a main source of destructive energy on the exhaust plumbing of turbocharger, which might lead to failure due to resonance. To avoid this failure changes must be done in exhaust pipework like additional components, supported brackets. To check whether the design is within the structural load limits on turbocharger outlet flange, testing is needed to do risk assessment. Dependency on test can be avoided every time with FEA analysis. Considering the purpose of finding bending and rotational moments on turbine housing outlet joint, ANSYS FEA methodology is developed which considers model analysis and harmonic analysis. Mode frequency, mode shape and acceleration amplitude are taken from testing, and it is compared with FEA analysis. Using this, the correlation was built between FEA model and test model. This says that FEA model is realistic. This being dynamic analysis, harmonic analysis is used for finding the bending and rotational moments.

Keywords - Turbocharger, Modal analysis, Finite Element Analysis (FEA), Modal correlation, harmonic analysis, experimental analysis

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Paper Code: 1199 **Track:** Mechanical Engineering

VOICE COMMAND BASED AXIALLY EXTENDING MECHANISM FOR FAN

Shreyas Kale, Kartik Shah, Pallavi War, Santosh Rane
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Cleaning ceiling fans is one of the most exhausting tasks that we face daily or weekly due to the posture we use to clean the fans. The major constraints are the distance of the fan from the ground and the body posture required to clean at such height. People usually feel tiredness in their shoulders and arms after performing this task. Also, there is a risk of falling from a chair or table, if used for cleaning, and getting seriously injured. Hence, this project aims to make a fan that can ease people's lives by easing the cleaning action of the fan. The fan can extend itself down to a person's shoulder level to ease the cleaning action. Besides, there will be a safety feature, voice recognition feature, and other Industry 4.0 technologies in the fan.

Keywords - Cleaning ceiling fans, Voice Command, NLP

Paper Code: 1518 **Track:** Mechanical Engineering

SYNTHESIS OF BENZIMIDAZOLE USING PLANT ASSISTED ZINC SULPHIDE BY GREEN APPROACH

Jayram Gholave[1], Vitthal Shivankar[2], Nitin Mirgane[3], Kiran Bhole[1], Gurumeet Wadhawa[4]
[1]Sardar Patel College of Engineering, Mumbai, [2]Rayat Shikshan Sansthas, Chhatrapati Shivaji College, Satara, Maharashtra, [3]SIES College of Arts, Science & Commerce, Mumbai, [4]Rayat Shikshan Sansthas, Karmaveer Bhaurao Patil College, Navi Mumbai

ABSTRACT

We have developed the use of the green approach technique in the presence of plant-assisted zinc sulphide nanoparticles derived from the euphorbiaceous family. A catalyst is described as an ecologically safe and effective method for producing benzimidazole derivatives. The condensation of aldehyde and o-phenylenediamine was followed by a Cylisation reaction, which resulted in the synthesis of the matching benzimidazoles in up to 93-95 percent yields. This approach might be used to make benzothiazoles and benzoxazoles derivatives as well.

Keywords - Benzimidazole, green approach, zinc sulphide nanoparticles

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Paper Code: 1837 **Track:** Mechanical Engineering

ARTIFICIAL FLAVOURS - A REVIEW

Hemlata Karne, Aditi Gadre, Shreeja Gawande, Krutika Khetade, Pradnya Kolsundkar and Swarada Kulkarni
Vishwakarma Institute of Technology, Pune

ABSTRACT

Flavours are key role players that contribute to the unique selling point of a wide range of products like food materials which include juices, jams, jellies, ice creams and pharmaceuticals, cosmetic products, toothpaste, and perfumes. The research on synthesising flavours artificially presents advanced ways of manufacturing flavours as close as possible to the original and natural ones. This review paper takes into consideration five very important and widely used flavours namely pineapple, peppermint, orange, strawberry, and vanilla. The methods of extraction of the natural flavour, their characterisation techniques, the aroma profiles, unique to each flavour and methods of manufacturing those flavours artificially according to their aroma profiles have been reviewed. The extraction, characterization, and manufacturing methods for all five flavours are similar for certain techniques while they vary a little depending upon the flavour and its natural occurrence as well. For pineapple flavour, the note method and bio-catalysed synthesis, with the help of fungal growth have shown to be the most effective. The dominating compound for pineapple is ethyl butyrate. As for peppermint flavour, solvent extraction and soxhlet extraction prove to be convenient methods for the manufacturing of essential oil. The peppermint essential oil majorly contains the compound menthol which is determined with the help of gc-ms. For orange flavour, alcohols and terpenes were identified as vital and considerable volatile compounds. The primary method for the extraction of essential oil is hydro-distillation. For strawberry flavour, the widely used method for extraction is spme. For vanilla flavour, the primary chemical component is vanillin which is most commonly and widely synthesised using eugenol.

Keywords - analysis, aroma profiling, artificial flavour, extraction

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Paper Code: 1950 **Track:** Mechanical Engineering

STUDY OF THE EFFECT OF INFILL PATTERNS: STATIC FAILURE, COST AND BUILD TIME ANALYSIS

Shreyas Khare, Mangesh Panchal, Parth Khamkar and Kiran Bhole
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Additive manufacturing is an up-and-coming technology with the potential to revolutionize the manufacturing industry. Infill patterns are a specification of additive manufacturing processes which can reduce build time, and save material and cost without compromising the strength of the product. The research presented in this report focuses mainly on infill patterns and the effect they can have on the manufacturing capabilities of various materials. An exhaustive study has been conducted studying various infill patterns and densities for their tensile and compressive behaviours. A comparative study has been conducted to study the capabilities of various infill patterns. From the results of the study combining the simulation-based and practical approach, a database containing the stress-strain properties of the model was created. The database was used to create a machine learning model which could predict the failure force for any given combination of infill density and pattern, provided the material properties were defined.

Keywords - Infill Patterns, Additive Manufacturing, Machine Learning, Cost Benefit Analysis, Universal Testing Machine

Paper Code: 2227 **Track:** Mechanical Engineering

DESIGN OF EXPERIMENTAL SETUP OF DESALINATION OF SEAWATER USING FRESNEL LENS

Sharad Valvi[1], Suresh Jadhav[2], Haseen Shaikh[1], Jayram Gholave[1], Kiran Bhole[1], Kiran Shelke[3], Balwant Bhasme[1], Rahul Chavhan[1], Vishal Dake[1], and Snehjit Kumbhar[1]
[1]Sardar Patel College of Engineering, Mumbai, [2]Veermata Jijabai Technological Institute Mumbai, [3]Late Pushpadevi Patil Arts and Science College, Risod, Washim, Maharashtra

ABSTRACT

This paper presents the way of Desalination of seawater using a fresnel lens. A physical setup was designed and fabricated. The experiments were conducted on the terrace of Sardar Patel College of Engineering. The experiments conducted were with respect to Mumbai's Climate. Solar radiation was the sole source of energy. The solar rays were incident on the Fresnel lens and fresnel lens due to its high converging power generated a high intensity focus that was enough for burning concrete bricks or iron nails. The focus generated by the lens reached the maximum temperature of 202℃. That energy was used for converting seawater into steam. The maximum water temperature recorded was 102℃. The steam was condensed using a condenser system and pure water was collected. The experiment was conducted in two stages. For stage 1 we have compared radiation and water evaporation level. Various problems like heat dissipation, vapor leakage, windy weather and other climatic factors were considered. The physical setup was redesigned for stage 2 in order to mitigate the problems. In stage 2 water solar radiation was compared with condensed water level. For both the stages we have compared the readings obtained with research papers available. For comparing water levels we have not considered the environmental variations.

Keywords - Desalination of seawater, fresnel lens, designed and fabrication, solar radiation

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Paper Code: 2514 **Track:** Mechanical Engineering

OPPORTUNITIES AND CHALLENGES OF GREEN MANUFACTURING UNDER MAKE IN INDIA PLI SCHEME

Ajinkya Lale[1] and Usha Pawar[2]
[1]RAIT School of Engineering, Dr. D. Y. Patil Deemed to be University, Navi Mumbai, [2]Datta Meghe College of Engineering, Navi Mumbai

ABSTRACT

A diverse group of individuals, known as stakeholders, participate in the creation of a manufacturing system. Suppliers of materials and other goods, producers, merchants, consumers, and policymakers are some of these stakeholders. Green manufacturing techniques are being implemented by the manufacturing sector to reduce its environmental impact and, additionally, to enhance the financial performance of its manufacturing activities. The manufacturing sector is being pushed to embrace green manufacturing techniques as stakeholders' awareness of the values of green manufacturing in practice grows. India is one of the fastest growing economies and ranks 10th in the world by nominal GDP. The Government of India has established the Make in India program to support the development of manufacturing infrastructure, encourage investment, encourage innovation, enhance skills development and protect intellectual property. The Make in India campaign was launched on 25th September 2014.The idea for this campaign came from India's Prime Minister, Narendra Modi, and it is part of an international marketing strategy. By luring in investments from companies throughout the globe, this strategy seeks to transform India into the global manufacturing hub. In this study we explored the advantages (Establish a Job Opportunity, Increase GDP etc.), and Challenges of Green manufacturing under Make in India.

Keywords - Green Manufacturing, Make in India, Production Linked Incentives

Paper Code: 2692 **Track:** Mechanical Engineering

A COST-EFFECTIVE SMART INVENTORY RETRIEVAL SYSTEM: A FRAMEWORK

Bhaveshkumar Pasi[1,2], Pallavi Dongare[2] and Suman Joshi[2]
[1]Sardar Patel College of Engineering, Mumbai, [2]Vishwaniketan's Institute of Management Entrepreneurship & Engineering Technology, Khalapur, Maharashtra

ABSTRACT

Warehouses are the backbone of sectors like e-commerce, manufacturing, export/import and other diverse industries, as there is perpetually a need for storage and timely retrieval. Generally, warehouses are enormous, and it takes a lot of effort, time and manpower to deal with the material's storage and retrieval from these warehouses. This may cost that industry precious time and also tamper with its efficiency of operation. Therefore, purpose of this research work is to eliminate these shortcomings by proposing the cost-effective automated system to locate, retrieve and store the inventory materials efficiently and without human interaction. This is done by developing a local network-based system which instructs individual carts to retrieve and store given items, making the overall process efficient.

Keywords - Efficiency, Industry 4.0, Manufacturing, Robotic Arm, Smart Inventory, Warehouse

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Paper Code: 2725 **Track:** Mechanical Engineering

3D SIMULATION DESIGN ANALYSIS AND TESTING OF CAMS TO OBTAIN OPTIMUM PRESSURE ANGLE AND MINIMUM RADIUS OF CURVATURE FOR TEXTILE APPLICATION

Madan Narayanan, Shashank Phulmali and Suraj Swami
Sardar Patel College of Engineering, Mumbai

ABSTRACT

In this paper, a functional analysis of advancement in shedding mechanisms used in textile loom industries is critically examined with 3D simulation software. This paper revolves around the design of cams for simple weave and twill weave patterns along with all the different cam dimensional parameters that affect the output motion of the follower. The recent advancement that textile industries can implement instead of using traditional methods for the preparation of weaving mechanisms is discussed in the paper. Different parameters such as base circle diameter, follower radius and offset of follower in the design of the cam were analyzed and the variations seen between them and the pressure angle and minimum radius of curvature were tabulated. The conclusion deals with the ways shedding cams can be improvised to achieve the task more efficiently. Shedding cams like cycloidal and simple harmonic is the topic of interest. The paper highlights the role of pressure angle and curvature radius, which are important design criteria in the design of shedding cams. The authors have discussed the various effects of the parameters on the output and have listed down the future work and research possible in the design and testing of the cam involving stress, vibration and dynamic analysis of the complete mechanism.

Keywords - Simple harmonic motion, Cycloidal motion, Pressure Angle, Radius of Curvature

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Paper Code: 2776 **Track:** Mechanical Engineering

SPRINGBACK ANALYSIS IN V BENDING PROCESS OF SHEET METAL THROUGH FINITE ELEMENT METHOD

Varsha Magar and Naveen Kumar Agrawal
Sir Padampat Singhania University, Udaipur, Rajasthan

ABSTRACT

Spring back in sheetmetal bending operation refers to its elastic recovery after withdrawal of the load. Spring back compensation is absolutely essential for accurate geometry of sheet metal components. The elastic recovery is mainly affected by tool design and material charaterisitc parameters. In this paper an investigation of spring back for SS304 Grade and C80 Grade stainless steel, commonly used in many engineering applications, in V bending process is carried out. Result shows the impact of tool design parameter and material characteristics on stringback. A Finite element model is generated in LS-DYNA.It is concluded that spring back can be reduced for C80 material due to Increase in the specimen grade.

Keywords - Sheet metal, Spring back, Elastic recovery

Paper Code: 2785 **Track:** Mechanical Engineering

IONIC LIQUID MEDIATED AN EFFECTIVE SYNTHESIS OF 2-ARYLBENZOTHIAZOL

Jayram Gholave[1], Kiran Shelke[2], Sharad Valvi[1], Haseen Shaikh[1], Balwant Bhasme[1], Kiran Bhole[1], Rahul Chavhan[1], Vishal Dake[1], Snehjit Kumbhar[1] and Pravinchandra Gaikawad[1]
[1]Sardar Patel College of Engineering, Mumbai, [2]Late Pushpadevi Patil Arts and Science College, Risod, Washim, Maharashtra

ABSTRACT

An effective synthesis of arylbenzothiazole from the cyclocondensation of o-aminothiophenol with aldehydes by using 1-benzyl-3-methylimidazolium dihydrogen phosphate ([bnmim]H2PO4) acidic ionic liquid at 70°C. This methodology gives eminent benefits like simple procedure, fast reactions, good yield and the ionic liquid was effectively reused for four cycles without critical loss of activity

Keywords - synthesis, arylbenzothiazole, ionic liquid

Paper Code: 3010 **Track:** Mechanical Engineering

DESIGN AND ANALYSIS OF THERMAL MAGNETIC RELEASE FOR MOULDED CASE CIRCUIT BREAKER

Suresh Jadhav[1], Sharad Valvi[2], Haseen Shaikh[2], Jayram Gholave[2], Kiran Bhole[2], Balwant Bhasme[2] and Pirsab Attar[1]
[1]Veermata Jijabai Technological Institute Mumbai, [2]Sardar Patel College of Engineering, Mumbai

ABSTRACT

Circuit breakers are the switchgears used for electrical protection of the devices. Circuit breakers protect the equipments from short circuit currents, overloads and fault currents. There are different types of circuit breakers and Moulded Case Circuit Breaker (MCCB) is one of them. MCCBs are used in applications where current rating ranges from 16A to 1600A.MCCBs have fault current carrying capacity ranging from 5kA to 200kA at 415 volts. For fault current values exceeding the specified value, the MCCB gets tripped. The tripping action takes place due to latching mechanism. This fault current is sensed by the release assembly in MCCB. The release assembly may be of microprocessor type (MPR) or thermal & magnetic type (TMR). In TMR a set of components sense the fault due to overload and short circuit fault. Overload fault occurs when a high value of current (with respect to the breaker rating) at a sustained rate for a long time. Short circuit occurs when current of much higher value than the rated current starts flowing through the terminal.

There was a need to develop TMR components for the DZ7 Moulded Case Circuit Breaker with a rating of 800A. The objective of this study is to design the components of this TMR using finite element analysis and other analytical tools. We are performing a finite element analysis for safeguarding each component against failure before testing the actual prototype. The designed components must be suitable for conducting mechanical endurance test with the MCCB.

Keywords - Moulded Case Circuit Breakers, Trip Force, Thermal Magnetic Release, Finite Element Analysis

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Paper Code: 3068 **Track:** Mechanical Engineering

NUMERICAL SIMULATION OF WATER JET–GUIDED LASER MICRO-MACHINING OF DIAMOND

Usha Pawar[1], Pravinkumar Dahiwadkar[1], Kiran Bhole[2] and Mansing Rathod[3]
[1]Datta Meghe College of Engineering, Navi Mumbai, [2]Sardar Patel College of Engineering, Mumbai, [3]K.J. Somaiya Institute of Engineering and Information, Mumbai

ABSTRACT

This work mainly constitutes, FEA model of parabolic heat transfer of diamond micromachining using laser beam covered with water jet, generated in MATLAB PDETOOL with 2D contour. In recent technologies, a water jet with very small diameter carries a laser beam, used for micro level machining and fabrications of various polymers, metals, and non-metals. A simulation model also has been prepared for both, Laser beam covered with water jet machining process and conventional Laser beam machining process functional for diamond processing. The detailed procedure of modelling this simulation for both, Laser beam covered with water jet diamond machining and dry laser beam diamond machining is an important part of this work.

Keywords - Water jet guided laser beam, Heat Affected Zone (HAZ), Micromachining, Parabolic heat transfer, MATLAB PDETOOL

Paper Code: 3186 **Track:** Mechanical Engineering

GENERALIZED DESIGN PROCEDURE FOR A COOKING ROBOT ARM

Manav Mepani, Tanish Mishra, Haseen Shaikh[1], Kshitika Gala and Kiran Bhole
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Cooking robots often make use of a robot arm as the primary manipulator for carrying out all necessary cooking actions. These arms usually adopt a PUMA style configuration for its extensive workspace and high versatility. With increasing interest towards automating cooking, there is a need for the documentation of a general design procedure for the arm based on certain known input parameters like reach and payload. This paper presents a generalized design procedure for cooking robot arm based on kinematic analysis and practical implementation of the robot arm for few class of recipes.

Keywords - Robotics and automation, Cooking robot, Robotic arm, Design Procedure

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Paper Code: 3517 **Track:** Mechanical Engineering

'DIGITAL TWIN' MODELLING FOR MONITORING PROCESS HEATER DESIGN PERFORMANCE

Sanket Chaudhari, Santosh Rane and Kiran Bhole
Sardar Patel College of Engineering, Mumbai

ABSTRACT

The purpose of this paper is to illustrate 'Digital Twin' technology in research proposal necessary to carry out research on performance of process heater design using. Development for an optimum performance modelling of process heater is necessary to achieve challenges in industrial process heaters. Therefore, upgradation in tubes and heater design with integration of state-of-the-art technology is a need for industry. This research will deliver the structured research method along with tools, methodology, test, data collection and deliverables regarding Process heaters. The research is developed into stages as per design improvisation identified in literature survey of journal articles and innovative concept application. It targets radiant tube design development to demonstrate higher heat absorption. Further, Process Heater design is focused by enhancement in heater geometric configuration. The improvisation in process heater majorly in radiant tube design, heater design and monitoring in operation are identified in literature survey. High heat flux and elevated temperatures are the major parameters to be focused to eliminate key failures in process heaters. Also, the process heater industry is suitable to adapt 'Digital Twin' technology. The research concentrates on development of pyrolysis heater vertical cylinder heater. There are other types of heaters also available but they are not part of this research. Stage heating technology as outcome developed in this research indigenously will enable to carry out critical chemical processes and elimination of coil failures. Integration of Digital Twin technology will enable predictions of future failures and unexpected maintenances. This research is about an innovation in radiant tube design and improvisation of heater design with adaptation of state of the art 'Digital Twin' technology.

Keywords - Process Heaters, Radiant Tube, Internet of Things

Paper Code: 3608 **Track:** Mechanical Engineering

EFFECTIVE UTILISATION OF SIMULATION TOOLS IN THE DESIGN OF AN UNMANNED AERIAL VEHICLE

Prachi Sahu, Dhanashree Mehare, Isha Likhite, Vaibhav Ramesh, Harsh Habbu, Sagar Kadel and Sakshi Kolekar
Sardar Patel College of Engineering, Mumbai

ABSTRACT

This paper illustrates the use of simulation softwares in the design process of an aircraft. Simulation tools assist in the creation of the most optimum model while experimenting with sustainable and efficient options. Adaption of these tools significantly improves the design and analysis process by allowing the engineers to replicate real-world behaviour and performance of the prototypes in a virtual simulation. The objective of this paper is to explore the advantages of utilising simulation tools in preliminary design phase itself. The losses avoided with the use of these softwares are significant and the results are just as precise as physical testing. Emphasising the use of these tools in softwares could have a huge impact on technology as well – developments could lead to creation of even more powerful and accurate simulating environments, capable of predicting nearly any process. Furthermore, existing tools can also be improved upon to minimise any error or discrepancy in results.

Keywords - planform, analysis, simulation, software, virtual, design, wing

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Paper Code: 3905 **Track:** Mechanical Engineering

PROPERTY EXPLORATION AND INVESTIGATIONAL ANALYSIS OF ECO-FRIENDLY REFRIGERANT BLEND (HFO/HFC) AS A DROP-IN REPLACEMENT FOR HCFC IN VCRS

Karthick Munuswamy and Ananth Sai Shankar V
Velammal Engineering College, Chennai, Tamil Nadu

ABSTRACT

The refrigerant combination [M-R1234yf/R32] (80%/20% by weight) is explored as a drop-in replacement for R22 in a vapour compression refrigeration system in this study. The performance parameters of the refrigerant mixture in the temperature range of -10°C to 80°C, which is the operating temperature of the working fluid in the system, were found to match with R22 using REFPROP. This was proven in the lab by doing a baseline test with R22 and then comparing it to the mixture. The COP of the refrigerant mixture was determined to be 3.8–5.5% greater than that of R22, according to experimental results. The work input of the compressor is lowered by 9.5%. In the range of 4.4–6%, the refrigerating impact is also diminished. The mixture's compressor discharge temperature was found to be 7°C to 9°C lower than that of R22. This report also considers the refrigerant mixture's safety and environmental impact. Our mixture has been demonstrated to be a safer, more cost-effective, and ecologically friendly alternative to R22 in air conditioning systems.

Keywords - Refrigerant mixture [M-R1234yf/R32], COP, Performance, Safety, low GWP

Paper Code: 3937 **Track:** Mechanical Engineering

DESIGN OF VARIOUS ROTOR GEOMETRIES FOR TWIN LOBE BLOWER USING PARAMETRIC EQUATIONS

Swati Shinde[1], Pradeep Jadhav[2] and Pradip Shinde[3]
[1]Padmabhooshan Vasantraodada Patil Institute of Technology, Sangli, Maharashtra, [2]Bharati Vidyapeeth, Pune, [3]State Government

ABSTRACT

Mathematical equation for lobe profile is established in parametric form and this equation is solved by using numerical methods. Geometry calculations for four different cases carried out.This forms basis for 3D cad model generation.Width of rotor at tip and waist is varied for various conditions and flow characteristics for these conditions can be verified .The flow characteristics for which we will give enhanced performance in respect of mass flow rate and pressure is compared with existing lobe performance .This will lead to the development of optimum lobe. This paper reports a study of profile of twin lobe roots blower.

Keywords - involute-Geometric curve, cycloid-Geometric curve, parametric equation-comprising radius and angle

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Paper Code: 4046 **Track:** Mechanical Engineering

MODELING OF VARIOUS ISSUES IN ORANGE SUPPLY CHAIN: AN ISM APPROACH

Abhijeet Digalwar and Sankalp Gawande
Birla Institute of Technology and Science, Pilani, Rajasthan

ABSTRACT

Agricultural sector in India has experienced waves of tremendous change since the time of independence and the subsequent green revolution. However, the disparity in the workforce percentage of agriculture and the share of GDP it contributes has been a worrisome aspect government is trying to resolve. Proper interventions like precision farming, automatic harvesting, and dashboards for market demand and information have been on the rise. This paper aims to decide on the most important issues concerning the orange supply chain and hierarchically rank the known issues. Interventions in this field are required at multiple levels and yet seem to be in a nascent stage at the most. The Interpretative Structural Model (ISM) is utilized in the present paper to discuss the most critical supply chain issues for orange.

Keywords - Interpretative Structural Modeling, Orange, Agricultural Supply Chain, Fruits, India

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Paper Code: 4382 **Track:** Mechanical Engineering

EFFECT OF CHANGE IN VAPOUR QUALITY OF AMMONIA ON THE HEAT TRANSFER IN BRAZED PLATE HEAT EXCHANGERS

Ranjeethkumar Singh and Balwant Bhasme
Sardar Patel College of Engineering, Mumbai

ABSTRACT

This paper presents a numerical analysis of two-phase refrigerant flow distribution in a brazed plate heat exchanger by using CFD. The plate-fin heat exchanger is a compact heat exchanger which is manufactured by brazing a stack of alternate plates (parting sheets) & corrugated fins together. The exchange of heat occurs through the streams through the fins. Generally, aluminum is used for manufacturing plate-fin heat exchanger due to its high thermal conductivity & low cost. In the present work a model of brazed plate heat exchanger is created and simulated in ANSYS Fluent software. The model results were validated with the results available in the literature. Present analysis shows that for constant mass flux with increasing the vapour quality of ammonia heat transfer increases. It also shows the with heat transfer the pressure drop also increases.

Keywords - Brazed Plate Heat Exchanger, ammonia refrigerant, CFD, Heat transfer, Pressure drop

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Paper Code: 4430 **Track:** Mechanical Engineering

CLOUD ERP ADOPTION BY SMEs: A SYSTEMATIC REVIEW

Anil Magare[1] and Usha Pawar[2]
[1]Lokmanya Tilak College of Engineering, Navi Mumbai, [2]Datta Meghe College of Engineering, Navi Mumbai

ABSTRACT

The use of cloud computing and cloud-based business operations is rapidly expanding in the global corporate community. The term "cloud-ERP" refers to enterprise resource planning (ERP) software that is hosted on the internet and used by businesses who subscribe to its use through a third-party service provider. By emphasising the key factors influencing this development, this article gives a succinct review of the research done on the subject of small and medium-sized firms (SMEs) using cloud ERP. This work includes systematic reviews of the relevant literature, and its findings give structure to the outlined in the previous papers based on the adaptation of cloud ERP. Information systems theory development may face some of the problems and obstacles that are discussed in this research. As an added bonus, this research provides important insights into the future of Cloud ERP and the factors that will ultimately determine its widespread acceptance. The findings deepen our appreciation for how SMEs may reap the benefits of cloud-based ERP systems.

Keywords - Enterprises Resource Planning (ERP), SMEs, Planning, Cloud ERP

Paper Code: 4494 **Track:** Mechanical Engineering

PERSPECTIVE OF LEAN SIX SIGMA AND INDUSTRY 4.0 FOR PRODUCT DEVELOPMENT

Sainath Bidikar and Santosh Rane
Sardar Patel College of Engineering, Mumbai

ABSTRACT

In today's global competitive business environment, improvement in quality and reliability of product has propelled design industry to develop an efficient product development (PD) for achieving great profitability index. To uphold a market leadership, an organization needs to work on improving product attributes that would meet basic or even exceeds the need of customer with lowest possible cost and in minimum possible time. The blend of data driven lean six sigma (LSS) and emerging era of technology driven Industry 4.0 arriving a significant attention for PD. The synergy of both LSS and Industry 4.0 drives the organizations to focus on optimizing product development period to satisfy customers' needs with better capability and reduced lead time. The purpose this research article is to explore and showcase the systematic approach for research in the domain of interaction between product development, LSS and Industry 4.0 in efficient manner. It broadly elaborates on opportunities, challenges, resources needed and research deliverables in the PD. It also confirms the technical feasibility and economic viability of research in the domain area. Literature survey on research domain with various case studies broadens the overview for implementing an efficient PD and use of business intelligence to overcome the deficiencies. This research identifies the potential competence of industry to enhance a newer perspective to product development activity with reliable decision-making capability. It focuses on enhancement of product development incorporating various LSS and Industry 4.0 at different phase. It does not cover conceptual and functional design perspective. Research would provide a framework for industry for product development for enhancing product performance, quality, and reliability, minimizing product costs, and shortening product launch time to market.

Keywords - Product Development, Lean Six Sigma, Industry 4.0, Quality, Reliability

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Paper Code: 4814 **Track:** Mechanical Engineering

MACHINE LEARNING APPROACH TO PREDICT VISCOUS FINGERING IN HELE-SHAW CELLS

Avdhoot Lendhe[1], Kiran Bhole[1], Nilesh Raykar[1] and Bharatbhushan Kale[2]
[1]Sardar Patel College of Engineering, Mumbai, [2]Datta Meghe College of Engineering, Navi Mumbai

ABSTRACT

The stokes flow between two flat parallel plates caused when the plates are separated by an infinitesimal distance is termed Hele Shaw fluid flow. When the gap is created, the pressure difference causes the Low viscous fluid to penetrate the Highly viscous fluid by a velocity which can be calculated using the pressure gradient, viscosity and speed of separation. Due to fluid non-uniformities, this penetration causes the fluid to form freckles on the surface of the acrylic plate. This branching is normally arbitrary, but when subjected to certain conditions can be predicted to a certain extent. This paper presents a novel way to predict this branching using Machine Learning. Firstly, it presents a way to preprocess the images such that the model may understand from the input, and learn some basic fundamentals required for predicting the branching. It then uses Catboost to train on these inputs and generates outputs which are later processed to give the final branching on the input image, with a good accuracy. Prediction of such intricate branching structures can be of great use in the coming future.

Keywords - Anisotropy, Hele Shaw, ML

Paper Code: 4851 **Track:** Mechanical Engineering

A SURVEY ON OPTIMIZING ENERGY DISTRIBUTION AT CHARGING STATIONS FOR PUBLIC TRANSPORT-ELECTRIC VEHICLES (EVs) FOR NAVI MUMBAI CITY, MAHARASHTRA, INDIA

Pranjal Jejurkar and Yogesh Gupta
University of Petroleum & Energy Studies, Dehradun, Uttarakhand

ABSTRACT

Following the Sustainable Development Goal (SDG) 7 towards affordable and clean energy, India has to adopt Electric Vehicles (EVs) as EVs generate fewer greenhouse gases (GHGs) than fuel based vehicles. From the study of the available literature, it is found that to encourage a shift to the use of electric public transport in urban areas, India has set a target of 80% three wheelers conversion into electric once by 2030. However, the biggest limitation to EVs is their need to recharge. At present, in India the power needed to recharge the EVs is based from the coal based power plants. Hence, substitute to coal based power like hydrogen fuel, solar energy, biofuels and wind power for charging EVs is the need to keep the promise of clean energy and zero emissions. In the present paper, a survey of the latest public transport automobile data and the charging stations, available and proposed, is carried out for Navi Mumbai city in Maharashtra. Vehicle categories along with their charging characteristics and charging demand on one typical EVCS is calculated and tabulated which will help for finding optimal integrated energy distribution. Eventually, the conclusion of this research will portray EVCS locations in the City along with its charging load depending on different combinations after integrating EVCS with renewable energy derived from solar, biogas and hydrogen Storage for effective E-Mobility Solutions across the City.

Keywords - Electric Vehicle Charging Station, Energy Optimization, Renewable Energy

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Paper Code: 5376 **Track:** Mechanical Engineering

A COMPARATIVE REVIEW OF BEVS AND HEVS ON THE TECHNICAL, ECONOMIC, AND ENVIRONMENTAL BASIS FOR SUSTAINABLE MOBILITY: CHALLENGES AND PROSPECTS IN INDIA

Abhijeet Digalwar[1], Manan Jain[1] and Prasanna Tillu[2]
[1]Birla Institute of Technology and Science, Pilani, Rajasthan, [2]Tata Motors Ltd., Engineering Research Centre, Pune

ABSTRACT

The transportation sector is the largest consumer of fossil fuels and a major cause of pollution and greenhouse gas (GHG) emissions in the world. Being a non-renewable source and not so environment-friendly nature of fossil fuels, shifting our dependencies to other energy sources which are environment friendly and economically scalable is the need of the hour. New developments in the automobile industry are mainly focused on Electric Vehicles (EVs) of various types. As a consequence, Internal Combustion Engine Vehicles (ICEVs) are left behind in the race. EVs offer a great deal to overcome many problems in this regard, but they come with new challenges too. Amidst all this, there are still uncertainties regarding the sustainable option for mobility, specifically in India, as per the current scenario. The answer is very subjective and depends on various factors. This paper attempts to identify the best possible means of mobility for consumers among the available option of Battery Electric Vehicles (BEVs) and Hybrid Electric Vehicles (HEVs), accounting for the various technical, economical, and environmental factors in the Indian context. This will be achieved by analyzing the various facts and comparing them on an equal platform.

Keywords - BEVs, HEVs, Sustainability, India

Paper Code: 5421 **Track:** Mechanical Engineering

MATHEMATICAL MODELLING AND ANALYSIS TO DERIVE OPTIMUM BRAKE PRESSURE FOR HILL START ASSIST SYSTEM IN COMMERCIAL VEHICLES

Anuj Kumar Shrivastava, Santosh Dalvi, Shreyas Mohite, Nainesh Lad, Sudarshan More, Abhishek Maske and Tanay Shigavan
Lokmanya Tilak College of Engineering, Navi Mumbai

ABSTRACT

Braking system is an integral part of automobile and so is for the commercial vehicles. Lag or delay in braking brings risk to the vehicle braking, efficiency and safety concern for the driver. At the hill starts and uphill, this becomes more dangerous. The Hill start assist is compounded along with the normal ABS system which can prevent roll backs on an inclination so that driver has a possibility to run safely when the brakes are actuated. The research wants to focus on the parameters which could help to improvise this and increase the brake efficiency. In this paper we would like to design and calculate optimum brake force required at various angles and then develop a MATLAB model to stimulate the results. This would help to make the system more efficient and prevent energy loss and reducing the dependency on the footbrake valve.

Keywords - Braking, Commercial Vehicle, ABS, Hill Start, brake force, efficiency

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Paper Code: 5899 **Track:** Mechanical Engineering

CONDITION MONITORING- AN EMERGING PREDICTIVE MAINTENANCE TECHNIQUE IN CONTINUOUS PROCESS PLANTS

Tanishq Kale, Divyesh Jilka, Aditya Thakkar and Parag Muley
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Condition Monitoring (CM) has emerged out as an indispensable technique for predictive maintenance in continuous process plants. This technique has enormous scope in thermal power stations, chemical and process industries such as steel, glass, and sugar plants etc. for assessment of equipment condition and diagnosis of root cause of abnormality, if any, in advance. This enables planned and effective plant maintenance to prevent unanticipated breakdown. Thus, the cost of maintenance and downtime are minimized and plant capacity utilization is increased to optimal. The present work includes a review of literature and case study as well as field study of various online and off-line CM techniques in practice at 250 x 2 MW Adani Dahanu Thermal Power Station (ADTPS) which includes vibration analysis, noise monitoring, oil condition monitoring, ultrasonic testing, motor current signature analysis etc. for critical plant equipment and auxiliaries such as Boiler Feed Water Pumps (BFWP), Primary Air (PA) and Forced Draught (FD) fans, turbines, motors, conveyors etc. The field study at ADTPS reveals that vibration analysis test for PA and FD fans indicated acceptable results of velocity (mm/s, RMS) as per ISO 10816-1 and acceleration values of 0.3-0.4 G. The present work also describes a proposed CM system using IOT for a single phase induction/synchronous motor along with the methodology and results of simulation test for the same.

Keywords - condition monitoring, predictive maintenance, vibration analysis, ultrasonic testing, thermal power plants, thermography, IOT

Paper Code: 5984 **Track:** Mechanical Engineering

FLOATING TRASH COLLECTOR 3D CAD MODEL: SUSTAINABLE SOLID WASTE MANAGEMENT FOR MUNICIPAL CORPORATIONS

Rupendra Nehete, Shivam Varade, Shubham Varade, Prayag Gorule and Aaris Saudagar
SIES Graduate School of Technology, Navi Mumbai

ABSTRACT

The presence of urban waste in still water bodies is increasing day by day as tonnes of waste products are being dumped by people in a direct or indirect way. The life of aquatic flora and fauna is in danger as well as the purity of water is being affected, which also causes an impact on human life. A solution to this social problem, a mechanically remote-controlled machine, has been presented and brought into reality. Hence, for the protection of the aquatic surroundings and environment, a new efficient prototype has been introduced which would contribute in a positive way to overcome these aquatic as well as human life problems. It will be widely used by municipal corporations for solid waste management.

Keywords - Aquadrone, Floating Trash Collector, Conveyor, Drone, Boat, Solid Waste Management, Remote Controlled

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Paper Code: 6243 **Track:** Mechanical Engineering

BANANA FIBER SANDWICH PANEL AS A GREEN ALTERNATIVE TO SYNTHETIC FOAMS FOR INSULATION IN TRANSPORTATION INDUSTRY

Ishani Prabhudesai and Nilesh Raykar
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Energy consumption owing to air conditioning systems in transportation is among the leading contributors to energy consumption in many metropolitan cities worldwide. Thermal insulation has been the most efficient remedy to reduce heat loss to the environment. Current materials used in insulation are usually polystyrene-based synthetic foams. Even though they have high performance, the environmental impact during their production is enormous. The purpose of this work is to design a natural fiber-based insulation panel offering better performance in terms of thermal conductivity than that of polyurethane foam. A new type of natural fiber sandwich panel using banana fiber is designed and configured to obtain desired values of thermal conductivity and compressive strength for different corrugation angles. A novel design using banana fibers is developed, which has a lower weight density and thermal conductivity than conventional extruded polystyrene (XPS) panels.

Keywords - Thermal Conductivity, Natural Fibers, Compression Strength, Transportation industry

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Paper Code: 6306 **Track:** Mechanical Engineering

IMPACT OF INSULATED ROOF ON ENERGY CONSUMPTION UNDER VARIABLE INDIAN CLIMATIC CONDITIONS: AN APPROACH TOWARD SUSTAINABLE BUILDINGS

Ruchita Shrimali, Naveen Kumar Agarwal and Kamal Kumar Agarwal
Sir Padampat Singhania University, Udaipur, Rajasthan

ABSTRACT

This study aims to determine the effects of insulating a building's roof with a composite insulation layer made up of seven different insulating materials stacked one on top of the other on the building's cooling load requirements in various climate zones in India. eQuest software is used to simulate the energy performance of residential buildings under various environmental circumstances. The outcome demonstrates that installing composite insulation on a building's roof greatly reduces the need for cooling and the magnitude of energy saved varies depending on the climate.

Keywords - Composite Insulation, Cooling Load, Energy Performance

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Paper Code: 6461 **Track:** Mechanical Engineering

THE TRANSIENT VIBRATION ANALYSIS OF SHAPE MEMORY ALLOY (SMA) REINFORCED COMPOSITE

Ranjit Patil[1], Santosh Rane[1] and Samir Kumbhar[2]
[1]Sardar Patel College of Engineering, Mumbai, [2]Rajarambapu Institute of Technology, Sangli, Maharashtra

ABSTRACT

Many civil, mechanical, and constructional systems must analyse and attenuate forced harmonic vibrations. Its useful resolution aids in the management of resonance, reduction of noise, an extension of system lifetime, and avoidance of structural fatigue disaster. Also, transient vibration analysis of structures is crucial in engineering practice for simulating real instances like aircraft wings, turbine blades, robot arms etc. SMA has advantages in dampening vibrations due to pseudoelastic behaviour, and hysteresis behaviour. To check the suitability of SMA composites for different applications, it is necessary to analyse their transient vibration response at different transformation temperatures of SMA. In this work, the SMA reinforced composite with viscoelastic material as matrix material is fabricated and tested for transient vibration response. Using suitable experimentation, the effect of SMA transformation temperature on transient and frequency response has been analysed. Response equation and MATLAB coding are used to create transient response curves at transformation temperatures. It has been observed that there is a significant effect of SMA transformation temperature on the transient vibration response of the composite. Also, the damping factor is found to be increased as austenite temperature affects viscoelastic matrix material.

Keywords - shape memory alloy (SMA), composite, transient vibration analysis, damping behaviour

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Paper Code: 6511 **Track:** Mechanical Engineering

MATERIAL FLOW OPTIMISATION FOR MULTISTAGE, MULTIPRODUCT PARALLEL LINES BY REAL CODED GENETIC ALGORITHM (RCGA)

Kailash Bhosale
Sanjivani College of Engineering, Kopargaon, Maharashtra

ABSTRACT

In the production planning phase, long-term decision problems are addressed. In this phase, the demand of the products is fulfilled by considering the production capacity, available time and available manpower. The demand of the products is determined by Monte-Carlo simulation method. The objective function is considered to minimise material flow time. A case study based on soap finishing line which is related to multistage, multiproduct parallel line is selected. The mathematical model is formulated as mixed integer nonlinear programming. The CPLEX optimisation solver is used to find the optimum solution.

Keywords - Production planning, Soap finishing line, mixed integer nonlinear programming

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Paper Code: 6742 **Track:** Mechanical Engineering

BATTERY PACK DESIGN AND THERMAL MANAGEMENT SYSTEM FOR FORMULA STUDENT ELECTRIC RACE CAR

Yash Kulkarni, Vinayak Chougule, Ankur Harge, Shantanu Kumbhar, Prachi Gadekar and Sagar Kadam
College of Engineering, Pune

ABSTRACT

Formula Student (FS) Competition provides a platform for engineering students to showcase their ability to conceptualize, design and produce a working model of a formula style race car. With aim to tackle growing concerns of fossil fuel stock, environmental impact and climate change, governments around the world are embracing new technologies. One such technology being electric vehicles (EV). In light of this push to move away from fossil fuels and to embrace electric technology, the host organization has put together a series of initiatives under the Formula Student banner to build a platform for students interested in switching to the Formula Student Electric category. But EVs is still in its nascent stage of development; and thus, the field is highly esoteric from student's point of view. Accumulator is one of the most important parts of an electric race car; it powers the entire car along with its tractive system. The paper demonstrates a simple approach at achieving a suitable battery design and its thermal management. Beginning with selection of suitable motor for drivetrain followed by estimation of energy requirement through MATLAB OpenLap simulation. Basis this requirement, a suitable cell configuration is designed. The battery pack is a potential source of heat generation and for its optimal performance during the race day, thermal management system is of utmost importance. A fan-based cooling system is devised to handle this heat load. This approach though not too complex provides a comprehensive method, right from motor selection to thermal system design for Formula Student racecar.

Keywords - Accumulator, battery pack, cell chemistry

Paper Code: 7063 **Track:** Mechanical Engineering

PERFORMANCE EVALUATION OF ELECTROLYTES USED IN ELECTRO CHEMICAL MACHINING OF TITANIUM BLOCK USING COMSOL TOOL

Devarpan Chakraborty[1], Ashish Pawar[1,2] and Dinesh Kamble[2]
[1]Dr. Vishwanath Karad MIT World Peace University, Pune, [2]Vishwakarma Institute Of Information Technology, Pune

ABSTRACT

ECM also known as Electro-Chemical-Machining is a Subtractive machining method which is generally used for more robust and rare metals, it can also be simplified as 'reverse electroplating' where the removal of material takes place instead of adding it. It is usually used for large production units and is used for machining tremendously hard materials or materials that are problematic to machine using orthodox methods. Electro-chemical machining is capable of machining both internal and external geometry. In comparison to conventional machining, it also offers a variety of advantages, including the capacity to create intricate geometrical patterns, smooth, crack-free surfaces, no-burr surfaces, little tool wear, and low energy consumption. Therefore, Electro Chemical machining is done to perform machining operation with less external force thus avoiding tool wear. As in electrolysis the medium plays a crucial role in the performance of the process, we would compare the performance results on the named electrolytes Sodium Chloride , Sodium Bromide , Sodium Nitrates on a titanium (Ti) block which is widely used for this process the evaluation would be done by simulations using the COMSOL software.

Keywords - Electrochemical machining, COMSOL software, Titanium block, sodium chloride, sodium bromide, sodium nitrate

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Paper Code: 7196 **Track:** Mechanical Engineering

COMPARISON OF TIME REQUIRED FOR SOLAR PV PLANT CLEANING WITH ROBOTIC AND MANUAL TECHNIQUE

Megha Nagrale[1], Suhail Niyaz Sayed[2] and Amit Nirmal[2]
[1]Sardar Patel College of Engineering, Mumbai, [2]Shirsh Technosolutions, Mumbai

ABSTRACT

It has been found that the accumulation of dust on photovoltaic panels can significantly reduce their output resulting in an increase in the cost of the electricity. There are several methods used to clean the solar PV panel. The PV cleaning system presented in this research paper is a straightforward alternative that addresses this issue effectively. This present work aimed to compare the time required for cleaning of solar pv panel system with manual and robotic technique. In the present study, an automated solar PV module cleaning system has been developed. The proposed design provides a durable, dependable, and automated cleaning mechanism for solar power plants. The robotic cleaning system was found less time consuming compared to the manual cleaning of the solar PV panel. It is found to be very difficult for manual cleaning to clean solar plants of higher capacity. Depending upon the size of the solar PV panel, it is found to be difficult to clean all surface area of the solar PV panel at the time of manual cleaning. The robotic cleaning system for a solar PV panel is found to be very effective for the solar PV power plants of higher capacity and located at remote locations.

Keywords - Photovoltaic (PV) Panel, Solar Energy, Robotic PV Cleaning, Solar Efficiency

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Paper Code: 7221 **Track:** Mechanical Engineering

DEVELOPMENT AND VALIDATION OF A STABILITY-INDICATING HPLC-UV METHOD FOR THE SIMULTANEOUS DETERMINATION OF ERYTHROMYCIN AND ITS RELATED IMPURITIES IN BULK DRUG FORMULATIONS

Nayan Gadhari[1], Suyog Patil[2], Sharad Upadhyay[1], Viswanath Patil[1], Kiran Bhole[3], Suresh Jadhav[4] and Jayram Gholave[3]

[1]Department of Chemistry, University of Mumbai, Mumbai, [2]Regional Forensic Science Laboratory, Biology Division, Aurangabad, Home Department, Government of Maharashtra, India, [3]Sardar Patel College of Engineering, Mumbai, [4]Veermata Jijabai Technological Institute, Mumbai

ABSTRACT

The daunting task of separting erythromycin (ERY A) with nine (known impurities), three (unknown impurities), and two unhydrolyzed synthetic intermediates had been achieved employing HPLC-UV. The hybrid silica-based RP C18 column at 55°C with isocratic elution of mobile phase (ammonium hydroxide/ammonia, t-butanol, and acetonitrile) in the ratio of 55:17:28 (v/v/v) at a flow-rate of 1.0 mL min-1 was utilized in the experiment. Forced degradation studies reveal that ERY A undergoes degradation under acidic and oxidative stress conditions. The resulting degradation products did not interfere with the detection of ERY A and its potential impurities which demonstrates the stability-indicating capability of this method. Method validation studies in respect of specificity, linearity, precision, accuracy, sensitivity and robustness were carried out in accordance with the International Conference on Harmonisation (ICH) guidelines. In comparison to the compendial methods given in the European Pharmacopoeia (Ph. Eur.) and the United States Pharmacopoeia (USP), the developed HPLC method has several merits in terms of selectivity, sensitivity, and robustness. The method was applied for purity assessment of ERY bulk drug samples as well as for assay of ERY in dosage formulations.

Keywords - Erythromycin, Bulk drugs, HPLC-UV, ERY A salts and impurities

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Paper Code: 7329 **Track:** Mechanical Engineering

A REVIEW ON RECENT TRENDS AND TECHNIQUES IN HEAT AND MASS TRANSFER OF METAL HYDRIDE HYDROGEN STORAGE REACTOR

Ajinkya Patil[1], S.V. Chaitanya[1] and Sharad Patil[2]

[1]AISSMS college of Engineering, Pune, [2]Rajarambapu Institute of Technology, Islampur, Maharashtra

ABSTRACT

Research on the transmission of heat and mass in relation to technologies for hydrogen storage are provided. Future energy needs are growing daily, and hydrogen is the perfect energy carrier to meet those needs. The key components of the hydrogen-based economy are production, purification, delivery, storage, and application. The most difficult obstacle to using hydrogen as a fuel is the development of methods for storing hydrogen. Hydrogen can be kept in solid state compounds, liquid and gaseous forms, as well as in gaseous form. Technologies for storing hydrogen include compression at high pressures of 700 bar or more, cryogenic liquefaction, physisorption, and absorption in the solid state using compounds like metal hydrides and complex hydrides. Storage of hydrogen in solid form compounds, which is safer and more effective than other methods, appears to be one of the most plausible alternatives. It does, however, entail extremely linked transport mechanisms like mass, heat, and chemical kinetics. Complex hydrides have significant advantages over traditional metal hydrides, making them suitable alternative hopefuls for solid state hydrogen storage. However, many of these hydrides exhibit both high thermodynamic stability and low kinetics. The use of catalysts and thermodynamic destabilization can, up to a point, solve such issues. Each storage method has serious heat transmission issues, according to earlier studies. These heat transfer issues, as well as potential fixes, are discussed in this review study, with a focus on Metal Hydride and three different hydrogen storage techniques. The usage of nanoparticles to improve the thermal conductivity of heat transfer fluid is another feature that is revealed. Each method examined has particular drawbacks, therefore none of them can fully meet the demands of a hydrogen-based economy.

Keywords - condition monitoring, predictive maintenance, vibration analysis, ultrasonic testing, thermal power plants, thermography, IOT

Paper Code: 7340 **Track:** Mechanical Engineering

IMPLEMENTATION OF INDUSTRY 4.0 IN INDIAN SME'S: A CONCEPTUAL MODEL

Ayush Raina[1], Harshal Panchal[1], Ayush Kakani[1], Pavan Nayar[1] and Anesh Raina[2]
[1]Dwarkadas J. Sanghvi College of Engineering, Mumbai, [2]Sardar Patel College of Engineering, Mumbai

ABSTRACT

Researchers are showing a growing interest in the implications of the technologies of Industry 4.0 on society. Societies are very concerned with achieving sustainable development for a variety of reasons, including the expansion of the world's population, the depletion of resources, the degradation of the environment, the limited availability of land, the growing consumption of food, and the management of waste. In this study, we investigate how Industry 4.0 might assist India's small and medium-sized enterprises (SMEs) in achieving sustainability both domestically and internationally. Achieving sustainability via accomplishment of the Sustainable Development Objectives (SDG), particularly the 9th and 12th goals, is the primary objective (Industry, innovation, infrastructure and responsible consumption & production). The Indian manufacturing industry is currently the primary focus of attention with regard to sustainable manufacturing. This includes the implementation of and frameworks pertaining to SME's, as well as the exploration of the individual, social, economic, and environmental factors that impact the organizational performances. This study will focus on developing a framework that will assist policymakers in putting into practice the technologies that are part of Industry 4.0.

Keywords - Industry 4.0, Sustainable Manufacturing, Indian SME's

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Paper Code: 7772 **Track:** Mechanical Engineering

TESSELLATION AND CFD ANALYSIS OF RADOME

Vishal Kurle, Dattatray Jadhav and Nilesh Raykar
Sardar Patel College of Engineering, Mumbai

ABSTRACT

A radome (a combination of radar and dome) is a structural, weatherproof enclosure that protects a radar antenna. The radome is made of a material that is invisible to radio waves. The radome protects the antenna from harsh weather and hides the antenna from view. The present work deals with the study of knowing the geometry of a radome and obtaining the shape and size of panels to suit manufacturing constrain. CFD analysis has been carried out on the radome to determine the pressure distribution, drag force, and lift force.

Keywords Radome, CFD analysis, Tessellation

Paper Code: 7779 **Track:** Mechanical Engineering

PASSIVE COOLING OF BUILDINGS - A REVIEW OF COOLING POTENTIAL OF AN EARTH AIR HEAT EXCHANGER IN INDIA

Swati Donde[1] and Ram Subhash Maurya[2]
[1]Mukesh Patel School of Technology Management and Engineering, Mumbai, [2]Sardar Patel College of Engineering, Mumbai

ABSTRACT

The world is facing problems with the issues of global warming and the depletion of fossil fuels. The construction industry in India is rapidly expanding, which will undoubtedly raise the demand for energy to maintain a comfortable climate in buildings. Thus, the ideal way to cut down on energy use would be to adopt passive cooling/heating methods. The earth air heat exchanger (EAHE) is a passive technique for creating comfortable conditions within a building. This paper discusses the many techniques employed by researchers to investigate its performance and application in various climatic conditions and soil types in India. This includes important research on the design of EAHE, experimental studies, parametric studies, and hybrid system design. It will provide light on the evolution of the EAHE system and its application in India.

Keywords - Earth Air Heat Exchanger, Passive Cooling, Thermal Performance, Hybrid System

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Paper Code: 7810 **Track:** Mechanical Engineering

TECHNICAL ANALYSIS OF SOLAR SCHEFFLER CONCENTRATOR FOR ITS ENERGY AVAILABILITY, AND THE WEATHER DATA CONDITIONS AT AL SEEB OMAN

Parimal Bhambare, Sudhir Chitrapady Vishweshwara and Varghese Manappallil Joy
College of Engineering, National University of Science and Technology, Muscat, Oman

ABSTRACT

This paper presents the weather data, solar insolation and Scheffler concentrator energy availability analysis at Al Seeb, which is one of the most populated regions in Muscat, Oman. This analysis is based on the data recorded using an all-in-one weather station installed at our institute. The solar insolation, wind velocity, and atmosphere temperature data have been analyzed and presented on a daily, monthly and yearly basis along with their minimum, maximum and average values. The solar thermal energy availability for the 16 m^2 standing type Fixed focus Scheffler concentrator has been assessed at Al Seeb, Muscat, Oman location. The loss of energy due to optical losses, tracking errors, mirror specular errors, mirror and receiver misalignments, etc., along with the aperture area calculations have been considered while estimating the available energy for the Scheffler concentrator. This analysis can be used for developing medium-temperature industrial applications in the region using Scheffler concentrators. The weather data and solar energy availability analysis presented in the paper may be useful to the designers to design solar and wind energy energy-based systems at the location. Apart from this, the information presented in the paper can also be useful to planners and contractors for the selection of energy systems and energy-related projects at the location.

Keywords - Weather data, Solar energy, Energy availability, Scheffler concentrator, Al Seeb Muscat

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Paper Code: 7811 **Track:** Mechanical Engineering

DESIGN AND SCRUTINIZE A TRELLIS FRAME USING DIFFERENT MATERIALS

Allen Pinto
Fr. Conceicao Rodrigues College of Engineering, Mumbai

ABSTRACT

Foundation on which machine parts rest is known as a frame. A skeleton on which all automotive parts like engine, gearbox, clutch, and suspensions are mounted and this skeleton which holds all these components is known as an automotive frame. It is required to note that any machine's design requires the consideration of aerodynamics, dynamics, thermodynamics, vibration analysis, stress analysis, Materials requirements, and providing the constraint of cost and durability. The work in this paper deals with the usage of materials like Aluminum 6061 and Steel AISI 4130. For our test, we are considered a trellis frame designed and modeled in fusion 360. After the modeling and design, the simulation is done on fusion 360. The simulation involves a static stress analysis involving maximum displacement, maximum strain, and maximum stress. This study involves comparing these materials and then finding a better material that is more feasible for real-world applications.

Keywords - Trellis Frame, Aluminum 6061, Steel AISI 4130, Static Analysis, Total Modal Displacement Analysis

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Paper Code: 7816 **Track:** Mechanical Engineering

GREEN PROTOCOL FOR THE SYNTHESIS OF BENZIMIDAZOLE DERIVATIVES AND ANTIPROLIFERATIVE ACTIVITY

Jayaram Gholave[1], Vitthal Shivankar[2], Paresh Gaikar[3], Nitin Mirgane[4], Kiran Bhole[1] and Gurumeet Wadhawa[3]
[1]Sardar Patel College of Engineering, Mumbai, [2]Rayat Shikshan Sansthas, Chhatrapati Shivaji College, Satara, Maharashtra, [3]Rayat Shikshan Sansthas, Karmaveer Bhaurao Patil College, Navi Mumbai, [4]SIES College of Arts, Science & Commerce, Mumbai

ABSTRACT

We have synthesized new Benzimidazole derivatives (2-((benzylthio)methyl)-1H-benzo[d]imidazol-1-yl) (4-chloropyridin-2-yl)methanone using green approach. The intermediates and final compounds were purified and characterized by IR, 1H NMR. The synthesized compounds shows better antiproliferative activity.

Keywords - Benzimidazoles, antiproliferative activity, Sonication

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Paper Code: 7941 **Track:** Mechanical Engineering

DESIGN OF RESILIENT SHOCK ABSORBER SYSTEM

Prakarsha Meshram, Sanchit Manhas, Jui Karmalkar and Nilesh Raykar
Sardar Patel College of Engineering, Mumbai

ABSTRACT

The design of resilient systems that can "bounce back" when deteriorated from their optimal performance level is an upcoming area of research. In the mechanical engineering domain, the integration of resilience in a system will increase the reusability of the system components and minimize the cost spent on single-use safety systems employed during an impact. This work focuses on the design of a novel shock absorbing system, which can be employed in machinery that will sustain the loads resulting from an impact. The design is influenced by the concept of Resilient Slip Friction Joint (RSFJ). In this paper, resilience is incorporated in the design of a friction damper type device which, at present, can be used to absorb impact energy in the range of 10J. The device is designed to regain its original position post-operation. A certain percentage of the total impact energy is absorbed via plastic deformation, some via elastic behavior of the device, and some by the system itself. The stiffness characteristics of the proposed design are assessed by simulating the system using a commercial finite element (FE) code. The design of the system is optimized for minimization of its weight by using a modified Powell Directional Search algorithm from the Mystic optimization framework. The deformations and stresses in the system due to the impact are evaluated using analytical and finite element methods. The proposed design is scalable with the assembly of multiple units of such devices to meet the different impact requirements.

Keywords - resilience, shock absorbers, impact, safety systems

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Paper Code: 8160 **Track:** Mechanical Engineering

INVESTIGATION OF OPEN POCKET 3D MILLING OF TI6AL4V BY GREY RELATIONAL APPROACH

Amit Patil[1], Vivek Sunnapwar[2], Kiran Bhole[1], Rohit Patel[3], Manas Bharambe[3] and Sachin Shinde[4]
[1]Sardar Patel College of Engineering, Mumbai, [2]Lokmanya Tilak College of Engineering, Navi Mumbai, [3]MET's Institute of Engineering, Nashik, Maharashtra, [4]Datta Meghe College of Engineering, Navi Mumbai

ABSTRACT

Titanium Alloy Grade 5 (Ti6Al4V) is a strong, lightweight, corrosion-resistant, and highly recommended material for various Aerospace components. The machining efficiency during milling is poor due to a lack of proper cooling and lubrication. Also, Ti6Al4V's sensitive metallurgy will affect the Material Removal Rate and Tool wear. The selection of shearing process parameters and proper cooling method is a crucial success in machining Ti6Al4V. The article explains the experimental investigation of open pocket milling under various cooling methods and shearing parameters through Taguchi Design of Experiments. The L9 orthogonal array combines cutting speed, feed, Depth of Cut, and Cooling methods in a systematic way. The investigation was conducted through Cavity milling Computer-Aided Machining strategy with PVD-TiAlN coated insert. The experimental results wear measured in terms of Average Surface Roughness, Flank, and Crater Wear. Investigation proves Nano Hybrid Flood Coolant + Cryogenic Air releases adequate lubrication and cooling. Consecutively reduction in the cutting tool wears is measured by scanning electron microscopy. The effective combination of process parameters viz. cutting speed = 60 m/min, feed rate = 0.19 mm/rev., axial depth of cut = 0.35 mm under Nano Hybrid Flood Coolant + Cryogenic Air is delving by Grey Relational Approach.

Keywords - Ti6Al4V, Open Pocket, Cavity milling, Hybrid Flood Coolant

Paper Code: 8231 **Track:** Mechanical Engineering

DEVELOPING A FRAMEWORK FOR INTERNATIONAL PROJECT RISK MANAGEMENT- A COMPARATIVE STUDY OF VARIOUS INTERNATIONAL STANDARDS

Rahul Dandage and Santosh Rane
Sardar Patel College of Engineering, Mumbai

ABSTRACT

Project Risk Management is identified as one of the significant Project Management knowledge areas. Effective risk management plays a crucial role in success of any project. International projects experience more critical risks than experienced by domestic projects. Variety of project risk management frameworks are recommended by global project management standards and associations. More than 20 project professionals were consulted for the risk management process practiced in their organizations. The feedbacks received from project risk professionals indicated that in practice, a standalone risk management framework may not work effectively. Hence, a combination of different risk management philosophies helps to manage the risks efficiently in international projects. There is a dearth of literature on developing a risk management framework based on variety of available global standards. This research paper examines nine different Project Risk Management frameworks recommended globally. Based on the comparison of these frameworks, a holistic Project risk management framework is developed using the Stage Gate approach. The inputs and outcomes identified for each stage of the project risk management framework will help the practitioners to take appropriate decisions at each Gate. The project risk management framework developed is conceptual and generic in nature. It's implementation in specific international projects can bring opportunities for further modifications and developments.

Keywords - Project Risk Management, International Projects, Stage Gate approach

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Paper Code: 8723 **Track:** Mechanical Engineering

STRENGTHEN OF CONSTRUCTION FILLER MATERIAL BRICK AND IT'S ENVIRONMENTAL IMPACT

Sandip Langade[1], Nandkumar Gilke[2] and Kashinath Patil[2]
[1]MIT Academy of Engineering, Alandi, Maharashtra, [2]K J Somaiya College of Engineering, Mumbai

ABSTRACT

The shelter is the basic need for humans. To fulfill this essential need large amount of natural and manmade resources are required. The weather conditions decide the construction material and its strength. The brick is major filler material and it is strengthened by the different methods based on the material used. This paper discusses the strengthening process of bagasse ash brick and the impact of various parameters on the strength of brick.

The compressive stress model was developed with bagasse ash weight percentage, the temperature of baking, and time for baking as input variables. The developed model was validated with the experimental results obtained. The maximum deviation observed between the model and experimental results was 19%.

Keywords - 'Baked Brick', 'Environmental', 'Carbon Foot Prints'

Paper Code: 8851 **Track:** Mechanical Engineering

INTEGRATION OF INTELLIGENT MANUFACTURING IN SMART FACTORIES AS PART OF INDUSTRY 4.0- A REVIEW

Sagar Joshi, Smit Mamaniya and Ruchit Shah
Dwarkadas J. Sanghvi College of Engineering, Mumbai

ABSTRACT

Industry 4.0 is a concept first originated in Germany in 2011. In recent years it has been a highly discussed topic of interest of various industries and is said to bring about a new revolution on the manufacturing side of the things. This paper introduces the relevant aspects of Industry 4.0 and reviews the work done by various researchers on it and how it involves to bring about a change using automation in the manufacturing industry by bringing together information technology with manufacturing that is Cyber Physical Systems and Internet of Things. Thus, this paper presents a literature review and identifies the characteristics and opportunities that Industry 4.0 brings along with it.

Keywords - Literature Review, Industry 4.0, Smart Factory, Intelligent Manufacturing, I4.0

Paper Code: 9250 **Track:** Mechanical Engineering

OPTIMIZATION OF DIESEL ENGINE CALIBRATION BY FUEL PUMP TO ENHANCE THE ENGINE POWER

Usha Pawar[1] and Bhushan Shinde[2]
[1]Datta Meghe College of Engineering, Navi Mumbai, [2]Alamuri Ratnamala Institute of Engineering and Technology, Shahapur, Thane, Maharashtra

ABSTRACT

In diesel engine the main four important system to run the engine that is 1. Air system 2. Fuel system 3. Lubrication oil system and 4. Cooling system. In this the main important system is Fuel system because fuel system supplies fuel as per engine requirement and to increase the engine Pressure, time and brake thermal efficiency and to achieve the exact parameter follow the below details. M/S Praga Marine PVT LTD (JNPT) and M/S Great Disha Ship India PVT LTD (MPT) they want their PT pump RPM 1500 to 1800 RPM and as per given application. In this project calibrated pump as per standard values. Set all the values as per their requirement and solved the problem immediately acted. Following procedure wise checked all the system each and every parts of fuel system and added spring and shims one by one , repaired and assemble pump with new gasket set and calibrated as per standard pump code data and fixed it to engine taken load trial all the parameter found extreme ok and solved their problem instant acted actively because Marine Industry time is like a diamond and gold so they are happy with my Instant work and on site work technique which mention below Methodology and calibration process.

Keywords - Pump pressure, Setting time, Brake thermal efficiency, Particulate matter

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Paper Code: 9543 **Track:** Mechanical Engineering

A SYSTEMATIC REVIEW ON INDUSTRY 4.0 TECHNOLOGIES IN MANUFACTURING AREA

Vivek Dahake[1,2] and Usha Pawar[2]
[1]Cummins India, Pune, [2]Datta Meghe College of Engineering, Navi Mumbai

ABSTRACT

Since "Industry 4.0" became a well-known name for the fourth industrial revolution, it has sparked significant discussion and been used in a variety of commercial settings. The idea builds on the advantages of the Internet and other technologies and demonstrates how workers might collaborate with computers in a "smart factory." Robotics, machine learning, and big data analytics can significantly enhance the entire supply chain. Many operations are made simpler by the interaction of the cloud (cloud), big data analytics (big data), and the Internet of Things (IoT). Discussions of other technologies, such block chain, are less prominent in the I4.0 setting, on the other hand. Based on this, we need to decide what research should be prioritized in order to better understand I4.0 in the manufacturing industry. In addition, practitioners looking to deploy one or more technologies may greatly benefit from the solutions to manufacturing-related challenges that may be gathered from the study's findings. In this study we explored the issues, advantages such as Enhanced Efficiency and Reduced Machine Downtime, Greater Efficiency and Disadvantages such as High Costs, Cyber security.

Keywords - Industry 4.0, Bigdata, Cloud, Manufacturing, IoT, Cyber

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Paper Code: 9573 **Track:** Mechanical Engineering

SIMULATION STUDY, SYNTHESIS AND TESTING OF CELL-PHONE PROTECTION COVER

Sachin Sawant, Yadnesh Chhatre, Aadesh Chawla and Vedant Chaware
Vishwakarma Institute of Technology, Pune

ABSTRACT

In today's technological world, everyone from small children to old people use a mobile phone. Cost of mobile phones is increasing day by day and dropping a mobile phone can be devastating. It can cause damage to the screen as well as internal connections which may result in improper functioning of the device. Our project is a simulation study and prototype designing of a cell phone protective cover which can reduce the impact on the device due to accidental drop. Drop test simulation plays a vital role to analyze the effect of impact on the device from accidental drop. Testing it actually is not economically feasible. Simulation of drop test of a mobile phone was conducted in ANSYS Workbench. Analyzing the simulation results and similar studies conducted helped in the prototype designing. Thus, few prototype designs are designed and executed in this project which will help to reduce the impact of the drops on the device.

Keywords - ANSYS, cell phone, drop test, synthesis, simulation

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Paper Code: 9601 **Track:** Mechanical Engineering

PERCEPTION SYSTEM IN AN AUTONOMOUS VEHICLE: A COMPREHENSIVE REVIEW

Nupur Avasare, Rutwik Bhangale, Sagar Patel and Vinit Joshi
Dwarkadas J. Sanghvi College of Engineering, Mumbai

ABSTRACT

Autonomous Vehicles are capable of driving on their own and making decisions based on signals received by various sensors that are integrated into the system. Sensors form the key element for receiving information in any driverless car. Autonomous cars can broadly be classified into 6 levels ranging from No Automation where sensors are used as warning systems only to Full Automation where the driver only must give inputs like the route and start the car, all other functions are handled by the car itself including the decision making. This review paper gives a brief description of the working of an Autonomous vehicle, SAE Levels of Automation, and different sensor technology used in autonomous vehicles.

Keywords - Autonomous car, Sensors, Automation, LiDAR, RADAR, IMU, GPS, Ultrasonic, CPU

Paper Code: 9609 **Track:** Mechanical Engineering

NUMERICAL ANALYSIS OF SOLAR FLOATS MADE OF LDPE FOR UPWIND CONDITION

Megha Nagrale[1], Prasad Kanedkhedkar[1] and Ashish Vajir[2]
[1]Sardar Patel College of Engineering, Mumbai, [2]Elite Renewtech Engineering, Mumbai

ABSTRACT

Drifting PV establishments are regularly built on inland colossal waterways, whether regular or man-made. The recommendations amalgamate a drifting mounting component that upholds solar photovoltaic modules above the water level with an edge comparable to the standard land-framed PV framework. The two most common kinds of photovoltaic-powered solar trackers easily accessible are the single-hub and double-hub. Single-axis solar-based trackers follow the sun from east to west while turning about a singular point. Double-axis solar-based trackers permit boards to screen the solar rays in two different axes. Single-axis solar-based trackers have majorly involved sun-powered trackers in India since they move east-west. When contrasted with a decent sunlight-based tracker mount board, single-pivot trackers are roughly 32.17 percent proficient. The Single axis and Double Axis Solar based trackers monitor the sun from the East direction to West Direction, guaranteeing harmonious power supply age over course of the day. Trackers give 15-16% greater yearly power than a static plant with a similar introduced limit. This is an occasional slant structure that is intended to meet the plan rules for slant points going from 5 to 15 degrees. During the season, manual shifting is performed. In view of the guideline of lightness productive and lightweight configuration, construct and recreate the mockup with lesser mass and minimum expense support materials for different outer burdens. Consider the Securing Productive Plan in view of the breeze and wave loads. The LDPE material plan will be exposed to Limited Component Study [FEA] and a weakness examination. The sun-powered floats ought to be built in a measured design to work with simple development and dismantling as well as transportation starting with one region and then onto the next.

Keywords - FEA (Finite Element Analysis), CFD (Computational Fluid Dynamics), PV (Photo Voltaic)

Paper Code: 9813 **Track:** Mechanical Engineering

KINETIC AND THERMODYNAMIC ANALYSIS OF MORINGA OLEIFERA SEED CAKE PYROLYSIS USING TG-DSC

N Tamilarasan, R Sakthivel and K Balaji
Amrita Vishwa Vidyapeetham (University), Coimbatore, Tamil Nadu

ABSTRACT

The present study aims to analyze the chemical kinetics and thermodynamic properties of Moringa oleifera (MO) seed cake pyrolysis using a thermogravimetric analyzer (TGA) and DSC. Kinetic properties such as activation energy and pre-exponential factor have been predicted from empirical data of MO seedcake decomposition. The reaction rate is determined by using the Arrhenius equation to understand the speed of the chemical reaction process. The frequency or pre-exponential factor is utilized to estimate the thermodynamic properties like change in enthalpy, change in entropy, and change in Gibbs free energy. It is observed that at a temperature of 317.86 C, a maximum derivative weight of 0.324%/oC is achieved, which implies the generation of maximum volatile elements during pyrolysis. Thermodynamic properties affirm the higher level of energy content in the MO seedcake. It is also inferred that the higher activation energy slows down the reaction rate of the chemical decomposition of MO seed cake.

Keywords - Moringa oleifera, Kinetics, Pyrolysis, Activation energy, Gibbs free energy, TGA

Paper Code: 9815 **Track:** Mechanical Engineering

EFFECT OF PISTON GEOMETRY ON COMBUSTION CHARACTERISTICS WITH AND WITHOUT EGR WHEN FUELED WITH METHYL ESTER IN VCR ENGINE

Shrikant Baste and Sudhakar Umale
Sardar Patel College of Engineering, Mumbai

ABSTRACT

In the current investigation, a 3.5kw compression ignition (CI) engine was fueled with behada, chicken fat, and turmeric oil methyl ester. The purpose of the current research was to explore the parameters of combustion such as cylinder combustion pressure, rates of pressure rise, net heat release rate, mean gas temperature, combustion duration, and combustion event time (crank angle). CI engine was modified by changing the piston head (square and tangential groove top) for methyl ester diesel blend operations. In the study diesel fuel is designated as B00 and methyl ester as B20. The influence of compression ratio (CR16 and CR18) with exhaust gas re-circulation (EGR 0% and EGR 10%) on combustion parameters was studied. Tangential groove top piston with compression ratio 18:1, EGR10%, and methyl ester B20, shows significant controlled and homogeneous combustion. Notable findings revealed a maximum cylinder pressure of 80 bar occurred at 40 milliseconds (ms) after the top dead center (aTDC) and the rate of pressure increases to 5.8 bar/deg when the piston is at the top dead center (TDC). Also, considerable heat release of 60 J/deg and a maximum mean gas temperature of 1750oC was recorded. The rise in the rate of pressure results in decreased ignition delay and combustion time. In addition, this method efficiently using B20 fuel with slight engine modification resulted in homogenous and clean combustion which will be helpful to reduce pollution.

Keywords - Methyl ester, Injection Pressure, Additive, Variable compression ratio

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Paper Code: 9885 **Track:** Mechanical Engineering

EFFECTS OF INJECTION PRESSURES ON BRAKE THERMAL EFFICIENCY AND SPECIFIC FUEL CONSUMPTION WHEN FUEL WITH METHYL ESTER

Shrikant Baste and Sudhakar Umale
Sardar Patel College of Engineering, Mumbai

ABSTRACT

In this present study, the effect of injection pressure on brake thermal efficiency and specific fuel consumption was studied. Compression ignition engine has been experimentally examined using trinity blends of methyl ester as the fuel. In the experimentation, the combination of behada, chicken fat oil, and turmeric oil along with diesel was used. Methyl esters in internal combustion engine are examined in terms of engine power by utilizing fuel mixes with varying injection pressures (210, 225, and 250 bars) under load conditions (0, 4, 8, 12.3, and 15 kg). Variable engine load and injection pressure for blends of methyl ester fuels produced superior burning and functional properties. Methyl ester is characterized by reduced engine load and rate of heat release. Methyl ester has better effective fuel combustion than diesel, although it has poor brake thermal efficiency. Increasing the injection pressure improves the result in burning fuel and brake thermal efficiency than the initial inlet pressure.

Keywords - Methyl ester, Injection Pressure, Additive, Variable compression ratio

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Paper Code: 9888 **Track:** Mechanical Engineering

MACHINE LEARNING BASED PREDICTION OF FATIGUE CRACK GROWTH RATE IN CARBON STEEL

Avdhoot Lendhe and Nilesh Raykar
Sardar Patel College of Engineering, Mumbai

ABSTRACT

There are various models out there, both theoretical and experimental, which are used to predict the fatigue crack growth in metals. Machine learning based computational models have been recently developed to predict such crack growth rate in a more comprehensive manner. This paper presents a supervised machine learning model with a better accuracy than the existing machine learning models. The experimental data obtained from the fatigue test carried out on CT specimen of material SA516Gr70 is used to test and train the model. The machine learning model XGBoost, which is implemented in this paper, is not only more accurate but also less likely to over fit when exposed to unseen data. Three alternative algorithms are investigated and by the process of elimination, best one is chosen. The paper shows the results received from some of those models, which were important in order to select the best one. The metrics used to filter and tune the model's performance are R2 score and mean squared error. The procedure for finding the optimal model and its results have been discussed.

Keywords - Fatigue Crack Growth Rate, Machine Learning, XGBoost

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Paper Code: 618 **Track:** Computer Science and Engineering

EXPERIMENTAL APPROACH FOR ANALYZING THE ALGORITHM WITH CAMERA ON DISTRACTED DRIVING ALGORITHMS BY USING IMAGE RECOGNITION MODELS

Brijesh Patil[1] and Dr Divya Midhunchakkaravarthy[2]
[1]Zensar, [2]Lincoln University College, Malaysia.

ABSTRACT

Distracted driving is a massive issue. Distracted driving is thought to be one of the leading causes of crashes, thanks to the increased usage of electronic gadgets. The numerous studies in the subject of distracted driving primarily aim to create a setting in which it is possible to determine whether the driver is in distracted driving mode or not. This research primarily focuses on using a camera to identify visual and physical distractions while driving and developing a gadget that can aid in accident prevention. The goal of this project is to determine if a person is distracted or not, to issue an alarm when distracted driving is discovered, and to manage the vehicle's movements following detection.

Keywords - Machine Learning, Monitoring system, Image Recognition

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Paper Code: 657 **Track:** Computer Science and Engineering

RESOURCE PROVISIONING FOR WORKFLOW BASED APPLICATION IN CLOUD PLATFORM USING OPTIMIZATION TECHNIQUES

Sangita Jaybhaye[1], Vahida Attar[2] and Bharti Vasgi[3]
[1]VIT, Pune, [2]COEP Technological University, [3]MMCOE

ABSTRACT

The service quality and execution cost are the most important concern for workflow execution in cloud computing. Resource provisioning is a solution to find a best suitable resource. It needs inclusive resource management that manages both computational and network resources. An effective budgetary schedule reduces the use of excessive assets. In distributed computing multi-target planning of logical dependent applications is expanding research considerations. Workflow scheduling algorithms serve utility functions for different users such as optimizing cost, time, and utilization. In this paper, the IBM Cplex Optimization Toolkit is used to map resources and improve output response within a given deadline. Amazon elastic cloud computing costing is used to analyze the model. The proposed approach gives better execution by optimizing the execution cost of workflow within the stipulated time.

Keywords - Scientific workflow, Resource Optimization, Cloud computing, Constraint Programming, Optimization modeling, Resource provisioning, Resource mapping

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Paper Code: 739 **Track:** Computer Science and Engineering

HUMAN FOLLOWING ROBOT

Parth Sheth, Shital Sobale, Kaustubh Paralkar, Dhananjay Pawal, Ram Mandhana and Atharva Pathak
Vishwakarma Institute of Technology

ABSTRACT

This paper depicts the project which is 'Human following Robot'- A prototype of a robot that can assist us in a variety of ways, such as transporting objects, working with greater accuracy in less time, and performing other tasks. In emergency situations, a robot that can assist us in the hospital or bring medical supplies will be more useful to a doctor. This type of robot has numerous advantages and will be beneficial in the future. This type of robot is quite likely to be near to humans. This robot aims to find the proper person or object to follow. For this, we have used ultrasonic and infrared sensors to move the robot in the forward direction and turn left and right respectively. For the movement of the robot, we wrote a code using Arduino IDE. We propose a prototype that incorporates an Arduino Uno and basic sensors such as an ultrasonic and infrared sensor in this paper.

Keywords - Arduino Microcontroller, Arduino Uno, Artificial Intelligence, DC gear motor, Human following, Human tracking, Infrared sensor, IR Sensor, Robot, Ultrasonic sensor

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Paper Code: 971 **Track:** Computer Science and Engineering

CLASSIFICATION OF BRAIN TUMOR USING TRANSFER LEARNING :A REVIEW

Rashmi Jolhe and Dr. Sudhirkumar Savarkar
Datta Meghe College of Engineering, Airoli

ABSTRACT

Brain tumor is abnormal mass of cells in the brain which may cause discomfort in the brain or any part of the body. The study of brain tumours has drawn a lot of interest from researchers in recent years. Clinical staff can rely on computer-based diagnostic techniques to identify brain tumours early, predict stand-alone warnings, and treat patients early, boosting their odds of survival. However, it is difficult and time consuming task to accurately diagnose brain tumor from MRI images. MRI (Magnetic Resonance Imaging) is a medical imaging technique that visualises the soft tissues of the human body and provides a wealth of information that aids in the diagnosis of brain tumor. In this paper, the review of different techniques based on transfer learning with MRI images along with their accuracies are given. It is anticipated that the shortcomings will be addressed in the future in order to provide dependable and accurate diagnostic systems.

Keywords - Brain Tumor Classification, Magnetic Resonance Imaging (MRI), Tumor Detection.

Paper Code: 1141 **Track:** Computer Science and Engineering

SELECTIVE TILING FOR ENHANCING MULTICLASS SMALL OBJECT DETECTION ON HIGH-RESOLUTION REMOTE SENSING IMAGES

Krishiv Dakwala and Shweta Dharmadhikari
Pune Institute of Computer Technology

ABSTRACT

Object Detection has been one of the major areas of development in deep learning and computer vision. Various CNN-based architectures have emerged in recent times having high accuracies and precision. These architectures are generally trained on low-resolution images. The advancement of camera technologies has resulted in increased resolution of images. Taking an example of remote sensing images captured from drones or satellites, these images can have resolutions as high as 15-meter i.e., each pixel represents a 15-meter by 15-meter square on the ground. These images generally have a small ROI (Region of interest) or small objects of interest. The main issue with the above-mentioned architectures is the computational requirements. To train a model on such high-resolution images, we need very powerful GPUs with huge memories. To tackle this problem, image tiling was traditionally used. A high-resolution image was broken down into patches of fixed size and then passed for training. In this paper, we propose a method to improve upon the existing tiling approach. This approach aims on improving the accuracy of the model.

Keywords - Computer Vision, Deep Learning, Artificial Intelligence, Deep Neural Networks, Convolutional Neural Networks

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Paper Code: 1462 **Track:** Computer Science and Engineering

IMPLEMENTATION OF HYBRID PROGRAMMING APPROACH USING PYTHON FOR CROSS PLATFORMS MOBILE AND WEB APPLICATION IN CLOUD ENVIRONMENT

Mihir Panchal, Prinkal Doshi and Neeta Kadukar
Shri Bhagubhai Mafatlal Polytechnic

ABSTRACT

Mobile and Web applications are used worldwide by individuals with drastic and emerging needs of data management and productivity. As a matter of fact, many mobile and web applications are developed in needs of individuals across the globe.These needs comprises of a number of fields like security, communication, entertainment, shopping, social media, etc. With the increasing demand of these needs and development of new fields in future, development of these mobile and web applications must fulfill them. As of now, rapid and agile development of mobile and web application along with platform independency for users is in demand. Along with that, access of these services anywhere, anytime, anyplace is also a need for end users and as and when required end user can enjoy the services. In order to provide these services technologies like Python can be integrated with Dart and frontend frameworks like Vue.js can be used in a cloud environment. In this paper, we have ventured upon the architecture for hybrid programming of python with mobile and web application technologies in a cloud environment.Likewise , we have presented in depth comparison and layers of mobile and web application technologies. This paper provides implementation of the proposed architecture by using hybrid programming.

Keywords - Cloud Computing, Flutter, Vue.js, Dart, Python, Hybrid Programming, JavaScript, Django, DartPy

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Paper Code: 1802 **Track:** Computer Science and Engineering

URBAN SOUND CLASSIFICATION USING ANN

Harshavardhan K S and Mahesh Sp
RV College of Engineering

ABSTRACT

The importance of the integration of artificial intelligence with the applications in use can be widely seen in today's technology. Audio is a key characteristic in this integration as it plays an important role in critical surveillance systems and driverless cars. The paper aims to provide an urban sound classification model that classifies different sounds appropriately. Most of the existing systems in the market have an efficiency and an architecture that can be points of concern when applied in the market. This paper takes advantage of the deep learning techniques to classify the different sounds in an urban environment. The coefficients extracted using the MFCC technique are used to train the proposed ANN model as the working of the MFCC closely resembles the working of the human ear. The Urban Sound 8k dataset has been used for this paper with 80% of the data allotted for training and the remaining 20% for testing. The achieved accuracy of this paper is 87%. From these results, it is safe to conclude that the proposed approach for sound classification can be efficiently used to develop sound classification and other audio dependent systems which can be implemented in the real world.

Keywords - Artificial Neural Networks, Sound Classification, Machine Learning, MFCC, Spectogram, Convoluted Neural Networks

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Paper Code: 1951 **Track:** Computer Science and Engineering

FACE RECOGNITION USING LBPH, HAAR CASCADE CLASSIFIER AND BACK PROPAGATION NEURAL NETWORK

Dr. Priya Chandran, Dr. Suhasini Vijaykumar, Shravani Pawar and Sudeshna Roy
Bharati Vidyapeeth's Institute of Management and Information Technology

ABSTRACT

Human face recognition is an important research area in the field of image processing. Due to its application potential in many areas, extensive research is going on this area to improve the accuracy of face recognition. In this paper, we have proposed a framework with two approaches to recognize the countenances inside the image. In the first approach we have used the modified LBPH with Haar cascade classifier. The improvement in this method is done by taking mean of the distance measures Euclidian, Manhattan and Canberra distance rather than using the traditional method of single distance measure. In the second approach, back propagation classifier is used to train the face image dataset. The proposed face recognition methods were implemented in python. The experimental results show that the BPNN classification achieved a good recognition rate compared to the modified LBPH and Haar cascade classifier approach.

Keywords - LBPH, Haar Cascade, BPNN, Face recognition, Feature Extraction

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Paper Code: 2243 **Track:** Computer Science and Engineering

PERFORMANCE COMPARISON OF VARIOUS SHORTEST-PATH ROUTING ALGORITHMS IN SDN

Deepak Kumar and Jawahar Thakur
Himachal Pradesh University.

ABSTRACT

Objectives: To make routing efficient by having high throughput and low end-to-end latency in an SDN environment. Methods: To implement this research, we adopted the Abilene topology. A comparison was made between Dijkstra (Dij-SDN), Extended Dijkstra (EDij-SDN), and Modified Extended Dijkstra (MEDij-SDN) based on their performances on two parameters, namely throughput, and latency. Findings: To emulate this research in mininet the Abilene topology consists of 16 hosts, 18 switches, and one RYU controller. All shortest path algorithms Dij-SDN, EDij-SDN, and MEDij-SDN have been run separately one by one for the duration of 120 seconds. Later, the performance metrics were compared based on TCP throughput and end-to-end latency. Novelty: Our research work is novel because previous studies have implemented the above algorithms using different controllers .i.e Floodlight, POX. The research work done in this paper follows RYU python-based controller, and it is the most efficient among all available SDN controllers. Because using the RYU throughput and latency results are better than the previous study's results obtained from different controllers. Application/Improvements: The research work done in this article can be extended to improve load balancing and security across routing links using nature-inspired algorithms like PSO (particle Swarm Optimization). There is a scope for exploring and implementing deep learning-supported QoS-based routing optimization. In recent times, research studies have been done in the field of Security, Load-balancing, routing optimization, and scalability.

Keywords - Dijkstra, Latency, OpenFlow, Performance, RYU, Throughput

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Paper Code: 2370 **Track:** Computer Science and Engineering

SMART WALKING STICK : A COMPREHENSIVE APPROACH TOWARDS IOT ENABLED STICK FOR VISUALLY IMPAIRED

Jazib Dawre, Ishita Kheria, Jay Jani, Jay Doshi and Ramchandra Mangrulkar
Dwarkadas J. Sanghvi College Of Engineering

ABSTRACT

According to the world health center, there are an estimated 36 million visually impaired people, most of them belonging to developing and underdeveloped countries. Many blind people in these countries rely on other people or guide dogs for assistance in their daily routine travel. This paper proposes a smart walking stick based on Raspberry Pi, Arduino, Infrared sensors and Ultrasonic sensors. Various electronic devices have been developed for blind people, but most of them cannot function due to the lack of infrastructure in these countries, as well as the prohibitive cost. Therefore, the paper sought to develop a cheap and workable alternative for these developing and underdeveloped countries. The paper proposes a light walking stick that integrates sensors and micro-controllers. Moreover, the proposed stick is also equipped with a built-in GPS system and includes an alert button that, when pressed, sends a SOS message along with the user's location to saved contacts.

Keywords - IoT, Visually Impaired, Raspberry Pi, Arduino, Computer Vision

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Paper Code: 2521 **Track:** Computer Science and Engineering

EMERGENCE OF CAPSULE NETWORK FOR AUTOMATIC MEDICAL DISEASE CLASSIFICATION

Sulbha Yadav[1] and Sudhir Dhage[2]
[1]Lokmanya Tilak College Of Engg. Koparkhairane, [2]Sardar Patel Institute of Technology, Mumbai.

ABSTRACT

Modern methods for classifying Medical diseases make use of deep convolutional neural networks (CNNs). To achieve strong generalization, these networks need a lot of training examples since they are ineffective at encoding the part-whole links. In place of CNNs, recent studies suggest an effective variation of capsule networks (CapsNets). Automatic medical disease classification using images of different modalities has received significant attention recently. We conduct the systematic study of CapsNets for automatic medical disease classification using medical images. We present the architecture and design of CapsNets with its different phases. The review of recent CapsNets-based studies presented a comparative analysis. The outcome of this paper is the current progress of CapsNets for medical disease classification and its challenges.

Keywords - Automatic disease classification, capsule network, convolutional neural network, deep learning, medical imaging

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Paper Code: 3169 **Track:** Computer Science and Engineering

AMIGO : MY VIRTUAL FRIEND - DIGITAL DIARY USING SENTIMENT ANALYSIS

Mannat Doultani, Jahnavi Mulchandani, Shruti Koku, Aryan Gupta and Ruchika Dusija
Vivekanand Education Society's Institute of Technology

ABSTRACT

India is one of the countries in the world with the highest rates of mental illness. As a consequence of the COVID-19 pandemic, 20 percent of the population is likely to be affected by some kind of mental health disorder. Around 56 million Indians struggle with depression, and 38 million have an anxiety illness of some kind. Although there is a clear need of assistance with such issues, there are only 3 psychiatrists and psychologists for every 100000 people in India. In the age of Artificial Intelligence, attempts are being made to develop smart systems that can aid medical professionals to cater to the increasing number of patients requiring assistance with mental health issues. The automatic extraction of positive or negative attitude expressions from text, known as sentiment analysis, has drawn a lot of attention from researchers in the last ten years. This technique is currently being used by social networking companies like Twitter, Instagram, Facebook, etc. to identify how their users are feeling based on their comments and posts in order to present them with targeted content in the form of advertisements and promotional posts. The same techniques can be extended to predict moods of individuals on a daily basis and use the records to depict the alterations over different periods of time. This can be of great use to individuals and healthcare professionals to keep track of behavioral changes and maintain a routine of self check-ins. In this paper, we have made use of the Long Short Term Memory model, which is a deep learning approach, to carry out sentiment analysis and have integrated it into a web application which is an artificially intelligent digital diary called 'Amigo: My Virtual Friend.'

Keywords - Sentiment analysis, Long short term memory model, mood prediction, deep learning, natural language processing

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Paper Code: 3316 **Track:** Computer Science and Engineering

ACTION RECOGNITION ON AMERICAN SIGN LANGUAGE USING DEEP LEARNING

Rishabh Bhargava, Shubh Nisar, Tanay Naik, Ravikumar Pandey and Pranit Bari
Dwarkadas J. Sanghvi College of Engineering.

ABSTRACT

People who are hard of hearing use sign language to reinforce knowledge they acquire in everyday interactions and to convey their thoughts and feelings. Even though they represent a large portion of any population, the majority of people are unable to communicate with them because they have little to no understanding of sign languages. The goal of sign language recognition is to recognize, evaluate, and comprehend the important hand and body movements. By bridging the deaf community's current communication gap with the rest of society, automatic sign language recognition offers better services to the deaf community. Such devices might save the lives of hearing-impaired individuals who are in life-threatening circumstances like cardiac arrest, crashes, accidents, etc. In this work, deep learning-based models for sign language gesture recognition are created to precisely anticipate the American Sign Language emergency signs (ASL). The collection includes the movies for eight distinct emergency scenarios glosses. The different models used for the study are CNN, LSTM, CNN with LSTM, BiLSTM and LCRN.

Keywords - Action Recognition, Deep Learning, American Sign Language, Recurrent Neural Networks, Convolutional Neural Networks, LSTM, BiLSTM, LCRN

Paper Code: 3518 **Track:** Computer Science and Engineering

GC-PC [GESTURE SENSING AND CONTROL SYSTEM FOR PCS]

Surabhi Kakade, Pritam Shinde, Pratiksha Shinde, Shobit Shinde, Sanket Shinde and Suyash Shinde
Vishwakarma Institute Of Technology, Pune

ABSTRACT

Easy and effortless interface between humans and computers [HCI] is a need of today's world. We see it around us that people operate smartphones by Hand gestures for e.g. showing their palms to auto-click a photograph; this auto-operating system is not seen in PCs or laptops to interact. Ultrasonic sensors along with the Arduino UNO board and Python coding provide a cost effective, reliable and smart solution for the problem. This project makes it possible to control one's pc or laptop remotely by sensing natural gestures and perform operations on one's desired commands.

Keywords - Hand Gesture, Ultrasonic Sensor, Arduino UNO, HCI [Human Computer Interaction], Python

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Paper Code: 4022 **Track:** Computer Science and Engineering

MEDICINAL PLANT SPECIES IDENTIFICATION WITH EXPLAINABILITY USING LIME

Ameya Ranade, Mihir Nikam, Rushil Patel, Aarti Karande and Prachi Dalvi
Sardar Patel Institute of Technology

ABSTRACT

Plant identification has a wide array of applications in the fields of agronomy and the discovery of natural and medicinal products. This research aims to explore various deep learning techniques like InceptionV3, Xpection, and ResNet to identify plants. Highly accurate machine learning models generally lack explainability and interpretability. Neural networks are usually opaque systems and thus a direct understanding of the interpretations becomes necessary. We aim to remove this ambiguity of how the model reaches its conclusion by introducing Explainable AI (XAI) techniques. Explainability aims to break such barriers by diminishing the lack of transparency in Artificial Intelligence and Machine Learning models, thus taking a step toward making AI reliable. In this paper, Convolutional Neural Network has been used to identify Vietnamese medicinal plant images based on the characteristics of the leaves, stems and other parts of the plant. Upon identification, our paper also elaborates on how each model predicts which part of the image helps the CNN model to make a prediction by integrating Explainable AI (XAI) using the Lime package. Through this research, we generated images using LIME package which highlight pixels that determine the result of our plant identification process.

Keywords - Medicinal Plants Classification, Explainable Artificial Intelligence (XAI), Convolutional Neural Network, Deep Neural Network, InceptionV3, Xpection, ResNet

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Paper Code: 4111 **Track:** Computer Science and Engineering

SPEECH SYNTHESIS FOR MARATHI LANGUAGE USING SYLLABIC APPROACH

Dr. Soumitra Das
Indira College of Engineering and Management

ABSTRACT

A new syllabic methodology for synthesizing speech is described in this work. The goal of a Marathi Language text to voice system is to translate a given text into a spoken waveform. Text to speech is made up of two main components: text processing and speech production. The syllabic technique involves separating a word into syllabic clusters for the benefit of simplicity and naturalness in speaking, as long as the splitting is flawless and precise. A syllable is a component of a word that is continuously pronounced. It's a group of syllables or letters that appear together in a sentence. When we use the syllabic strategy to break down a word, we get the following information: how long to pronounce each letter, where to pause, and where to emphasize. The fundamental units of the Marathi language are aksharas, which are represented by the letters C for Consonant and V for Vowel. In Marathi, there are 37 Consonants and 14 Vowels, as well as unique characters such Anuswar, Rafar, and Visarg. To break the word down into syllabic clusters, we must first discover the correct structure of the word. Every word has two structures: CV (Consonants Vowel) and PH (Phonetic). CV and PH are extremely important in establishing whether or not a rule has been broken. This strategy produces positive outcomes in terms of accuracy and training duration.

Keywords - Synthesizing Speech, Text to Speech, Marathi Syllabic approach, Vowel, Phonetic

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Paper Code: 4283 **Track:** Computer Science and Engineering

GEOMETRICALLY TRANSFORMED LATENT SPACE RECONSTRUCTED COEFFICIENTS FOR IMAGE DATA AUGMENTATION

Vaishali Suryawanshi and Tanuja Sarode
Thadomal Shahani Engineering College

ABSTRACT

Image classification using deep learning based Convolutional Neural Network (CNN) is a classical task that engaged many researchers primarily due to its applications in various fields such as medical sciences, agriculture etc. Deeper neural network requires huge amount of data for training else result in poor performance on validation set. Scarcity of data is a common issue in many fields including medical image analysis where huge datasets are not available due to manual effort of labeling, confidentiality issue or lack of expertise. Many Image Data Augmentation (IDA) methods are proposed in the literature mostly based on the geometric transformations, and recently Generative Adversarial Networks (GAN) based approaches. In this paper, a hybrid method applying geometrical transformations on reconstructed latent space coefficients are used for image data augmentation. The proposed technique is evaluated using the confusion matrix-based evaluation parameters. Significant improvement in performance is observed with the proposed technique resulting in better generation ability when the VGG16 model is trained on Cifar-10 dataset.

Keywords - Image Data Augmentation, Latent Space, MCC, Image Classification, Generalization, Overfitting

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Paper Code: 4335 **Track:** Computer Science and Engineering

HEALTH-BOT : A CONVERSATIONAL AND PERSONALISED CHATBOT LEVERAGING NLP

Rishi Kaul, Khushi Jashnani, Priyav Mehta and Sudhir Dhage
Sardar Patel Institute of Technology

ABSTRACT

India with a population of over 1.2 billion people, has a challenging task to provide quality healthcare to its citizens. Although healthcare is free for everyone in the public sector, there arise many issues ranging from staff shortages to long waiting times for appointments. The high rate of illiteracy makes it difficult for patients belonging to socially and economically backward classes to understand medical reports which forces them to make multiple visits to doctors. The challenges of healthcare accessibility, affordability and absence of healthcare workers are important challenges to be dealt with. We thus propose a conversational chatbot with multilingual support, based on Natural Language Understanding to process their queries and provide them with relevant medical information. Thus, through our solution we aim to address the challenges faced by the public healthcare system.

Keywords - chatbot, conversational AI, Rasa, health-care, virtual assistant, NLP

Paper Code: 4426 **Track:** Computer Science and Engineering

APPROACHING AI DRIVEN HAND GESTURE RECOGNITION

Sai Murali Marisetty, Sireesha Yalla, Raja Subramanian R, Sai Seetha Ramakrishnamacharyulu Vedala, Satya Praveen Kumar Reddy Yalla and Raja Sudharsan R
Kalasalingam Academy of Research and Education

ABSTRACT

The ponder of how people and computers associated is known as human-computer interaction (HCI). Hand motions are a marvelous approach to communicate with those who do not comprehend what we're saying, particularly when they do not. It is additionally an basic component of human-computer interaction. Understanding hand signals is basic for guaranteeing that the gathering of people knows what the speaker is endeavoring to communicate or that the computer gets it what we are saying. The main idea of this project is to try different approaches to hand gesture recognition. In this project we work first with radar data and then with camera sensor to achieve hand gesture recognition. We first attempted to construct hand gesture recognition using radar data, and because most people don't know sign language and there aren't many translators, we developed a real-time technique for American Sign Language based on neural network finger spelling, followed by another model with media Pipe. We present a complex neural network (CNN) technique for detecting human hand motions from camera-recorded pictures. The goal is to distinguish human activity hand motions from camera photos. Skin models, hand position, and orientation were used to generate the CNN's training and test data. The hand first passes through the filter, and then it passes through a classifier that predicts the type of hand motion. The hand position is intended to transform and rotate the image of the hand in a neutral position. Then train the CNN with the corrected image. We used machine learning, deep learning, and computer vision to create this model. Our Media Pipe model works well to detect different gestures.

Keywords - Deep Learning, CNN, Machine Learning, Radar, Media Pipe, HCI, RNN, Sign Language

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Paper Code: 4479 **Track:** Computer Science and Engineering

A REVIEW PAPER ON EFFICIENT MEMORY ALLOCATOR WITH VIRTUAL MEMORY PAGING DEMONSTRATOR

Kuldeep Vayadande, Vishwam Talnikar, Shubham Mulay, Dnyaneshwari Navale, Akhilesh Nawale and Vishal Sonkusale
Vishwakarma Institute of technology,Pune

ABSTRACT

The primary goal of this study is to create a memory allocator which shows whether that memory is free or not. There are many algorithms for implementing this allocator, in this study we have algorithms like first fit, best fit, worst fit. The programs are assigned memory to block based on their task. The memory is released and given to another programme or combined with the main memory after the operation of the programme is complete or it is idle. The paper also compares the suggested algorithm with a paging simulator. This study also includes paging methods for memory allocation algorithms like LIFO, OPT, LRU, LFU. Some basic information about this study contains some basic information about simulation which consists of reference string, number of physical and virtual frames, and different types of algorithms used. This study also shows state of physical memory at end of each state including which frame is present and which frame is removed. We also added existing system as well as comparison table in this study.

Keywords - Memory Allocation, Paging Demonstrator, Memory Paging, Memory Block, Memory Chunk

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Paper Code: 4591 **Track:** Computer Science and Engineering

DEEP LEARNING APPROACH FOR AUTO COUNTING COMPLEX PLANTS

Vijay Kumar Balla and Ramesh Cheripelli
G Narayanamma institute of technology and science

ABSTRACT

In order to address the issues affecting crops and their productivity, plant phenotyping is one of the emerging research topics that requires attention. In this paper, we use Convolutional Neural Networks architecture to count the plants in agricultural areas. Regression is used in place of classification to estimate the number of plants in a field photograph. This eliminates the requirement to know (or estimate) the maximum anticipated number of plants. The CNN will be trained on these images and evaluated using them. Our tests demonstrate that using the Inception-v3 CNN architecture, we can get a Mean Error as low as possible.

Keywords - Plant Count, Deep learning, Phenotyping, Neural Network, Regression

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Paper Code: 4623 **Track:** Computer Science and Engineering

CONVOLUTIONAL NEURAL NETWORK ARCHITECTURES FOR FATTY LIVER DISEASE DETECTION

Shaun Almeida, Hirtika Mirghani and Maniroja Edinburgh
Thadomal Shahani Engineering College

ABSTRACT

In the field of healthcare, nonalcoholic fatty liver disease (NAFLD) is the commonly occurring liver disease in both adults and adolescents all over the world. So far, improvements in technology have led to more efficient methods of liver disease detection which help to identify an appropriate treatment for the disease. This paper aims at delivering a comprehensive review of commonly used convolutional neural network (CNN) architectures to effectively diagnose liver disease. These CNN architectures include AlexNet, VGG, InceptionV3, Xception and ResNet. The performance of different neural networks was evaluated on different parameters such as accuracy, precision, F1 score and sensitivity. We first describe the architecture of the neural network used and then we review the various studies done using that particular neural network for liver disease detection. Majority of all the neural networks were either trained on ultrasound images, digitized biopsies or MRI images. The database and the training algorithm used is also described for each study.

Keywords - Convolutional Neural Networks, Deep Learning Medical, Imaging, Nonalcoholic fatty liver disease

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Paper Code: 4673 **Track:** Computer Science and Engineering

COLLEGE-BUDDY: THE INTERACTIVE DEEP LEARNING BASED CHAT-BOT TO ASSIST COLLEGE STUDENTS

Rahul Bembade, Devanshu Dalal, Tanishq Deshpande, Avinash Dhakne and Yash Gaherwar
Vishwakarma Institute Of Technology, Pune

ABSTRACT

Artificial intelligence plays an increasingly significant role in society and industries today. Many real-life applications can benefit individuals and help them to improve their skills and work more efficiently. One of them is A chatbot, which is computer software that simulates the machine to human interaction using natural language processing. Due to advancements in chatbots, they can be used in many real-life applications. The chatbot can save time and money for the organization and provide better service. It can do the monotonous work of conversation automatically, which could be tedious and time intensive for humans. The proposed chatbot application uses Deep Learning models to help students with their college queries and provide them with feedback as quickly as possible. It involved the use of Natural Language Processing and Deep Learning. Students and college administrations can easily communicate with each other using the proposed application.

Keywords - Deep learning, Natural language processing, Artificial neural networks, Web Application

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Paper Code: 4720 **Track:** Computer Science and Engineering

FACE MASK DETECTION FOR COVID-19 PRECAUTIONARY MEASURES USING SVM APPROACH

Prasad Mutkule[1], Megha Kurhe[1] and Kalpana Singh[2]
[1]Sanjivani College of Engineering, Kopargaon, [2]Deva Nagri College, Meerut

ABSTRACT

The significant event that has arisen as a result of the rapid global spread of COVID-19 (Coronavirus 2019) is a disaster in public health. The World Health Organization (WHO) has provided a number of suggestions for preventing the spread of the COVID-19 virus. The World Health Organization suggests that individuals who are concerned about contracting COVID-19 always wear a mask whenever they are in a public or crowded place. This is because COVID-19 can be spread through the air. This tip is helpful for people of all ages, from grownups to young children. A quick glance at someone's appearance isn't always enough to reveal their genuine identity. As part of our research, make use of deep learning architectures to carry out an in-depth analysis of the data that we have obtained. In this particular study, each and every one of the prerequisites for such a model were studied. In order to distinguish between masked and unmasked labels in an image, the method that has been suggested makes use of convolutional neural networks (CNNs), which are a form of deep learning. The approach that was suggested yielded experimental findings that provided an accuracy rate of 99.72% when applied to the reference datasets. This outperforms previous systems and data sets that were considered to be state-of-the-art in a real-time setting.

Keywords - COVID-19, Convolutional Neural Networks, Deep Learning, Support Vector Machine

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Paper Code: 4807 **Track:** Computer Science and Engineering

COMPARATIVE ANALYSIS OF CNN MODELS FOR DEEP DREAM GENERATION

Siddarth Mohan[1], Vandana Jagtap[1], Monalisa Bhinge[2] and Heet Maulik Shah[1]
[1]MIT World Peace University, [2]Sinhgadh Institute of Management

ABSTRACT

Artificial Intelligence is a growing domain, with contributions and advancements in a plethora of fields like healthcare, business, agriculture, etc. With the capability of being used for making autonomous decisions, Artificial Intelligence can also be used for creative purposes, such as creating abstract art and simulating visualizations and patterns seen in dreams. Using CNN models this study focuses on a niche of the creative purposes of AI – Deep Dream. In this paper we have used different pretrained models and run the deep dream algorithm on them for the same input image to observe the output from different models. We have also tried to report the results by displaying the output image and finding out the loss of the model at the end of a particular number of iterations.

Keywords - Deep Dream, CNN Models, Creative AI, Activations, Loss

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Paper Code: 5221 **Track:** Computer Science and Engineering

AN EMPERICAL REVIEW ON APPLICATIONS FOR WOMEN SAFETY

Aditi Singh Bisht, Delzeen Machhi, Muskaan Mahajan and Kavita Bathe
K J Somaiya Institute of Engineering and Information Technology

ABSTRACT

Protection of human rights and the safety of citizens, especially women and children is paramount in any country. Taking measures to eradicate the fear of crime against women is a crucial step that every government should take. Additionally, technology can be put to great use, to provide women with a sense of security, so that they can feel secure at any given point. Advanced technology such as Mobile applications, the Internet of Things, machine learning, artificial intelligence, GPS technology, Deep learning methods, and wireless sensor technology can collectively be used to create a safe environment for all women who may be traveling alone in a relatively new area, at odd times. Women should be able to travel fearlessly to any destination. This paper reviews multiple studies performed that provide technological solutions to mitigate crime against women. Additionally, limitations based on the existing systems have been analyzed and discussed.

Keywords - Machine learning, deep learning, artificial intelligence, IoT, women's safety

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Paper Code: 5417 **Track:** Computer Science and Engineering

A LE-NET BASED ARCHITECTURE APPROACH TO CLASSIFYING AND DETECTING CORN-MAIZE PLANT LEAF DISEASES.

Mohith V Menon and Harishchander Anandaram
Amrita Vishwa Vidyapeetham

ABSTRACT

One of the most significant elements that might have a serious effect on crop output is the presence of plant diseases. As a result, one of our goals is to develop an automated system that is capable of recognising plant illnesses in the most straightforward manner feasible. Our objective in this line of research is to develop methods that will enable crop farmers who are not necessarily knowledgeable within plant breeding to identify illnesses as soon as they emerge. This will allow for a reduction in both the rate at which diseases spread and the amount of damage they cause to crops. We present an extremely lightweight CNN architecture that can be trained to categorise photos of corn-maize plant leaf into their designated categories: healthy,grey leaf spot disease, northern leaf blight illness, and common rust disease. Because of the significantly reduced complexity of our architecture, It works better for actually making inferences on constrained-resource devices like mobile phones.

Keywords - Machine Learning, Deep Learning, Convolution Neural Network, fully-connected, Le-Net

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Paper Code: 5432 **Track:** Computer Science and Engineering

FRAUD DETECTION AND MONITORING OF WATER TANKERS USING IOT

Dipti Pawade, Avani Sakhapara, Akshata Ingalahalli, Mishtee Gandhi, Ashwini Dalvi and Irfan Siddavatam
KJ Somaiya College of Engineering

ABSTRACT

During the water crisis, water supply through tanker is the common scenario in the India. Most of the time Government hire private tankers on contract basis to distribute the water and pay them based on the number of trips. It is observed that these tanker contractors show fake trips necessarily charge for it. To avoid so roaster is maintained which has entry for each trip. Yet this is not sufficient to control the malpractices. It might be possible that, from the source the entry for the tanker trip is made in roster but there is no guarantee that tanker will reach to the specified destination. In between the tanker driver can sell that water to someone else. Sometimes the tanker reaches to the desired destination but between half of the water is sold. Thus, the intended beneficiaries don't get enough water. Many times, muddy and contaminated water is being distributed which may lead to many health issues. Thus, there is a need of some automated mechanism using which Government officials can keep track of tanker movement, count number of trips, check the quantity and quality of the water. This motivated us to come up with IoT based solution which comprise of various sensor to collect the data such as GPS location of tanker, level of water, pH and turbidity value of water etc. This data is store over a cloud and made available through a web application. This way Government officials can get consolidated report as well as alters if any malpractice is carried out.

Keywords - Water distribution through tanker, malpractices in water supply, IoT, GPS tracking, Water pH, Turbidity, Water level

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Paper Code: 5671 **Track:** Computer Science and Engineering

STACKED ENSEMBLE MODEL FOR APPLE LEAF DISEASE DETECTION

Yudhir Gala, Nisha Vanjari and Shubhada Labde
K. J. Somaiya Institute of Engineering and Information Technology, Mumbai

ABSTRACT

The agricultural industry plays an important role in helping boost the economy of the country. But this industry suffers major setbacks because of decreased crop yields which occur due to the late identification of varied plant diseases in the crop. The crop may get affected by these plant diseases due to different seasonal conditions. Identification of such diseases is done using studying the visually observable patterns on the leaf. Early detection of such diseases is necessary in order to minimise the effects of the disease in early stages and prevent it from spreading and affecting the crop yield. But such a diagnosis cannot be done easily by the naked eye for a large number of crops in a field. It requires a formidable amount of work for monitoring plants manually.Hence, here an expert system is recommended to detect diseases from the infected leaves by combining transfer learning and image pre-processing principles. In this paper,we compare the performance of different deep CNN models with an ensemble created using these models in order to increase the ensemble's detection rate of diseases in infected apple leaves.

Keywords - apple disease detection, plant disease detection, ensemble, transfer learning, stacking, convolution neural network

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Paper Code: 5785 **Track:** Computer Science and Engineering

REAL TIME VIDEO TO TEXT CONVERSION OF SIGN LANGUAGE

Abinaya Devi Sv, Kiruthika Sakthi, Niranjani S, Abinaya S and Sharanyaa S
Panimalar Engineering College

ABSTRACT

Sign Language is an non-verbal communication in which visible bodily actions are used to convey vital messages, either instead of or in conjunction with spoken words. Hands, face, and other parts of the body are used in sign language. Nonverbal body language, like merely expressive motions, proxemics, or joint displays of attention are distinct from gestures that convey specific messages. Gestures are culturally different and can communicate a wide range of meanings in different social and cultural contexts. In this work, the model will track the evolution of human behavior and recognize language patterns. Each movement of the joint, elbows and face must be identified. The goal of this research is to develop a deep learning model that can classify live video actions of human sign languages such as words and sentences. The classification accuracy of live action gesture types using LSTM is found to be higher than other state of art algorithms. It is expected that, if the LSTM approach is supplemented by the addition of continuous image sequential input, feature extraction methods and correct identification of video types , the success rate of the results produced will increase.

Keywords - Deep Learning, Open CV, LSTM, Mediapipe

Paper Code: 5962 **Track:** Computer Science and Engineering

HEART DISEASE PREDICTION

Surabhi Kakade, Aryan Shisode, Aryan Shindode, Omkar Shigade, Omkar Singate, Aditya Shirsath and Raj Shishupal
Vishwakarma Institute of Technology

ABSTRACT

This paper analyses the detection of heart disease using mechatronics. Over the post decades, heart diseases have only become more common. The reason being increased stress, fat containment, inactive lifestyle, etc. Therefore, a need for a cheap alternative over the expensive conventional devices was felt. The main objective of the model is to get a better accuracy to detect heart-disease by monitoring the heart rate in which the target output counts that a person having heart disease or not.

Keywords - Cardiac, Arduino, Sensor, Pulse, BPM

Paper Code: 6218 **Track:** Computer Science and Engineering

VISION-BASED GARBAGE SPILL DETECTION FOR SMART CITY SUSTAINANCE

Jyoti Madake, Aryan Waghresha, Kshitij Wayal, Shripad Bhatlawande and Swati Shilaskar
Vishwakarma Institute of Technology Pune

ABSTRACT

Waste pollution in today's society is a significant contributor to environmental degradation. The detection of garbage bin overflow across the city is suggested to be accomplished by a combination of computer vision and machine learning. The system that is being proposed uses cropping and resizing in order to prepare images. In the suggested model, grey-level co-occurrence matrix (GLCM) and Haralick texture features are used for garbage detection. Five distinct GLCM feature vectors, Correlation, Homogeneity, Energy, Entropy, and Contrast, are chosen to characterize the texture of garbage. The Light gradient boosting machine (LGBM) is utilized for classification. The approach has a 93.71 percent accuracy rate. This strategy is more adaptable and makes less use of resources in comparison to the one that is currently being used for garbage identification. This technology not only enables accurate identification and recognition of garbage but also reduces operational costs by more than half, making it more cost-effective overall when compared to earlier monitoring approaches.

Keywords - Garbage spill detection, Light gradient boosting machine (LGBM), Grey-level Co-occurrence matrix (GLCM), Smart city

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Paper Code: 6503 **Track:** Computer Science and Engineering

A NOVEL MANNED DRONE DESIGN WITH A LEGAL PERSPECTIVE

Om Prakash and Jatinderkumar Saini
Symbiosis Institute of Computer Studies and Research, Pune, India

ABSTRACT

Drones for civilian applications are in the spotlight of the media. Due to the rapid technological developments, more and more companies and government organizations provide a variety of opportunities. Internet company Amazon wants packages delivery with drones, in Japan rice fields are sprayed by drones, in the United States is being tested whether drones can be used in the extinguishing fires and the Red Cross is investigating whether drones are used to provide food and medicines can be delivered to hard-to-reach areas. Also, citizens are buying more and more drones simply because they enjoy themselves-film or photograph themselves, their house or their neighbourhood from above. In this research, the opportunities of drones are mapped out. Some see opportunities for making existing activities more efficient or effective, for example when drones are an alternative to more expensive manned aviation. However, very less research is available on this attractive alternative. The research is therefore conducted to provide a justification for such drones. This research reveals that drones offer completely new insights and opportunities, for example in healthcare. The novel legal frameworks regarding the use of drones carrying payloads are also explained in detail and placed in an international perspective. In this research contours are also outlined for future legislation that will create space for the opportunities, risks, and threats that exist for the use rotorcraft, quadcopter as well as fixed-wing system drones.

Keywords - drone, rotorcraft, quadcopter, payloads, fixed-wing system

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Paper Code: 6645 **Track:** Computer Science and Engineering

ANALYSIS OF SECURITY AWARE VIRTUAL MACHINE PLACEMENT TECHNIQUES

Aparna Bhonde and Satish Devane
Datta Meghe College of Engineering, Airoli

ABSTRACT

IT services for businesses or consumers can be delivered over the Internet using the adaptable, affordable, and tried-and-true cloud computing model. Cloud service providers in view of efficient utilization of the resources encourages multitenancy which can lead to different cache-based side channel attacks. The majority of these assaults take place when co-residency is attained that means when the attacker is able to run the VM on the same physical server. Different placement policies are created with varied goals in mind to enhance various aspects of the quality of service. In Cloud computing, the virtual machine (VM) placement is an important step which takes place while a new VM request is received and targets to map the physical server to host the new VM request. A VM allocation policy can lead to effective resource usage, enabling cloud service providers to achieve improved performance and minimal datacentre energy consumption. This paper provides in depth analysis on existing VM placement policies and optimization techniques which serves the various objectives like cost, resource, power, traffic and performance along with the effect on cloud metrics. The paper has also done first of its kind survey on existing security aware VM allocation policy against the co-residency attacks in the data centre and analysed their capabilities. Finally, findings from survey and directions for future research are provided.

Keywords - Virtual machine, Virtual machine allocation policy, Datacenter threats, Quality of service

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Paper Code: 6782 **Track:** Computer Science and Engineering

ZEBRA CROSSING SMART DEVICE FOR PEDESTRIANS SAFETY

Surabhi Kakade, Shon Daberao, Jidnyasa Dadmal, Mayur Dabade, Bhumika Chule and Sunny Chourasiya
Vishwakarma Institute Of Technology , PUNE

ABSTRACT

According to the road accident report of Union Transport Ministry,62 pedestrians die daily in India, up 84% in years. Therefore, the huge reintroduction of crossover on all major roads in metropolitan cities recently is timely and worthwhile. For reducing such fatality rate, our proposed paper prevents these accidents by introducing a modern & user-friendly zebra crossing smart device for pedestrians safety. Our project is with the view at making the road traffic environment safer for pedestrians by maintaining systemic balance between pedestrian, traffic & proper road functionality.

Keywords - Arduino Uno Programming, ESP32 CAM pedestrian safety, Road safety, Sensors, Strict road policy

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Paper Code: 6900 **Track:** Computer Science and Engineering

VISION-BASED RECOGNITION OF SLOW SIGNAL AND STOP SIGNAL FOR AUTONOMOUS DRIVING

Jyoti Madake, Tanmayee Tajne, Prachiti Talgulkar, Shripad Bhatlawande and Swati Shilaskar
Vishwakarma Institute of Technology Pune

ABSTRACT

The research on autonomous vehicles has increased with the flourishing of the smart city agenda and improvement in commute-related aspects. This contributes to expanding the scope of research for the detection of pedestrians, cyclists, nearby cars, and other objects on the road. This paper presents a novel approach to the recognition of stop and slow-down signals. The signals are detected based on cyclists, bikers and pedestrians crossing the street. The approach of this paper is to detect these types of signals, which will support autonomous vehicles in avoiding accidents and ensure the safety of people travelling around an autonomous car. The dataset used in this project is Joint Attention in Autonomous Driving (JAAD) and Cyclist Arm Signal Recognition (CASR). The SIFT is explored for keypoint feature detection and extraction. Accuracy of several classifiers such as Decision Trees, Random Forests, SVM, KNN and GNB has been obtained with the highest accuracy of 92.83% given by Random Forest.

Keywords - Autonomous vehicles, recognition, SIFT, JAAD, CASR

Paper Code: 7608 **Track:** Computer Science and Engineering

INTELLIGENT APPLICATION OF VOICE RECOGNITION AND PERSONAL SECRETARIAT FOR EFFECTIVE BUSINESS MANAGEMENT

Sumedh Vichare, Varun Mehta, Ramchandra Mangrulkar, Raveena Tripathi and Sunil Kumhar
D. J. Sanghvi College Of Engineering.

ABSTRACT

The focus of this work is to design an efficient mobile application targeting small business owners in India. The development of the application is aimed at small-scale business owners all over the country who are not well versed with the use of modern technology. The mobile application will assist these users in managing their inventory, keeping track of employees, and placing orders with suppliers for their products. The voice recognition feature has been added to increase accessibility and usability of the application. The collaborative filtering method is used by most recommender systems to give customized information. The collaborative filtering method is a quick and effortless way to achieve personalization. Staff payment and management is another tedious task requiring much manual effort. Features like scheduling staff payment and staff attendance are also accessible in the product. If stock runs out, there will be a provision to order new stock from the best wholesaler instantly. The goal is to create an all-in-one assistant that will handle and keep track of all the operations that typically occur in a grocery store.

Keywords - Mobile application, Inventory management, Association rule mining, Collaborative filtering, Recommendation system

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Paper Code: 7882 **Track:** Computer Science and Engineering

THE HAPPY PATH: APPLICATION FOR MENTAL WELLBEING

Harsh Sandesara, Karan Shah, Darshak Bali, Abhijeet Salunke and Anand Godbole
Sardar Patel Institute of Technology

ABSTRACT

Mental health is the basis for the wellness and efficient functioning of people. Lately, there has been an increased focus on the need for mental health welfare. Our aim is to create a mobile application that can help provide free and accessible mental health care to everyone. We seek to do this by using state-of-the-art machine learning techniques to recommend various exercises and meditations to our users and provide them with an intuitive user interface.

Keywords - Mental Health, Mobile Application, Emotion Recognition

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Paper Code: 7924 **Track:** Computer Science and Engineering

STATISTICAL ANALYSIS FOR LAND USE PLASTIC WASTE IN INDIA USING AI

Guru Akaash Janthalur, Varun Tripathy, Priya R. L, Ajay Nair and Manigandan Kasimani
Vivekanand Education Society's Institute of Technology, Mumbai.

ABSTRACT

India faces a major problem of Plastic Waste Management, where urbanization, industrialization, and economic growth have contributed to an increase in plastic waste generation. The rapidly growing population and the improved living standards have only worsened this problem. As per details provided by 35 Indian States/Union Territories, estimated plastic waste generation during the financial year 2019-20 is approximately 34,69,780 tonnes per annum. Solid waste collection, transportation, treatment, and disposal costs for Urban Local Bodies (ULBs) range from Rs.500 to Rs.1,500 per tonne. However, very little money is invested in scientific plastic waste disposal. Statistics on plastic waste generation are insufficient since quantified treatment of environmental issues is difficult. The problem with the data on plastic waste generation in India is that it has extrapolated values from a study prepared by the Central Pollution Control Board (CPCB) [12] . Moreover, most of the existing systems discuss the analysis of the amount of plastic waste generated in a specific area and fail to discuss the rate of growth and amount of plastic waste generation in the next few years. The proposed work calculated the amount of plastic generated in different states and ULBs of India for the past 10 years and thereby predicted the amount of plastic that will be generated in the following 10 years, thus suggesting mitigation measures in places having high amounts of plastic waste generation.

Keywords - Artificial Intelligence, Machine Learning, Web Development, Statistical analysis, Plastic Waste Management, Indian land use plastic waste

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Paper Code: 8056 **Track:** Computer Science and Engineering

SOFTWARE RUNTIMES FOR DISAGGREGATED MEMORY: A REVIEW PAPER

Kuldeep Vayadande, Vaishnavi Narkhede, Harsh Solanki, Om Surushe, Sushrut Kulkarni and Tejas Ekbote
Vishwakarma Institute of Technology

ABSTRACT

This is a review paper that studies different approaches applied to deal with memory problems through the use of Disaggregated memory. Disaggregated memory assists in addressing deficiencies in resource allocation in modern data centers. To make fragmented memory practical, numerous software runtimes have already been created. The virtual memory subsystems are used by the system to discretely provide disaggregated storage to developers via a remote storage abstraction. Regretfully, using virtual RAM for fragmentation has a number of drawbacks, including considerable dirty data amplifier due to the use of page graininess for monitoring to the cached memory and high overhead caused by the utilization of page mistakes to evaluate which data to install and cache remotely (4KB or higher). The various papers discussed concepts like tiered memory systems for better efficiency concentrated on binary memory systems and tactics geared at non-volatile systems, how physicals systems perform against cloud networks, utilization of disjoint RAM. They also describe how disaggregated memory can help in real life applications like data centers in better management and efficient use of storage because of the advantages in optimal storage consumption and convenience of administration.

Keywords - Software Runtime, Disaggregated, Memory, Latency

Paper Code: 8216 **Track:** Computer Science and Engineering

MENTAL HEALTH MODEL TO ASSESS PSYCHIATRIC FITNESS IN WOMEN BY SPEECH ANALYSIS USING MACHINE LEARNING

Jyothi N M[1], Husna Tabassum[2], Rajani Thota[3], Saurabh Gupta[4], A Pavani[1] and S Madhusudhanan[5]

[1]Koneru Lakshmaiah Education Foundation, [2]HKBK College of Engineering, [3]Vardhaman college of Engineering, [4]Shri Ram College of Commerce University of Delhi, [5]Prathyusha Engineering College.

ABSTRACT

Women psychiatric health is one of the most neglected factors. Women mental health is very important as mentally healthy woman is the backbone of entire family and society. Even though many papers are published related to mental illness detection and treatment using various methods through survey, questionnaires, public health databases, clinical records, social media usage etc., by applying different Machine Learning (ML) algorithms for prediction, still there is huge room left for identifying and analyzing the mental illness through different means and applying ML for prediction, detection and assessment. The main aim of this research work is to demonstrate that speech is the easiest way to recognize symptoms of mental illness like depression, stress, anxiety, trauma etc. The speech signal carries hidden attributes like intensity, pauses, speech rate which reveal lot of information about the psychological fitness of a woman. The model is deployed on all the kernels of SVM to study and analyze the prediction accuracy of classification using three classification labels. The result obtained is more realistic in assessing the psychiatric fitness with overall accuracy of 90.78 percent.

Keywords - kernels, psychiatric fitness, speech, SVM

Paper Code: 8338 **Track:** Computer Science and Engineering

FIRE DETECTION SYSTEM USING MACHINE LEARNING ALGORITHMS

Amit Sinha, Shelley Gupta and Meenakshi Vishnoi
ABES Engineering College, Ghaziabad

ABSTRACT

There are lots of disasters happening in recent times in the world. One of the major disasters which have drawn the most attention is the large area fires, especially forest areas. Forest fires can occur naturally and also sometimes by humans. Forest Fires just does not harm the plants and trees of the forest, but also the animals living in the forest. It also affects the nearby places where humans live since smoke, carbon dioxide and carbon mono-oxide concentration increase in the atmosphere which can lead to several health problems such as respiratory problems. We can detect the fire by deploying various wireless sensor nodes in the forest areas by which they sense the fire and can inform us, so that we can control the damage to be done by forest fire. We can increase the efficiency of detection using machine learning techniques on the data collected by various wireless sensor nodes. In this report we will compare some of the machine learning techniques used by researchers with wireless sensor nodes in predicting forest fire.

Keywords - Forest Fire, WSN, Correlation Coefficient, Sensor Nodes

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Paper Code: 8731 **Track:** Computer Science and Engineering

COMPARISON OF DIFFERENT APPROACHES FOR AUTOMIZED MEDICAL CHATBOT

Vinayak Deshpande, Suyog Mahangade, Mayuri Sathe, Utkarsha Gawade and Ranjana Badre
MIT Academy Of Engineering

ABSTRACT

Our daily lives depend greatly on our health. Medical chatbots can save healthcare costs and improve access to services and information since they are conversationally built with technology in mind. For a variety of disorders, there are numerous therapies available. No human beings could reasonably be aware of every disease and treatment option. However, the issue is that there is no single location where we can access all the information about the illness. The objective is to develop a chatbot where users merely enter their symptoms and the chatbot, using that method, diagnoses the illness and dispenses medication. Arranging a doctor's visit for any health concern may be quite difficult. The objective is to build a plan before calling a doctor. The objective is to create an artificial intelligence-powered medical chatbot that can recognize an ailment and deliver basic details about it before the patient contacts a doctor. This will result in decreased healthcare costs and more people having access to medical information by using a medical chatbot. In this, we employed FFNN (Feed Forward Neural Network) and NLP (Natural Language Processing).

Keywords - Natural Language Processing, Feed Forward Neural Network, Artificial Intelligence, Medical Chabot

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Paper Code: 8815 **Track:** Computer Science and Engineering

ACTION RECOGNITION WITH NEURAL NETWORKS

Akshith Nukala, Achuth Dintakurthi, Abhiram Madurapanthula, Narshima Murthy Goggula and Harini Mohan
Kalasalingam Academy of Research and Education

ABSTRACT

With the increasing usage of monitoring applications such as environments, entertainment, and healthcare systems, "Activity Recognition" has gained a lot of attention in video analytics technology. If we consider large-scale surveillance systems, such as finding suspicious activity in an airport, it is also a challenging task for trained human resources. If we can't find the culprit, it results in adverse situations. Considering the healthcare system, observing patients all day long is one such task. If we detect suspicious activity, it means we can respond spontaneously. This is how activity recognition can be applied in real-world scenarios. Gesture recognition and prediction are closely related to most computer vision problems, such as human gesture prediction and recognition, gait recognition, and future event recognition. Enterprise products like Microsoft's Kinect are notable examples of action recognition techniques. Most surveillance systems attempt to solve the problem of video stream/file input-based detection, prediction, and activity recognition of humans and vehicles for AI-based surveillance of social environments such as apartments and public environments such as busy road crossings, railway stations, and airports.

Keywords - Action Recognition, Time Distributed Layer, LRCN, Convolution, Pooling, LSTM

Paper Code: 8966 **Track:** Computer Science and Engineering

A BRIEF SURVEY ON VIDEO SUMMARIZATION TECHNIQUES

Nihar Ranjan[1], Akanksha Wagh[2] and Shraddha Jainak[2]
[1]RSCOE, [2]JSPM Rajarshi Shahu College of Engineering,

ABSTRACT

Video Summarization is a method which gives a short representation of the original video which includes the summary of the key points from the entire video. Video summarization provides a clear analysis of the video by removing noise and unnecessary content and extracting key frames contents from the original video. The architecture in video summarization shows how a large video shortens to short and story contents. Many researchers studied and proposed various video summarization techniques. The proposed approaches include Convolutional Networks + Long Short Term Memory (ConvNets+LSTM), 3 Dimensional Convolutional Networks (3D ConvNets), Two Stream Network, You Only Look Once (YOLO), Generative Adversarial Networks (GAN) and Inflated 3D ConvNet(I3D). These techniques have their own drawbacks but when compared with each other I3D gives accuracy around 93.4% for video summarization which is better as compared to others. Object detection in video summarization requires detection of spatial and temporal features. Video Summarization methods have vast applications like creating trailers of a film, generating highlights of a game, etc.

Keywords - Video Summarization, Inflated 3D Convolutional Network, Action Recognition, Object Detection

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Paper Code: 9374 **Track:** Computer Science and Engineering

TIMELY TASTE

Shreyash Tekade, Puja Cholke, Om Tekade, Prathamesh Thakare, Pratik Tekawade and Anurag Tekam
Vishwakarma Institute of Technology, Pune

ABSTRACT

The world is having major changes in technology and computing power makes it possible to create a better-automated solution for the current tasks that require high efficiency and accuracy. In Timely Taste, we offer all the college cafeterias a full-fledged order management website with a pre-ordering system. This system when applied helps us to reduce the delayed orders and there is no burden to provide the change of the staff for the order. Usually, people need to go to the canteen and order the food, they keep waiting for a long period of time to get their order. This is where Timely Taste comes into the picture, users can simply order with this website and can book a timeslot at which they will come to receive their order; this saves a lot of time for all the staff and students or whoever using these services. All students have limited time and have classes to attend .This application helps them to manage their time more efficiently and don't have to mess up their schedule. To order anything from the college cafe all you've to do is open the browser and log in to the website, order everything and you'll receive an OTP that will contain a secret code which you'll be showing to the vendor to receive the order. This whole platform can be used by anyone within the vicinity of the serving cafe, college, or vendor.

Keywords - Web Development, Django, HTML, Canteen Management, CSS, Food Booking System

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Paper Code: 9566 **Track:** Computer Science and Engineering

STUDY OF DEEP LEARNING TECHNIQUES FOR DEVELOPMENT OF CHATBOT MODELS

Satish V. Bhalshankar and Dr. Ratnadeep R. Deshmukh
Dr. Babasaheb Ambedkar Marathwada University, Aurangabad MS

ABSTRACT

Chatbots, in recent times, have assumed vital significance in terms of their role, utility and applications moreover chatbots generate and maintain interest in clients, display information, provide focus thus leading to better client experience. Availability of exact, humongous data and enhancement computational capacities have produced well known deep learning models in general and led to uncommon breakthrough within field of NLP in particular. Task-oriented models are built to achieve specific tasks like ordering online food whereas the non-task or open-domain chatbots attempt to mimic human exchange in all its features. Chatbots have progressed with progressive use of artificial intelligence (AI) which incorporate concepts of deep learning, Deep NLP algorithms etc., to deliver superior experiences in conversations. Deep learning is a procedure of learning, featured with ANN structures. Deep Learning model comprises of huge dataset and high number of secured hidden layers to memorize important point which is used to realize advanced classification and desire precision. The types of Deep Learning are RNN, LSTM, Bi-LSTM, Seq2seq and Attention Mechanism. The main motivation is to identify suitable DL techniques for development of Marathi Generative Chatbot System. A patent bearing Patent File Number 202221028115, "A Marathi Virtual Interactor based Question Answering Model" has been filed in this regard. In this paper we examined the above mention concepts by implementing 8 models for the datasets generated during 2018 to 2021, available on GitHub portal and have further verified the results of each model as claimed by the respective author or developer.

Keywords - chatbot, NLP, NLU, RNN, Deep Learning, LSTM, Seq2Seq, AI, accuracy loss, supervised & unsupervised

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Paper Code: 9655 **Track:** Computer Science and Engineering

TRAIN TRACK CRACK PREDICTION USING CNN WITH LENET - 5 ARCHITECTURE

Sree Nandha S S, Athish V P and Rajeswari D
SRM IST

ABSTRACT

Train track crack detection is a process of identifying cracks in the structure of railway tracks. Railways are major modes of transport in India. The tracks must be in good condition for trains to have safe voyages. Cracks that appear on the tracks are often due to heat and other natural causes. At present these cracks are identified manually by railway personnel by inspecting them at regular intervals. This process is not effective as it consumes more time and there is an increased chance of leaving the cracked track undiscovered. The aim of this research work is to avoid the derailment of trains and reduce the cost and time that happens due to the cracks. This work proposed a technique for recognizing railway track cracks by combining Convolutional Neural Networks with image pre-processing technique. Observations indicate that neural networks are capable of capturing the colors and textures of lesions related to respective railway track breaks with 94.6% accuracy.

Keywords - CNN, Train Track Crack Classification, Tensorflow, LeNet, Deep Learning, Convolutional Layer, Pooling Layer

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Paper Code: 9792 **Track:** Computer Science and Engineering

VISION-BASED DETECTION OF CAR TURN SIGNALS (LEFT\RIGHT)

Jyoti Madake, Om Wagatkar, Yashovardhan Chaturvedi, Shripad Bhatlawande, Swati Shilaskar and Kundan Vernekar
Vishwakarma Institute of Technology Pune

ABSTRACT

Nowadays in India, due to the increase in the number of accidents vehicles are being automated using a variety of Computer vision algorithms. This paper focuses on the detection of tail signals of cars under different illumination circumstances. This system is implemented using FAST and SIFT algorithm which helps to extract features from the images. The obtained features were optimized by using K-Means Clustering Algorithm. This huge feature vector is converted into 8 clusters. These optimized feature vectors were trained on five different classifiers as Decision Tree, SVM(RBF), Random Forest, and Voting Classifier. The trained data set used in this algorithm contains around 9052 images. The obtained accuracy results of different classifiers are as follows, Decision tress has 76.36%, SVM(RBF) has 77.91%, Random Forest has 87.52%, KNN has 89.72%, the Voting classifier has 86.52%. It is observed that KNN gives the highest accuracy among the five used classifiers. This has, to the best of the authors' knowledge, not been presented in literature before.

Keywords - Fast-feature detector, SIFT-Feature, K-means, PCA, KNN, Decision Tree, Random Forest, SVM, Voting Classifiers

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Paper Code: 9893 **Track:** Computer Science and Engineering

HORSE RACE PREDICTION

Puja Chavan, Mrunal Shinde, Atharva Shinde, Nikhil Shinde, Jignesh Shinde and Neha Shinde
Vishwakarma Institute Of Technology

ABSTRACT

Horse racing has been one of the most enjoyable forms of gambling long since. Winning streaks are difficult to achieve without the right knowledge and tools which makes the betting aspect of this game intimidating. This system predicts the horse which has the highest chance of winning under certain given circumstances using machine learning technology. For this model 6348 races and 79447 horse records were considered where a race had 14 horses each. This prevents the better from losing money to the immoral traps set by the bookie or the organization or due to his/her lack of knowledge and placing informed bets.

Keywords - Winning Horse, Machine Learning, Python, Sci-kit Learn, Classification

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Paper Code: 9932 **Track:** Computer Science and Engineering

BODY HEIGHT ESTIMATION FROM 2D UNCALIBRATED IMAGES: AN ANTHROPOMETRIC SOLUTION

Isha Dhumal and Varsha Naik
MIT-WPU, Dr. Vishwanath Karad's MIT World peace University

ABSTRACT

For determining the height of an individual, there have been various techniques implemented, but these require certain human effort. In this paper, we propose a novel algorithm to determine the height of an individual from a 2D-uncalibrated image which aims to reduce these human efforts. Unlike previous studies we do not need another object with known dimensions as a reference to determine the height, instead we make use of anthropometric measures of the person. Since anthropometric measures are used, it does not matter how the person is standing or at which angle the camera is placed as long as the entire body is visible.

Keywords - Anthropometry, Uncalibrated Images, Stature Estimation, Multiple linear regression models

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Paper Code: 9960 **Track:** Computer Science and Engineering

OTP BASED DOOR LOCK SYSTEM WITH MOBILE APPLICATION USING ARDUINO UNO AND ESP8266 WI-FI MODULE

Sheetal Sobale, Krisha Patel, Aayushi Patel, Srushti Nikam, Sudhanshu Pathrabe and Shreyash Patil
Vishwakarma Institute of Technology, Pune

ABSTRACT

Today, installing a home security system is a critical study in implementing cutting-edge technology to attain this purpose. One of the most useful technologies to allow remote monitoring of various household appliances is the wireless network technology. This article intends to offer a security system based on Arduino technology, in which the door lock and Wi-Fi are combined to create a fantastic powerful system along with a mobile application to send a secure password, as well as to notify the owner about the time of arrival by providing them with a User ID. As a result, only owners or authorized personnel can be permitted access through the door. The system operates by sending an OTP on user click and opening the attached lock if the entered code is correctly verified. In this study, we look at how to use Wi-Fi connection and OTP built into cellphones to supplement existing door lock system issues. This system uses OTP (One-Time-Password) authentication and an Arduino smartphone-based design to create a wireless OTP door lock system that allows users to live a more convenient and secure life free of the fear of theft and other crimes.

Keywords - Arduino, Digital door-lock system, IoT, OTP based locks, Security, Smart-home automation

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Paper Code: 9986 **Track:** Computer Science and Engineering

EVALUATING PERFORMANCES OF VARIOUS CNN ARCHITECTURES FOR MULTI-CLASS CLASSIFICATION OF ROTTEN FRUITS

Krishiv Dakwala, Vishwajit Shelke, Pranav Bhagwat and Anant Bagade
Pune Institute of Computer Technology

ABSTRACT

In recent years, Artificial Intelligence (AI) has been at the crux of many advancements across different industries such as E-Commerce, Finance, and Healthcare. The introduction of new Machine Learning techniques in the agrifood industry could become a turning point. The quality of the produce is one of the major factors that drives this industry, and it plays an important role in consumer consumption thereby affecting the sale of the produce. For a country like India, which heavily depends on agriculture, the introduction of modern methods in agriculture is vital for increasing efficiency and thus increasing the amount and quality of produce. AI-driven autonomous systems could cut down the manual labor which will hence reduce processing times and can have a huge impact on processing expenditure as well as sales. Deep Learning along with Computer Vision can be used to analyze the quality of fruits and vegetables. It can also be used to grade the goods according to their freshness and can even identify rotting fruits and vegetables. Traditionally, manual labor is used to perform the above-mentioned tasks but with the introduction of the proposed technology, we can cut down the costs and reduce the processing time. We plan to implement various pre-trained CNN architectures using Transfer Learning to implement multi-class classification of rotten fruits. Finally, we use performance speed and accuracy as the main metrics to compare the models and showcase their usefulness in this domain.

Keywords - Computer Vision, Deep Learning, Convolutional Neural Networks, Artificial Intelligence, Image Classification

Paper Code: 2640 **Track:** Information Technology

DESIGN OF A SIDE-CHAIN-BASED HIGH-SECURITY MODEL FOR ENERGY-AWARE ECG CLASSIFICATION DEPLOYMENTS

Sonali Lohbare and Swati Dixit
Electronics and Telecommunication Engineering, G H Raisoni University, Amravati, Maharashtra

ABSTRACT

Electrocardiogram (ECG) signals are classified into heart disease categories through the design of high-efficiency signal processing models. These models must be able to perform Pre-processing, Segmentation of signal, Extraction of Feature, Classification, and Post-Processing steps with high efficiency in terms of accuracy and power metrics. To attain this, researchers have proposed the use of reinforcement learning models, that assist in offloading computationally complex tasks on the cloud. Due to this offloading, there are communication vulnerabilities between the ECG sensing device and the cloud data center. To mitigate the different vulnerabilities, researchers have proposed the use of various data security mechanisms, which adds to the computational complexity of the underlying ECG model. This increases the delay needed for communication, thereby reducing the real-time performance capabilities. While maintaining high security, side blockchain-based systems were introduced, which possess characteristics like immutability, transparency, traceability, and distributed computing. But the delay needed for the main blockchain is directly proportional to the chain length, thus they are not suited for big data applications like ECG signal communication. The proposed design of a novel side chain high security and QoS model for energy-aware ECG classification deployments to overcome these issues. While improving security performance making the model highly applicable for extensive variation of health real-time IoT data in which Delay, Energy, Throughput, and PDR are evaluated.

Keywords - ECG, Low Power, WOA, Optimization, Delay, Splitting, Merging, Security, Blockchain, Attacks

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Paper Code: 6161 **Track:** Information Technology

DOES THE SMART TOUR GUIDE APP MATCH VISITOR EXPECTATIONS AS A TOUR GUIDE: AN ANALYSIS OF PINAKIN APP USER REVIEWS

Arvind Mahajan[1], Sunil Kumar[1], Rahul Chavhan[2], Sachin Kale[3], Mandar Sonawane[3] and Rajendra Londhe[3]
[1]Lovely professional University, Jalandhar, Punjab, [2]Sardar Patel College of Engineering, Mumbai, [3]Government Polytechnic Thane, Maharashtra

ABSTRACT

Smart tourists are using smart tour guide apps on their sightseeing tours in the age of smart tourism. However, before installing the app, the most of users read about it or read reviews, based on the purpose for which the app will be used. The goal of this study was to identify the gap between customers' expectations and the app service provider. To discover the research findings, content analysis and sentiment analysis was conducted on "Pinakin app" user reviews. This study's key finding is that users have expectations for both content and app quality. Positive, neutral, and negative sentiments were discovered in this study from the app users' reviews.

Keywords - Pinakin app, Tour guide apps, content analysis, app qualities

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Paper Code: 578 **Track:** Electronics Engineering

MOBILE APPLICATION BASED WATER GARBAGE COLLECTOR ROBOT

Sachin Sawant, Gauri Choudhari, Vedant Choudhari and Ojas Chougule
Vishwakarma Institute of Technology, Pune

ABSTRACT

This project work aims to help in cleaning water reservoirs such as ponds and swimming pools by collecting floating trash using modern technology. In this project, a water garbage collector robot has been constructed which can collect floating garbage from water bodies and thus counter water pollution. This prototype is an embedded system that uses Node MCU as a microcontroller. The robot collects floating waste through a conveyor belt mechanism. The conveyor mechanism uses a garden net along with various components to hold and mount the belt at a particular angle. The base is made with a sun board sheet on which all the other components are used. The waste is dropped into a box which is made using a sun board sheet also. Single-shaft DC motors along with motor drivers are used for the movement of the robot and the operation of the conveyor belt. Propellers are used for navigation. The robot navigation, as well as the conveyor belt, can be controlled using an Android application that communicates with the robot via Wi-fi technology.

Keywords - Embedded system, floating trash, garbage collector, mobile application, robot, water pollution

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Paper Code: 4330 **Track:** Electronics Engineering

TIQ COMPARATOR BASED 8 BIT FLASH ADC FOR COMMUNICATION APPLICATIONS

Radhika Joglekar[1], Rishona Daniels[1], Aishwarya Jagare[1], Payal Shah[1] and Surendra Rathod[2]
[1]Sardar Patel Institute of Technology, Mumbai, [2]Fr. Conceicao Rodrigues College of Engineering Mumbai

ABSTRACT

*Primary motivation of this paper is to design an ADC that is suitable for communication applications with high operating speed in GSPS and fabricate at SCL (Semi-Conductor Laboratory) Chandigarh, India. This paper presents an 8-bit Flash ADC using TIQ (Threshold Inverter Quantization) Comparator and ROM encoder. It has been observed that the DNL is 0.051*LSB, INL is 1.73*LSB with dynamic power dissipation of 0.277μW, and operating speed of 0.4 GSPS. The application of the implemented ADC in communication has been demonstrated in the SID Antenna receiver. The simulation has been carried out with BSIM 180nm technology in LTspice.*

Keywords - Flash ADC, Threshold Inverter Quantization, Comparator, ROM encoder

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Paper Code: 5072 **Track:** Electronics Engineering

DESIGN AND DEVELOPMENT OF SMART PILL DISPENSER

Neeta Chavan, Isha Chavan, Aishvarya Birambole, Risa Samanta and Saakshi Karkera
Vivekanand Education Society's Institute of Technology, Mumbai

ABSTRACT

This paper proposes a novel idea to provide reminders and medicines automatically to patients to take their right dosages at appropriate time. Nowadays, most of the patients may forget to take their medicines as per the prescription due to mental stress. Hence, it may cause prolonged periods to recover from the diseases. Sometimes, the aged patients are gulping tablets and their dosage level incorrectly causing a severe problem. Therefore, it is necessary for the patient to take proper medicines at precise quantities and time. To overcome these problems, a novel Smart Pill Dispenser system is proposed. This system uses, Microcontroller, LCD display and Real Time Clock (RTC) module, Buzzer used to intimate the patients to take proper dosage according to the prescription at the right time. This portable and economical Smart Pill Dispenser system would help aged patients, especially to the illiterate patients.

Geriatrics rely on their medications to keep them healthy, but complex medication schedules can lead to mistakes like missing doses, taking incorrect amounts, or taking medicines at the wrong times. These mistakes could lead to unnecessary doctor or hospital visits, illness and even death. Hence there is a need to design a Medication Dispensing Device that can help Geriatrics to take medication on schedule. This would prevent unplanned hospital or doctor visits related to incorrect medication use. This paper proposes a design of a smart device which dispenses the medications on the prescribed schedule.

Keywords - pill dispenser, reminder, geriatrics, hospitals

Paper Code: 5422 **Track:** Electronics Engineering

DESIGN OF A MULTIMODAL BRAIN COMPUTER INTERFACE WHEEL - CHAIR CONTROL SYSTEM BASED ON EEG AND ARDUINO MICROCONTROLLER

Swapnil Doiphode[1] and Tanishq Kale[2]
[1]Mercedes – Benz Research and Development, Bengaluru, Karnataka, [2]Sardar Patel College of Engineering, Mumbai

ABSTRACT

One of the most essential obligations we have as responsible citizens is to enhance the quality of living for the d by providing enough care at the appropriate time. There have been many people born with physical impairments across the world. Some of them are born with impairments that make it difficult for them to move about and need ongoing support. It is tough to locate someone who can assist them all the time. It is challenging to maneuver a mechanical wheelchair, which many disabled and elderly individuals rely on for mobility. For certain people with disabilities, controlling an Electric Powered Wheelchair (EPW) might be difficult. As a result, a wheelchair that is both intelligent and agile is essential. The brain-computer interface (BCI) plays significant impact on old people's lives. They can operate any piece of equipment without having to use both hands

Keywords - Brain computer interface, BCI, Mind Wave Mobile

Paper Code: 5655 **Track:** Electronics Engineering

ENHANCEMENT OF UNDERWATER IMAGES USING WHITE - BALANCED EMD AND CONVOLUTION

Sampada Deshpande, Maitreyi Ekbote and Reena Sonkusare
Sardar Patel Institute of Technology, Mumbai

ABSTRACT

When light travels through water, it gets attenuated due to the scattering of photons. This results in the addition of noise, low contrast, and blurring of images when the image is captured by the camera. This paper focuses on the enhancement of such underwater images with the help of the Empirical Mode Decomposition (EMD) algorithm. To improve the performance of the EMD algorithm, the images are white-balanced before applying the EMD algorithm. The Gray World Algorithm is used to white-balance the images. After applying the algorithm, the images are convoluted so that the output obtained has sharp images. With this approach, there was an approximately 93% to 98% reduction in the Mean Squared Error and a 31% gain in the Peak Signal to Noise Ratio when compared to the existing studies.

Keywords - Convolution, Image Enhancement, Underwater images, White Balanced EMD

Paper Code: 5670 **Track:** Electronics Engineering

INTELLIGENT REALTIME ROBUST VEHICLE MOVEMENT-BASED ROAD TRAFFIC SIGN RECOGNITION

Sujata Gaikwad and Mansi Subhedar
Pillai HOC College of Engineering and Technology, Rasayani, Maharashtra

ABSTRACT

Autonomous driving systems have increasingly become a topic of prospect in recent years. As a result of people failing to pay attention to traffic signs and restrictions, the accident rate has increased too much. With the utilization of combine data set, generated from road traffic sign images will help to overcome the problems of traffic sign detection databases, which vary for different territory. Utilizing a combined dataset created from photographs of road signs will assist in resolving issues with traffic sign detection databases that differ depending on the territory. The proposed system has created a data-driven traffic sign identification and detection system with high accuracy as well as high performance ability in training and recognition procedures using this data set and a perfect Convolutional Neural Network (CNN). It also makes it easier for the motorist to focus on driving rather than paying attention to every single traffic sign, which lowers the risk of accidents. In India it is important to be able to identify and recognize traffic signs, hence this research aims to offer an effective strategy for doing so. For live monitoring, the R-Pi Camera is employed. The methods suggested in this research, such as feature extraction and neural networks, help to overcome the draw- backs of the current approaches, increase the effectiveness of traffic sign detection, and decrease the number of accidents on the road.

Keywords - Vehicle Live monitoring, feature extraction, convolution neural network

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Paper Code: 7285 **Track:** Electronics Engineering

DRY AND WET AUTOMATIC WASTE SEPARATOR USING ARDUINO

Sachin Sawant, Nikita Chaudhari and Pratik Chaudhari
Vishwakarma Institute of Technology, Pune

ABSTRACT

*There is an urgent need to have proper waste management in society. One of the important tasks in line with this is the separation of dry and wet waste appropriately. Everywhere, it's not possible to manage the waste of the whole city by taking the help of human efforts. With the help of modern technology; an effort is made through this project by developing an automatic Dry and Wet waste separator system using Arduino UNO. It is working on the combination of different sensors and components like GSM Module 900, Arduino UNO, LCD 16*2, etc. Here, we have divided the dustbin into two separate compartments as dry and wet. With the help of Moisture content in the garbage, the system will segregate the waste into respective compartments. For this project, all the connections are done and programmed using the Arduino-IDE software tool.*

Keywords - Arduino, Dry, Dustbin, Embedded System, Wet, Waste Management

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Paper Code: 7331 **Track:** Electronics Engineering

DEVELOPMENT OF AN ENERGY NEUTRAL FREE SPACE OPTICAL LINK USING OFF-THE-SHELF SOLAR PANEL

Soumya Debashis Das and Gyan Ranjan Biswal
Veer Surendra Sai University of Technology, Burla, Odisha

ABSTRACT

Low cost and modest data rates makes the small wireless communication cells (SCs), an apt site for the early introduction of combined wireless backhaul communication and power transfer. The three basic concepts to be illustrated in this paper are optical wireless power transfer (OWPT), solar energy harvesting (EH) and electrochemical storage. Small Cells are defined as the moderately powered radio access nodes that enable data communication to consumers within areas ranging from a few meters to a few kilometers. A Si solar panel with corresponding 1550 nm VCSEL was taken for the experimentation. Should the cost of deploying OWPT be decreased, non- renewable grid power connections will not be needed, leading to significant cost savings during wireless network deployment. The core of this paper is the characterization of the optical properties of Laser Diodes (LDs), in particular, the use of VCSELs for simultaneous data and power transmission. A 1550nm VCSEL is used in a laser driver circuit showing improved bandwidth. Simultaneously, there is an optical power transfer averaging up to 5mW from the board. Photovoltaic (PV) Panels are used as a receiver to convert the transmitted optical power into electricity and data. The use of the concept of maximum power point tracking (MPPT) plays a significant role in the efficient electrochemical storage of the PV panels energy. The integration of all the three modules, optical wireless power transfer, energy harvesting, and the electrochemical storage is demonstrated in an end-to-end system with good efficiency. Finally, the same power stored in the battery powers the entire solar LiFi receiver board and the laser transmitter.

Keywords - VCSELs, LiFi, Optical Wireless Power Transfer, MPPT

Paper Code: 8342 **Track:** Electronics Engineering

REAL-TIME INDIAN SIGN LANGUAGE DETECTION USING SSD-MOBILENET

Amit Sonkamble[1], Rahul Chavhan[2], Bhimrao Jadhao[1] and Shivraj Rathod[3]
[1]Veermata Jijabai Technological Institute, Mumbai, [2]Sardar Patel College of Engineering, Mumbai,
[3]Defence R & D Division of Kalyani Centre for Technology, Bharat Forge Limited, Pune

ABSTRACT

Human beings interact with each other by using natural language such as words, writings. But for deaf people, sign language is only the way of communication. They face problems in communicating with other hearing people without a translator. For this reason, the implementation of a system that recognizes sign language would have a significant impact on deaf people's social lives. ISL uses both hands to make gestures instead of one hand unlike ASL. The proposed system is to develop an ISL recognition system that translates the sign language into text that can be read by anyone. This can be done by various approaches like smart gloves, object detection and pose detection. The proposed method uses a tensor flow object detection for detecting hand moments. The features are extracted with the help of mobile-net and further detection is made by single shot multi-box detection (SSD) The system can able to detect 26 of 26 ISL signs in real time with mAP score 96.1%

Keywords - Indian Sign Language, ssd mobilenet, object, detection, computer vision, machine learning

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Dr Santosh Rane
Conference Chair
Sardar Patel International Conference SPICON 2022