2022 IEEE Pune Section`s International Conference on
Information, Implementation & Innovation in Technology

15th – 17th December 2022

INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY
INNOVATION & LEADERSHIP
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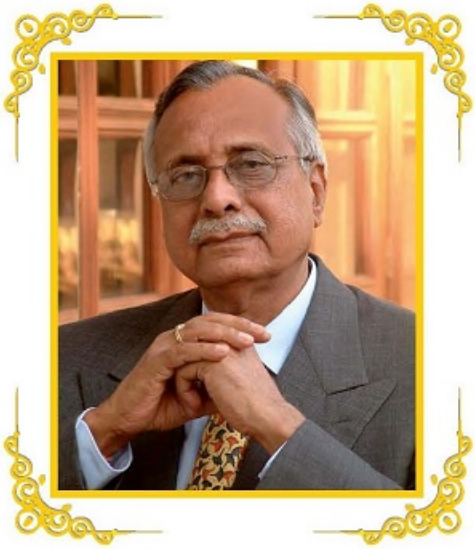
IEEE Pune Section

Persistent
See Beyond, Rise Above

IEEE
PUNECON
2022



"An abiding trust in your abilities to perform,
a strong determination to never give up and
unshakeable belief in yourself are all you need to
conquer the pinnacles of success"

Late Shri. Pralhad P. Chhabria

(12/03/1930 - 05/05/2016)

Founder President - I^2IT, Founder Chairman - Finolex Group

2022 IEEE Pune Section's
International Conference

IEEE PuneCon 2022

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IEEE Pune Section

Persistent
See Beyond, Rise Above

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Message

Aruna M Katara
President
Hope Foundation and Research Centre
Mentor, IEEE PuneCon 2022

Respected dignitaries, delegates, authors, colleagues, and friends,

I thank you all for being a part of the 5th IEEE Pune Section's International Conference on Information, Implementation, and Innovation in Technology (IEEE PuneCon 2022), hosted on our beautiful campus.

I am glad to see that I²IT provided this platform for researchers, academicians, professionals, and students to learn, share, and develop innovative ideas.

I²IT is the dream of our Chairman, Late Shri P P Chhabria, who envisioned this institute to grow into one of India's foremost knowledge hubs that will foster research and be known as an academic centre of excellence. IEEE PuneCon 2022 is a step towards realizing this dream.

India has the potential to be the next superpower, but for that to happen, our academic institutes need to encourage research and entrepreneurship. We're hopeful that through IEEE PuneCon 2022, everyone will be able to take away useful ideas and connections that will help them progress further in their careers. We're looking forward to hosting a successful conference that will feature both familiar elements as well as new and innovative ones.

On behalf of the entire team, I would like to express our sincerest gratitude to all of the authors, speakers, delegates, and other notable guests for their time and for sharing their experiences with us.

Kudos to Team I²IT for having hosted this conference!

Message

Dr. Anand Deshpande
Founder, Chairman and Managing Director
Persistent Systems Ltd.
Mentor, IEEE PuneCon 2022

"I am pleased that Persistent is closely associated with IEEE PuneCon 2022.

'Continuous innovation' has become critical to keep up with the demands of our ever-evolving world. I believe that breakthrough technology innovations do not happen in silos. To harness innovation, it is essential that students, researchers, and experts come together and share their perspectives on the latest technologies. I am glad that IEEE PuneCon 2022 provides the presenters from academic, research, and industry backgrounds with a unique platform to collaborate, network, exchange ideas, and showcase their technical innovations.

With papers covering themes such as Sustainable Ecosystem, Technological Innovations, AI & Applications, IoT & Robotics, Data Science and Communication & Signal Processing, I am confident that the technical discussions from IEEE PuneCon 2022 will spur many innovative outcomes. Here's wishing the speakers, participants & organizers all the very best! "

Message

Amrita Katara
Managing Trustee
Hope Foundation and Research Centre
Chief Patron, IEEE PuneCon 2022

Respected dignitaries, delegates, authors, colleagues, and friends,

It is indeed an honour and it gives me immense pleasure to welcome you all to the 5th IEEE Pune Section's International Conference on Information, Implementation, and Innovation in Technology (IEEE PuneCon 2022). It is a moment of pride to host the very prestigious annual event of IEEE Pune Section in association with Persistent Systems. In the current era of startups, India has added one unicorn almost every week in the past year and has emerged as the world's 3rd largest ecosystem enabler for startups. Information, Implementation and Innovation in Technology being the theme of this conference perfectly blends with the need of the hour, to encourage and nurture the entrepreneurship ethos and culture which will act as a catalyst to outperform the global competition in various economic sectors. Various tracks of this conference such as Artificial Intelligence, IoT & Robotics, Data Science, Sustainable Ecosystem, and Technological Innovations will certainly pave the path to indigenous innovations and state-of-art product development and implementation for the various technological challenges in a sustainable and scalable manner for our country.

I would like to express my best wishes and hearty congratulations to the entire organising committee who started working on the preparations almost a year ago, to the Technical Program Committee, Publication Team, Registration Team and every individual who has contributed in many ways to make this international conference become an incredible reality post covid.

I hope all the participants will have a fulfilling learning experience and will make this 5th edition of IEEE Pune Section International Conference a grand success.

Message

Mr. Girish Khilari
Chief Patron, IEEE PuneCon 2022
Chair, IEEE Pune Section

IEEE PuneCon 2022, the 5th edition of this international conference will build upon the success of its predecessors by continuing to deliver value in the form of new information, implementation, and innovation in technology.

The IEEE Pune Section International Conference strives to be a premier event that gives researchers from all over the world a chance to share their ideas and showcase their technical expertise. This conference focuses on a variety of topics related to technology and progress, including sustainable ecosystems, technological innovations, artificial intelligence and applications, the IoT and robotics, data science, communication, and signal processing. Attendees can expect to gain insights into cutting-edge technologies and recent innovations.

It is being organized jointly by the IEEE Pune Section and the International Institute of Information Technology (I^2IT), Pune, in association with Persistent Systems.

My deepest congratulations to all of the keynote speakers, delegates, research scholars, institute faculty members, and every member of the organizing committee for making this conference a roaring success in 2022.

Message

Dr. Pandurang Kamat
Chief Technology Officer
Persistent Systems Ltd.
Chief Patron, IEEE PuneCon 2022

We are excited to be a part of IEEE PuneCon 2022, jointly organized by IEEE Pune Section and International Institute of Information Technology (I^2IT), Pune, and Persistent Systems. This year's theme for the conference focuses on 'Information, Implementation, and Innovation in Technology' and explores problems & opportunities in these areas.

IEEE PuneCon 2022 is an excellent platform for students, researchers, engineers, and professionals to present technical papers on sustainable and cutting-edge technologies. For 30+ years Persistent has made deliberate efforts to contribute to the thriving technology ecosystem in Pune, bridge the Industry-Academia gap, and enable platforms that foster collaboration and innovation. This conference aligns with our ethos and we look forward to 3 days of brilliant ideas and thought-provoking discussions.

Message

Dr. Vaishali Patil
Principal, I²IT, Pune
General Chair, IEEE PuneCon 2022

I am thrilled to welcome you all to the IEEE Pune Section's International Conference, IEEE PuneCon 2022. Over the years IEEE PuneCon, the flagship event of IEEE Pune Section has evolved to attain greater heights of standards and accomplished a good recognition. We are honored to be hosting IEEE PuneCon 2022 in association with IEEE Pune Section and Persistent Systems. This year's conference is based on the theme of "Information, Implementation, and Innovation in Technology" and we hope that the talks and discussions over the course of the conference will be meaningful and provide valuable insights.

The topics of the keynote talks are aligned with this theme and the distinguished speakers will highlight the significance from the perspective of their expertise. The conference provides a platform for researchers, academicians and professionals from diversified domains to present their work and seek reviews from experts. It offers them an opportunity to network and exchange ideas through intensive interactions thus opening wider avenues in allied fields. I am pleased to share that IEEE PuneCon 2022 has received an overwhelmingly positive response in terms of paper submissions.

I would like to sincerely thank all of the authors for their participation in this conference. I extend my sincerest gratitude to the reviewers for their outstanding contribution in terms of the judicious evaluation of a large number of submissions. I am grateful to the organizations that have offered financial sponsorship and supported the conference. The success of the conference is an outcome of the dedicated and consistent efforts of all the committee members who started the preparations almost a year ago.

Thank you all for your hard work and dedication!

Message

Dr. Rajesh Ingle
General Chair, IEEE PuneCon 2022
Chair, IEEE Computer Society Pune Chapter
Chair, IEEE R10 (Asia Pacific) SAC (2015-2018)
Vice-Chair, MD, IEEE India Council

It gives me immense pleasure to write this message for the 'IEEE PuneCon 2022, scheduled from 15th to 17th December 2022 in Pune, India at International Institute of Information Technology (I^2IT), Pune.

The main objective of the conference to identify and explore the issues, opportunities, and solutions to various problems in society, environment, and industry using cutting-edge techniques of Science and Technology by bringing together researchers from Academia and Industry. This conference will provide a platform for researchers, engineers, and practitioners to contribute to identifying emerging research topics and present the latest advances & innovations in theories, applications, infrastructure, and schemes. The theme of IEEE PuneCon2022 being 'Information, Implementation and Innovation in Technology' includes all aspects of Information, Implementation and Technological Innovations to bring together Researchers, Engineers, and practitioners. It encompasses wide and diverse topics of applications in the fields of Science, Engineering, Technology, and Management.

IEEE is the world's largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity. IEEE Pune Section was established on June 26, 2010. The Section falls under the jurisdiction of the Asia Pacific Region (R-10) of IEEE. The Section interfaces with the industries and academia through various technical and humanitarian activities.

I am confident that IEEE PuneCon 2022 will be immensely valuable for scholars and researchers, and hope that all participants will enjoy their stay in Pune. I welcome you all for this memorable experience "IEEE PUNECON 2022"

Best wishes!

Message

Dr. Vivek Deshpande
Organizing Chair, IEEE PuneCon 2022
Conference Chair, IEEE Pune Section

It gives us immense pleasure to welcome all the research scholars, industry experts, faculty members; students for the IEEE PuneCon 2022) scheduled on 15-17 December 2022 at I^2IT Pune. This conference provides a fantastic opportunity for scholars to network interact, and meet world-renowned professionals while learning, exchanging ideas, and solving problems. Many high-quality expert conversations are expected to assist students and young researchers in learning about Information, Implementation, and Innovation Technology. World-class keynote speeches, instructional talks, and special sessions will be presented by scholars and experts from academia, industry, and research organizations at IEEE PuneCon-2022.

The overwhelming response of researchers for submission is a matter of pleasure to note. The participation of all the presenters at IEEE PuneCon 2022 will enrich their experience with good interactions with the international technical community.

These contributions were subjected to a rigorous evaluation process by an intellectual panel member comprised of professionals in respective disciplines. Submissions for presentation and, as a result, publication in the proceedings are encouraged. We are convinced that the discussions and deliberations will be of the greatest level and that the presentations will be successful. All presenter's involvement in IEEE PuneCon 2022 will enrich their experience by allowing them to interact with members of the international technical community.

We are certain that this conference will bring people from similar fields together to exchange their innovative ideas and experiences, as well as to work on joint projects.

Message

Prof. (Dr.) Varsha Degaonkar
Organizing Chair, IEEE PuneCon 2022

Innovation is the process of coming up with new ways to do things. Every aspect of life can benefit from innovation. Innovators should be good at associating, questioning, discovering, and experimenting. Technology and its related advancements are directly linked to organizational growth. To come up with better inventions, engineering, design, and education must work together. The phases of innovation are idea generation, problem solving, and implementation.

The theme of IEEE PuneCon2022 is "Information, Implementation, and Innovation in Technology," which includes all aspects of Information, Implementation, and Technological Innovations to bring together Researchers, Engineers, and practitioners. It encompasses wide and diverse topics of applications in the fields of Science, Engineering, Technology, and Management.

IEEE PuneCon2022 aims to identify and explore the issues, opportunities, and solutions to various problems in society, the environment, and industry using cutting-edge techniques of science and technology by bringing together researchers from academia and industry in a unique forum.

It's an honor to be the Organizing Chair for the 5th IEEE Pune Section International Conference on Information, Implementation, and Innovation in Technology, IEEE PuneCon 2022. This will be held at I^{2}IT, Pune, India over a span of three days with an impressive lineup of keynote speeches and six different parallel oral presentation sessions. In addition, there will be workshops focused on Artificial Intelligence, Extended Reality, SAP, Interpretable Enterprises and Blockchain.

This three-day event will undoubtedly establish a brand-new set of innovation clusters in the future.

Kudos!!!

Chief Guest - Inauguration

Dr. Shailendra V Gade
Outstanding Scientist and Director General,
Armament and Combat Engineering (ACE), DRDO

Dr. Shailendra V Gade, Outstanding Scientist Sc'H' has been appointed as 'The Director General (Armament and Combat Engineering Systems DG (ACE) Pune w. e. f. 1st Sep 2022. As DG (ACE) he is heading 9 Laboratories of DRDO namely ARDE Pune, HEMRL Pune, R &D E (E) Pune, MSC Pune, ACEM Nasik, VRDE Ahmednagar, CVRDE Chennai, PXE Balasore and OGRE Chandigarh & Manali. He joined ARDE (DRDO) Pune in Mar 87. In Jul 2021, he was appointed as Director VRDE Ahmednagar.

Dr. Shailendra V Gade obtained B. E. in Mech. Engineering from NIT Raipur in 1985. He pursued post-graduation (M. Tech.) in Mech. Engg. (Design) from IIT Bombay and Ph.D. from IIT Delhi in the area of High-velocity impact.

Dr. Gade as Project Director ATAGS has spearheaded the flagship and one of the most ambitious projects of DRDO '155 mm x 52 Calibre Advanced Towed Artillery Gun System (ATAGS)' at ARDE. The ATAGS is arguably the best Artillery Gun system of the world. Under his leadership, ten fully integrated ATAGS have been realized achieving all the OR parameters. The systems have undergone winter PSOR trials at SFFR Sikkim in Feb 2021 and summer PSOR trials at PFFR Pokharan in Apr 22 successfully and demonstrated their firepower and mobility in different terrains.

Dr. Gade initially worked on the Design and development of the Launcher System for India's fully Indigenous Multi Barrel Rocket Launcher System -Pinaka and played a pivotal role towards fructifying this system and its induction into Army. Subsequently, he took over the Small Arms group at ARDE and led the team successfully towards realizing, Joint Venture Protective Carbine (JVPC), Under Barrel Grenade Launcher (UBGL), Multi-Calibre Individual Weapon System (MCIWS), Air Bursting Grenade (ABG) apart from improvements in the INSAS Small Arms. Dr. S V Gade carried out extensive research and formulated a project proposal on 'Future Infantry Soldier as a System (FINSAS)' towards enhancing the capabilities of the Soldiers in the areas of lethality, Surveillance, Survivability, protection and Communication. The Army is constantly working towards implementing the concept of F-INSAS in Indian army.

Dr. Gade has led the team in developing the Armament System for Infantry Combat Vehicle (ICV) for DRDO's project Abhay. Abhay was equipped with a main Gun system and a very innovative two column feed and ejection system to handle two different Ammunitions. He has been instrumental in leading the team in developing various FSAPDS and practice Ammn. for MBT Arjun and other main Battle tanks. He has been associated with several critical projects at VRDE namely Wheeled Armoured Platform 8x8 (WhAP), Infantry Protected Mobility Vehicle (IPMV), CBRN (Tracked), CBRN (Wheeled), 70 Tonne Trailer for MBT Arjun, 155 mmx 52 Cal MGS, 180 HP engine for UAV Rustom Mark II, Robotic Kit for

Chief Guest - Inauguration

Autonomous driving (UGV). He is also spearheading several strategic systems projects.

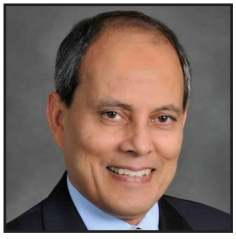
Technical Expertise: Dr Gade has expertise in the design of Small Arms, Artillery and tank Guns, Modeling & Simulations, Manufacturing technologies, System-Integration, Test & Evaluation, Composite materials, All Electric servo control, Electrohydraulic control systems, Kinematics & Synthesis of mechanisms, Materials engineering, Kinetic energy Ammunition, Numerical simulation of penetration mechanisms, behaviour of materials at high strain rate, surface engineering technologies etc.

Honours and Awards: Recipient of DRDO Performance Excellence Award 2002 (for Pinaka), Team Leader award for 'Modern Sub Machine Carbine' in 2006, Team Leader award for Armament System for ICV Abhay in 2008, DRDO 'Scientist of the Year award 2013',Team leader award for Air Bursting grenade in 2015, Team Leader award for ATAGS in 2017, DRDO 'Agni Award for Excellence in Self Reliance 2017' for ATAGS. Recently declared DRDO Award 2020 for Best innovation/ Futuristic Development as a Team Leader. Under his leadership, VRDE has been announced Silicon Trophy for 2020.

Research Guide & Publications: Guided B Tech & M Tech students as Project Guide. He has more than 40 papers to his credit in National & International Journals. He has been delivering technical lectures in the Infantry and Artillery International conferences.

Membership of Professional Bodies: He is a member of many professional societies.

Chief Guest - Inauguration



Dr. Saifur Rahman
Director, Virginia Tech Advanced Research Institute, USA
2022 IEEE President-Elect

Saifur Rahman, IEEE Life Fellow, has been elected as the 2022 IEEE President-Elect. Over the past 40+ years, IEEE has been an integral part of his pursuit of excellence in professional life. While speaking at 200+ IEEE events in all ten regions, he has come across academics, young professionals, mid-career engineers in industry and government, and corporate executives including women and under-represented minorities. Engagements with members and volunteers globally at the grassroots level have given him better insights to understand the community needs in developing relevant programs to advance their professional careers.

Dr. Saifur Rahman is the founding director of the Advanced Research Institute at Virginia Tech. He has served as the chair of the US National Science Foundation Advisory Committee for International Science and Engineering from 2010 to 2013. He is the founder of BEM Controls, LLC, a software company which provides building energy efficiency solutions. In 2006 he served on the IEEE Board of Directors as the vice president for publications.

Dr. Saifur Rahman is a distinguished lecturer for IEEE Power & Energy Society, and has lectured on renewable energy, energy efficiency, smart grid, energy internet, blockchain, IoT sensor integration, etc. in over 30 countries.

His research at Virginia Tech has been funded by Duke Energy, Tokyo Electric Power Company, the US National Science Foundation, the US Department of Defense, the US Department of Energy, and the State of Virginia.

He has trained over forty doctoral/postdoctoral students.

Dr. Saifur Rahman was the president of the IEEE Power and Energy Society (PES) for 2018 and 2019. He is the founding editor-in-chief of the IEEE Electrification Magazine and the IEEE Transactions on Sustainable Energy. He has published more than 160 journal papers and has made more than 500 conferences and invited presentations. His h-index is 56 with close to seventeen thousand citations.

Awards

- "IEEE Technical Activities Board Hall of Honor", 2014 Honoree.
- "Outstanding Power Engineering Educator Award", IEEE Power & Energy Society, 2013.
- "Meritorious Service Award", IEEE Power & Energy Society, 2012.
- "IEEE-USA Divisional Professional Leadership Award", 2012.

Chief Guest - Inauguration

- “IEEE-USA Professional Achievement Award”, 2011.
- “IEEE Millennium Medal” for outstanding achievements and contributions to IEEE, April 2000.
- “Outstanding Young Engineer,” IEEE Virginia Mountain Section, 1983.

Guest of Honor - Inauguration

Dr. Abhay Wagh
Director
Directorate of Technical Education, Maharashtra State

Dr. Abhay Wagh is presently working as Director, Maharashtra State Board of Technical Education. He is working in the field of Technical Education from last 29 Years in various capacity: as teaching faculty, trainer, administrator, and policy maker. He has experience of implementing several projects for Technical Education. Dr. Abhay Wagh worked as Deputy Secretary to the Government of Maharashtra in Higher & Technical Education Department, Mantralaya. He has also worked as a Joint Director, Dy. Director & Asst. Director(T) in the Directorate of Technical Education, Maharashtra. Dr. Abhay Wagh worked as State Project Advisor for the World Bank Assisted 'Technical Education Quality Improvement Programme' Phase II (TEQIP-II) for the State of Maharashtra. He has worked for the prestigious 'Rashtriya Uchchatar Shiksha Abhiyan (RUSA)' of the Ministry of Human Resource Development (MHRD), Government of India. He has worked as a State Nodal Officer for the Community College Project of MHRD, Government of India.

Achievements:

- Recipient of the 'Skoch Gold Award of Excellence' for successfully implementing 10 projects in the State of Maharashtra based on good governance, during the 37th Skoch Summit on 'Minimum Government, Maximum Governance'.
- Awarded with 'E-Maharashtra' honour for efforts in e-administration by Directorate of Information Technology, Govt. of Maharashtra.
- Promising Engineer Award from Institution of Engineers at Nashik in 2001.
- Awarded with 'Vidnyan Nishtha Puraskar' by Kanushri Pratishthan in 2007.
- 'Maratha Seva Sangh Award' for first Doctorate in Electronics Engineering in North Maharashtra Region.
- Awarded "Gaurav Patra" for Social Contribution to Society.
- Awarded "Kartavya Daksha Adhikari 2004-05" from Vidyarthi Kruti Samiti, Nashik in 2005.

Ph.D. Guidance: Approved Research Guide for Ph.D. Programme in different Universities viz. Dr. Babasaheb Ambedkar Marathwada University Aurangabad, Veermata Jijabai Technological Institute (VJTI) Mumbai & Sant Gadge Baba Amravati University. Guided several Ph.D. students in the field of Electronics Engineering and related areas.

Research Areas: The different areas of Communication Engineering with Special Interest in Fiber optics, LASERS, RF and Microwave Circuits, Modeling and Simulation, Power Electronics. Currently guiding research scholars working in the areas of face recognition, facial biometrics, Wavelets, WiMAX, genetic algorithms etc.

Research Publications: Published 35 papers in International/National Journals/Conferences.

Chief Guest - Valedictory

Prof. Rajkumar Buyya
Director, Cloud Computing and Distributed Systems (CLOUDS) Lab,
The University of Melbourne, Australia
CEO, Manjrasoft Pvt Ltd, Melbourne, Australia

Dr. Rajkumar Buyya is a Redmond Barry Distinguished Professor and Director of the Cloud Computing and Distributed Systems (CLOUDS) Laboratory at the University of Melbourne, Australia. He is also serving as the founding CEO of Manjrasoft, a spin-off company of the University, commercializing its innovations in Cloud Computing. He has authored over 850 publications and seven textbooks including "Mastering Cloud Computing" published by McGraw Hill, China Machine Press, and Morgan Kaufmann for Indian, Chinese and international markets respectively. Dr. Buyya is one of the highly cited authors in computer science and software engineering worldwide (h-index=157, g-index=342, and 129,200+ citations). Dr. Buyya is recognised as Web of Science "Highly Cited Researcher" for six consecutive years since 2016, IEEE Fellow, and Scopus Researcher of the Year 2017 with Excellence in Innovative Research Award by Elsevier. He has been recognised as the "Best of the World" twice for research fields (in Computing Systems in 2019 and Software Systems in 2021) as well as "Lifetime Achiever" and "Superstar of Research" in "Engineering and Computer Science" discipline twice (2019 and 2021) by the Australian Research Review. He received 2021 "Research Innovation Award" from IEEE Technical Committee on Services Computing and 2021 "Research Impact Award" from IEEE Technical Committee on Cloud Computing.

Software technologies for Grid, Cloud, and Fog computing developed under Dr.Buyya's leadership have gained rapid acceptance and are in use at several academic institutions and commercial enterprises in 50+ countries around the world. Manjrasoft's Aneka Cloud technology developed under his leadership has received "Frost New Product Innovation Award". Dr. Buyya received "Mahatma Gandhi Award" along with Gold Medals for his outstanding and extraordinary achievements in Information Technology field and services rendered to promote greater friendship and India-International cooperation. He served as founding Editor-in-Chief of the IEEE Transactions on Cloud Computing. He is currently serving as Editor-in-Chief of Software: Practice and Experience, a long-standing journal in the field established 50+ years ago. He has presented over 700 invited talks (keynotes, tutorials, and seminars) on his vision on IT Futures, Advanced Computing technologies, and Spiritual Science at international conferences and institutions in Asia, Australia, Europe, North America, and South America. He is recently recognized as a Fellow of the Academy of Europe.

For further information on Dr.Buyya, please visit his cyberhome: www.buyya.com

Keynote Speaker

Takako Hashimoto, PhD
Vice President, Director of International Center,
Chiba University of Commerce (Professor),
IEEE Japan Council Chair,
BoG Member, IEEE Computer Society

Keynote Address: Structuring Topics on Large-Scale Twitter for Discovering People's Perceptions

Abstract: Twitter is one of the most influential microblogging services today, where users exchange messages. In this talk, a clustering method for structuring large scale Twitter data and automatically discovering topics, as well as its applications, will be presented. We evaluate the computational efficiency of the proposed method and also show that its scalability systematically improves as the data volume increases. We apply the proposed method to a large Twitter dataset (26 million tweets) on COVID-19 vaccination in Japan. In addition, we collect more than 100 million vaccine-related tweets posted by 8 million users and use the Latent Dirichlet Using the Allocation model, we perform automated topic modeling of tweet text during a vaccination campaign in Japan, and show that citizen participation on social platforms contributed to reducing anxiety and speeding up vaccination through social learning and support.

Keynote Speaker

Srikanth Thiagarajan, PhD
Clinical Trials and Algorithm Lead,
Medical Products Group, ADI USA

Keynote Address: Management and Utilization of Data in the Context of Growing Role of Clinical Grade Wearable Devices

Abstract: In the current presentation, the focus is on actual clinical grade wearable medical devices used in-hospital and out-of-hospital. They are not new phenomena – several medical grade devices are already ambulatory and are usable as wearable devices; in some applications, wearable devices are a quick alternatives for implantable devices and in some other applications, wearable devices have created a space for themselves.

Earlier generation of in-hospital devices used a combination of PC based applications and embedded platforms; in the current generation of wearable medical devices, part of the computation happens in the wearable platform (as an embedded computation) and rest of the computation happens in the cloud platform.

Data in the context of wearable medical devices consist of two distinct categories: clinical and non-clinical. Clinical information can be related to patient's prior conditions and current measurements that are being done using a wearable device. In the long term monitoring device, this information can be over a few months or up to a few years also. Clinical information is highly personal and access can be regulated to be available mainly for the service providers and the patient or patient nominated relatives.

Non-clinical information from medical grade wearable devices include status and location information from the wearable devices, and information related and relevant to service provider or an hospital system. Monitoring diagnostics from a central triaging facility can access these information from multiple patients associated with a hospital system or region. In other words, concepts from centralized monitoring system in an ICU ward are getting adapted over a geographical area or over an Institution supported area, and used in data monitoring and presentation. Processes and triaging services are utilized for alarm services, as used in bio-telemetry services.

Current presentation will discuss sample applications, and the nature of different monitoring offered as medical systems move towards remote patient monitoring (RPM) applications.

Keynote Speaker

Prof. Rajkumar Buyya
Director, Cloud Computing and Distributed Systems (CLOUDS) Lab,
The University of Melbourne, Australia
CEO, Manjrasoft Pvt Ltd, Melbourne, Australia

Keynote Address: Neoteric Frontiers in Cloud, Edge, and Quantum Computing

Abstract: Computing is being transformed to a model consisting of services that are delivered in a manner similar to utilities such as water, electricity, gas, and telephony. In such a model, users access services based on their requirements without regard to where the services are hosted or how they are delivered. Cloud computing paradigm has turned this vision of "computing utilities" into a reality. It offers infrastructure, platform, and software as services, which are made available to consumers as subscription-oriented services. Cloud application platforms need to offer (1) APIs and tools for rapid creation of elastic applications and (2) a runtime system for deployment of applications on geographically distributed Data Centre infrastructures (with Quantum computing nodes) in a seamless manner.

The Internet of Things (IoT) paradigm enables seamless integration of cyber-and-physical worlds and opening opportunities for creating new class of applications for domains such as smart cities, smart robotics, and smart healthcare. The emerging Fog/Edge computing paradigms support latency sensitive/real-time IoT applications with a seamless integration of network-wide resources all the way from edge to the Cloud.

This keynote presentation will cover (a) 21st century vision of computing and identifies various IT paradigms promising to deliver the vision of computing utilities; (b) innovative architecture for creating elastic Clouds integrating edge resources and managed Clouds, (c) Aneka 5G, a Cloud Application Platform, for rapid development of Cloud/Big Data applications and their deployment on private/public Clouds with resource provisioning driven by SLAs, (d) a novel FogBus software framework with Blockchain-based data-integrity management for facilitating end-to-end IoT-Fog/Edge-Cloud integration for execution of sensitive IoT applications, (e) experimental results on deploying Cloud and Big Data/ IoT applications in engineering, and health care (e.g., COVID-19), deep learning/Artificial intelligence (AI), satellite image processing, and natural language processing (mining COVID-19 research literature for new insights) on elastic Clouds, (f) QFaaS: A Serverless Function-as-a-Service Framework for Quantum Computing, and (g) directions for delivering our 21st century vision along with pathways for future research in Cloud and Edge/Fog computing.

Keynote Speaker

Shilpa Ramteke
Architect, Persistent Systems

Keynote Address: Introduction to Extended Reality (XR) – Augmented Reality/Virtual Reality/Mixed Reality

Abstract: Extended Reality (XR) is a term referring to all real and virtual combined environments and human-machine interactions generated by computer technology and wearables. It covers all the immersive technologies - Augmented Reality (AR), Virtual Reality (VR) and Mixed Reality (MR). XR is a set of technologies that will fundamentally change the way we interact with our environment. For these immersive technologies to become a form of interaction, we need to understand what each of them do, how they can be perceived and where they can be applied. These represent a merging of the physical and the digital worlds into rich, context aware and accessible user interfaces.

XR applications are currently being adopted and used in several domains such as Healthcare, Manufacturing, Telecommunication, etc. and they can address many use cases requiring real time solutions and information. Also, the current Metaverse adoption for collaborations and interactions in 3D spaces and environments with multi-users, is an amalgamation of all these XR technologies.

Keynote Speaker

Ravindra Naik
Chief Scientist,
TCS Research

Keynote Address: Interpretable Enterprises – a way forward

Abstract: Software systems that automate an Enterprise may use a variety of technologies and rely on AI-based analytics for making decisions. But the enterprise and the software systems generally have difficulty in answering the mundane, day-to-day questions of their customers regarding their products and services. If business owners want to make changes in the rules of the products or services, it is difficult to precisely analyze the impact of such changes on the overall behaviour of the products and services. To address these and other similar challenges that every enterprise or business faces today, we propose a set of machine-processable representations, with a human-readable notation of the business products and services offered by the enterprise; referred to as enterprise knowledge. We discuss potential ways of interpreting and processing such enterprise knowledge to answer questions of the customers and business sponsors. Such representations also serve as digitized requirements of the enterprise for constructing its software systems. We bring out the possible ways of creating and authoring such digitized enterprise knowledge from existing enterprise documents and existing software applications.

IEEE PuneCon 2022 Conference Committee

Mentor	
Ms. Aruna Katara President, Hope Foundation and Research Centre	**Dr. Anand Deshpande** Founder, Chairman and Managing Director, Persistent Systems
Chief Patron	
Ms. Amrita Katara Managing Trustee, Hope Foundation and Research Centre	**Mr. Girish Khilari** Chair, IEEE Pune Section; CTO and Director, Elliot Systems
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PuneCon 2022 Programme Schedule

DAY 1: 15th December 2022 Thursday

TIME	SESSION	SPEAKER	VENUE
10.00 am - 10.30 am	**Keynote address: -** Introduction to Extended Reality (XR) – Augmented Reality/Virtual Reality/Mixed Reality	**Shilpa Ramteke** Architect, Persistent Systems	Online Session
10.30 am - 1.00 pm	**Workshop: -** Responsible AI	**Reshma Kedar Godse** Senior Data Scientist, Persistent Systems	Online Session
	Workshop: -An Insight into SAP-ERP & its Functioning	**Ramesh Chinchnikar** Director (SAP Operations) Primus Tech Systems Pvt Ltd.	PPCRC, I^2IT
LUNCH BREAK			
2.00 pm - 2.30 pm	**Keynote address: -** Interpretable Enterprises – a way forward	**Ravindra Naik** Chief Scientist, TCS Research	PPCRC, I^2IT
2.30 pm - 5.00 pm	**Workshop: -**Beyond Text Mining – Towards Interpretable Representation of Enterprise Documents	**Ravindra Naik** Chief Scientist, TCS Research	PPCRC, I^2IT
	Workshop: -Demystifying Blockchain	**Naresh Jain** Co-Founder & COO, Snapper Future Tech	PPCRC, I^2IT

PuneCon 2022 Programme Schedule

DAY 2: 16th December 2022 Friday

TIME	SESSION	SPEAKER	VENUE
09.30 am - 11.00 am	**Inauguration Ceremony** **Chief Guest: Dr. Shailendra V Gade,** The Director General, Armament and Combat Engineering Systems, DG (ACE), DRDO **Chief Guest: Dr. Saifur Rahman,** Director, Virginia Tech Advanced Research Institute, USA 2022 IEEE President-Elect **Guest of Honor: Dr. Abhay Wagh,** Director, Directorate of Technical Education, Maharashtra State		Mohini Chhabria Convention Centre, I^2IT
11.00 am - 11.30 am	**Keynote address: -** Structuring Topics on Large-Scale Social Media for Discovering People's Perceptions	**Takako Hashimoto, PhD** Vice President, Director of International Center, Chiba University of Commerce (Professor), IEEE Japan Council Chair, BoG Member, IEEE Computer Society	Online Session
12.00 noon - 1.30 pm	Technical Paper Presentation Session 1		Online Session
LUNCH BREAK			
2.30 pm - 3.00 pm	**Keynote address: -** Management and Utilization of Data in the Context of Growing Role of Clinical Grade Wearable Devices	**Srikanth Thiagarajan, PhD** Clinical Trials and Algorithm Lead, Medical Products Group, ADI USA	Online Session
3.00 pm - 5.30 pm	Technical Paper Presentation Session 2		Online Session

PuneCon 2022 Programme Schedule

DAY 3: 17th December 2022 Saturday

TIME	SESSION	SPEAKER	VENUE
10.00 am - 11.30 am	Technical Paper Presentation Session 3		I^2IT
11.30 am - 12.00 noon	**Keynote address: -** Neoteric Frontiers in Cloud, Edge, and Quantum Computing for Big Data/IoT (Internet of Things) Applications	**Dr. Rajkumar Buyya,** Redmond Barry Distinguished Professor, Director, Cloud Computing and Distributed Systems (CLOUDS) Lab School of Computing and Information Systems The University of Melbourne, Australia	Mohini Chhabria Convention Centre, I^2IT
12.00 noon - 12.30pm	**Valedictory function:** **Dr. Rajkumar Buyya,** Redmond Barry Distinguished Professor, Director, Cloud Computing and Distributed Systems (CLOUDS) Lab School of Computing and Information Systems The University of Melbourne, Australia		Mohini Chhabria Convention Centre, I^2IT
LUNCH BREAK			

PuneCon 2022 Programme Schedule

Paper Presentation Session 1

16th December 2022, 12:00 Noon – 1:30 PM

Artificial Intelligence		Sustainable Ecosystem	
#ID	**Track 1**	**#ID**	**Track 2**
90	ARF [Augmented Reptile Feeder] Speaker: Pratiksha Dattatray Shinde	**245**	Selection of Digital Learning Platforms for Future Education 4.0 in India Speaker: Rajkamal Chhagan Sangole
187	Apollo XXI - An Astronomy Portal Speaker: Vaishnavi Bhokare	**277**	Flood Risk and Inundation Mapping of Assam using a GIS-based Approach Speaker: Anna C. Berlin
36	Real Estate Price Prediction using Supervised Learning Speaker: Vedang Matey	**250**	Simulation of a Grid Integration With Hybrid (Solar + Wind) Energy Systems by Using SPWM Inverter Speaker: Shubhangi Shivaji Pawar
221	Phishing Attack Detection on Text Messages Using Machine Learning Techniques Speaker: Swarangi Uplenchwar		
81	Categorization of Nutritional Deficiencies in Plants With Random Forest Speaker: Kavitha S		
220	An Electroencephalogram Based Detection of Hook and Span Hand Gestures Speaker: Swati Shilaskar		

PuneCon 2022 Programme Schedule

Paper Presentation Session 1

16th December 2022, 12:00 Noon – 1:30 PM

Technological Innovations		Internet of Things and Robotics	
#ID	**Track 3**	**#ID**	**Track 4**
222	Small-Scale Relational Database Management System Speaker: Spurthi Bhat	**196**	Design and Development of Autonomous Mobile Robot for Mapping and Navigation system Speaker: Kiran B
193	Leveraging the Fullest Potential of Online Teaching Learning: A Design Thinking Framework Approach Speaker: Dr. R. S. Kamath	**111**	IoT Based Theft Detection in Three Phase Distribution Line Speaker: Pranav Potdar
32	Flying ad hoc network (FANET): Opportunities, trending applications and simulators Speaker: Ashish Singh Parihar	**155**	Photoplethysmography sensors concept and advancements: A review Speaker: Shaunak Shiralkar
246	Education 4.0: Case Study on Selection of Digital Learning Platform and Communication Tools for Future Education 4.0 in India Speaker : Rajkamal Chhagan Sangole	**153**	IOT Based Intelligent Healthcare monitoring system Speaker: Prof. Anuradha Bakare
123	Bibliometric Analysis of Online Food Delivery: A study on Pre (COVID-19) and Current Scenario Speaker: Dilip Kumar	**254**	RAKSHAK - An energy efficient intelligent helmet Speaker: Aditya Venkata Sheshu
114	The Secure E-Wallet Powered by Blockchain and Distributed Ledger Technology Speaker: Nilesh P. Sable		

PuneCon 2022 Programme Schedule

Paper Presentation Session 1

16th December 2022, 12:00 Noon – 1:30 PM

Data Science		Communication & Signal Processing	
#ID	**Track 5**	**#ID**	**Track 6**
244	A Case Study on Use of Blockchain Technology as a Dominant Feature to Issue and Verify Documents Required for Admission to UG/PG Technical Programs in Maharashtra (India) Speaker: Anandkumar Ashokchand Jain	**185**	Human Emotion recognition using Gabor variance features with back propagation neural network classifier Speaker: Kanchan S. Vaidya
186	Search-based Feature Selection for Cross-Project Defect Prediction Speaker: Yogita Khatri	**259**	Watermelon Ripeness Detector using Signal Processing Speaker : Veena Karjigi
194	Magnitude Prediction Model for Japan Seismic Tremors Using Artificial Neural Network Speaker: Dr. R. S. Kamath	**269**	Brain Tumor Detection System using Convolutional Neural Network Speaker: Shubham Ravindra Koshti
217	High-Level Design and Rapid Implementation of Blockchain-Based Real Time Supply Chain Platform Speaker: Deptii Chaudhari	**34**	Real Time Network Intrusion Detection using Machine Learning Technique Speaker: Adrian Dsouza
218	YouTube Trend Analysis Speaker: Saumya Patni	**85**	An Algorithm for Auto-threshold for Mouth ROI Speaker: Shilpa Sonawane

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Paper Presentation Session 2

16th December 2022, 03:00 PM – 5:30 PM

Artificial Intelligence		Artificial Intelligence	
#ID	**Track 1**	**#ID**	**Track 2**
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258	AI and Deep Learning based Mask Detection System using Generic Camera Speaker: C. H. Patil	**230**	Vehicle Characteristic Recognition by Appearance: Computer Vision Methods for Vehicle Make, Color, and License Plate Classification Speaker: Aayush Agarwal
255	A Review of Deep Learning Application in Oral Cancer Prognosis Speaker : Sayyada Hajera Begum	**183**	Best-Fit: Best Fit Employee Recommendation Speaker: Sumit Raut
139	A Modified Approach Of Hyper-parameter Optimization To Assess The Classifier Performance Speaker: Dr D Lakshmi Padmaja	**204**	Heart Failure Prediction with Ensembled Learning Speaker: Dr. Deepali Vora
203	Machine Learning Approach: Consumer Buying Behavior Analysis Speaker: Sashikala Mishra	**261**	AI Virtual Hardware Speaker: Tummala Sravya
243	Vision-based monitoring of student attentiveness in an e-learning environment Speaker: Jyoti Rishikesh Madake	**229**	Various Aspects and Progression of Group-Based Emotion Recognition Methods: A Review Speaker: Prajyot Haribhau Mohite
242	Forest Cover Change Detection of Sahyadri Ranges, India Speaker: Jyoti Rishikesh Madake	**226**	Image-dev : An Advance Text to Image AI model Speaker: Manavkumar Patel

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202	Effective utilization of Machine learning techniques to classify Breast Cancer tumors Speaker : Gauri Prakash Kamath	**134**	Crop Yield Prediction And Recommendation System Speaker: Nachiket Pethe
105	A Web-based Application for Snake Species Identification using Vision Transformer and CNN-based Ensemble Meta Classifier Speaker: Kanishka Dandeniya		

Paper Presentation Session 2

16th December 2022, 03:00 PM – 5:30 PM

Technological Innovations	
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276	Online Examination and Evaluation System Speaker: Dr. Harshad Kumar Dandage
234	Hand Gesture Identification and Voice Command Based Hardware Reduction Speaker: Amogh Godbole
233	A Forensic Methodology for the Analysis of Twitter Application in Android Devices Speaker: Priyanka V S
280	A Covid-19 Tracker for Medical Front-liners Speaker: Rajeev Ramesh
72	Method for extracting data from an overprovisioned SSD Speaker: Hepi Suthar

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Paper Presentation Session 3 (Offline Mode Only)

17th December 2022, 11:00 AM – 12:30 PM

AI/ DS/ IoT & Robotics		TI/ SE/ CSP	
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106	Preview of trained Manpower in Electric Vehicle Sector (IoT & Robotics) Speaker: Kaliprasad Mahapatro	**265**	Green synthesis and characterization of Ag-PANI (Polyaniline) nanocomposite and its application as a carboxylate vapour sensor (SE) Speaker: Madhura S Walujkar
157	A Strategy to Identify Loyalty Using Elbow Curve Method for Customer Segmentation (DS) Speaker: Dr. Baljeet Kaur	**146**	Preview of trained Manpower in Electric Vehicle Sector (SE) Speaker: Mrs Gayatri K Palnitkar
169	Empowering Nonprofit Organization to Reduce Donation Attrition with Machine Learning (DS) Speaker: Manish Kumar	**206**	Autonomous Metro - A step towards Automation (TI) Speaker: Aniket Kulkarni
		281	Study and Analysis of 4G-5G Spectrum Mobile Signals on Germination Seed and Further Growth Speaker: Sharad Pustake

Abstracts

Paper ID: 32

Flying Ad Hoc Network (FANET): Opportunities, Trending Applications and Simulators

Ashish Parihar and Swarnendu Chakraborty

Abstract: Flying objects have always been an exciting and attractive world to feel and watch. It ranges from a fly-enabled playing toy to commercial planes. When it comes to the wireless networking domain, flying ad hoc network plays a vital role in managing and handling unmanned aerial vehicles (or drones) to serve a variety of real-time applications like in-agriculture, remote sensing, terrorist location tracking, good delivery, weather prediction, forest fire monitoring and many more. Since these drones have the flying capacity without any assistance from human personnel, their applicability regions are growing day by day. Now a days, this field is a center point of attraction for the researcher community due to its highly dynamic attributes and hence through this work, we present various research opportunities in this domain of drone-based networks along with a discussion to its trending applications. We have also discussed various existing simulators that are capable of modeling this kind of ad hoc domain in their platforms and quite helpful for future investigators to understand the best-suited environment for their art-of-works in regard to this field.

Keywords*: Drone network, Flying ad hoc network, Routing protocol, Unmanned aerial vehicle, 5G communication.*

Paper ID: 34

Real Time Network Intrusion Detection using Machine Learning Technique

Adrian Dsouza, Vedant Lanjewar, Abhishek Mahakal and Sunil Khachane

Abstract: This paper reflects the work carried out in network security using different machine learning techniques. In response to the exponential increase in network space breaches and data leaks, the demand for a system that can detect anomalies and notify the system admin is imperative. Using packet sniffing modules, we capture the packets and then compare them to a pre-trained machine learning module trained on the NSL KDD dataset to detect ambiguous packets. By selecting the desired port, the IDS sniff all incoming packets and categorizes them as anomalous if their behavior isn't normal. On successful prediction, we present the user with a choice of taking action against the prescribed threat or ignoring it as per the user's request. A detailed analysis report shall then be presented periodically to provide an overview of the overall health of the system on which our IDS system has been deployed.

Keywords*: Packet-sniffing, Real time intrusion, Decision tree, Network packets, NSL KDD, Intrusion Detection System, Anomaly Detection, Cyber security, Packet sniffing, DDOS, Firewall.*

Paper ID: 36

Real Estate Price Prediction using Supervised Learning

Vedang Matey, Nikita Chauhan, Aditi Mahale, Vidya Bhistannavar and Dr. Ajitkumar Shitole

Abstract: The least transparent sector of our economy is real estate. Housing prices change daily and are occasionally inflated rather

than based on an appraisal. The central focus of our approach is using fundamental factors to forecast house values. Here, we strive to establish our assessments on each essential aspect when deciding the house's price. In our project, three elements affect a house's price: its physical attributes, design, and location. There have been a lot of studies utilizing typical machine learning techniques to estimate house prices effectively. Still, they need to pay more attention to how well each model performs and ignore the less well-known but more sophisticated models. Our project involves predictions using different Regression techniques like Linear Regression, Lasso Regression, and Decision Tree. Our project includes estimating the price of houses without any expectations of market prices and cost increments. The project aims to predict residential prices for customers considering their financial plans and needs. This project means to predict house prices in Pune city with various regression techniques. The project aims to predict cogent housing prices for those who do not own homes depending on their financial capabilities and desires. Estimating pricing will be possible by examining the mentioned goods, fare ranges, and advancements. This initiative aims to enable individuals to pinpoint the specific timeline for home acquisition and sellers in assessing the cost of a home sale. Spending resources on web-based apps without consulting a broker will benefit clients.

Additionally, it provides a brief explanation of the various graphical and numerical techniques that are required to calculate the price of a home. Our study explains the goal of machine learning, the workings of the house pricing model, and the datasets that went into developing the model we suggest. Lasso, Decision Tree, and Linear Regression were among the models looked at in the study (accuracy: 83.54 percent) (accuracy – 77.88 percent).

***Keywords**: Machine learning, Linear regression, Lasso, Supervised machine learning, Feature extraction, Decision tree.*

Paper ID: 72

Method for Extracting Data from an Overprovisioned SSD

Hepi Suthar and Dr. Priyanka Sharma

***Abstract**:* The SSD market has been expanding quickly in recent years. There is a spare data storage space of the spare capacity/area and over provisioned capacity as a solution to issues such as the rewriting life of SSD. Additionally, it was reported that they could recover data from locations where it was impossible to access it normally. This also implies that data restoration is more difficult with SSD than with HDD. From the standpoint of digital forensics, we examine the differences between HDD and SSD data restoration. Then, we provide a fresh approach to data extraction from SSDs with over provisioned capacity.

***Keywords**: SSD, Digital Forensic, Over Provisioned Capacity, Secondary Memory, NAND Flash Memory*

Paper ID: 81

Categorization of Nutritional Deficiencies in Plants With Random Forest

Kavitha Nair and Kotadi Chinnaiah

***Abstract**:* Agriculture supports to greater extent for the means of living in India, especially in rural areas. But generally the crop production attained by farmers would be much below the optimal production. The main reason for the crop production gap is due to the lack of essential soil nutrients and irrigation in the agricultural farms. To escalate the crop production, it is essential to balance the chemical elements or nutrients present in the soil with varying parameters of soil like the pH and soil moisture. Crop productivity can be increased

to optimum level by efficient soil nutrient management. In case of Nutrient deficiencies, visual symptoms will appear on the leaf. This paper put forwards a method to identify the nutrient deficiencies of cabbage leaves by making use of visual symptoms appearing on the leaves by Classification. Seven types of deficiencies N, P, K, Ca, B, Zn and Mg are considered in this study.The proposed study consists of creation and pre- processing of a set of images consisting of nutrient deficient and healthy leaves of cabbage, feature extraction and by using Random Forest performing multi class classification of nutrient deficient leaves. The paper focuses on recognizing the visual indications of nutritional deficiency and thereafter classification.

***Keywords**: Balance, Classification, Nutritional Deficiency, Random Forest, Visual Symptoms*

Paper ID: 85

An Algorithm for Autothreshold for Mouth ROI

Shilpa Sonawane, Dr.Mrs.P.Malathi and Dr.B.B.Musmade

***Abstract**:* Lip reading technology is best possible solution of speech recognition in noisy environments. Lip reading is a methodology to interpret by lip movement without the involvement of audio. The accuracy of lip-reading technology is based on accurate mouth region of interest (ROI). Viola Jones algorithm is used for mouth region extraction. The accuracy by viola jones is affected by merge threshold parameter of cascade object detector. Due to incorrect threshold multiple bounding boxes appears for mouth ROI. The correct selection of merge threshold leads to single bounding box on mouth region. The technique to find appropriate threshold to extract mouth ROI is presented in this paper. The algorithm is applied on GRID and LRW dataset. Experiment is tested on both frontal and profile face video frames. The accuracy obtained on frontal face frames from GRID dataset is 100 % while 86.20 % accuracy achieved with profile video frames from LRW dataset.

***Keywords**: Viola Jones algorithm, cascade object detector, ROI, AAM, GRID, LRW.*

Paper ID: 90

ARF [Augmented Reptile Feeder]

Puja Chavan (Cholke), Pritam Shinde, Pratiksha Shinde, Sanket Shinde, Shobit Shinde and Suyash Shinde

***Abstract**:* This paper describes a method of gaming based on AR[Augmented Reality] and Computer Vision in the field of AI[Artificial Intelligence]. AI and AR include a wider range of applications in upcoming technologies. These technologies are becoming an integrated part of our way of life. These technologies are gaining more popularity in the gaming sector. AR games achieve popularity with the masses, causing growing addiction. We have developed a game called Augmented Reptile Feeder (ARF). We describe an algorithm based on the hand tracking module. The Augmented Reptile Feeder system is intended for 2D gaming innovations with real world interaction. This will be achieved by tracking the movements of the index finger using hand detection in the CV zone. Operating this game is pretty simple and straightforward for users. ARF ultimately provides an enhanced platform unlike the rest available in the gaming market.

***Keywords**: AR[Augmented Reality], CV-zone, AI [Artificial Intelligence], Computer Vision, Hand Tracking, ARF[Augmented Reptile Feeder].*

Paper ID: 105

A Web-based Application for Snake Species Identification using Vision Transformer and CNN-based Ensemble Meta Classifier

Kanishka Dandeniya, Chamodhi Wickramasinghe and Chirath Dasanayaka

Abstract*:* Being a tropical country, Sri Lanka has one of the highest snakebite rates in the world. In 2019, 50 snake bite fatalities have been reported in Sri Lanka. Therefore, the accurate identification of the snake category is crucial for healthcare workers to diagnose and treat the victims as well as to save the snake from being killed. In this paper, we present a web-based application based on Convolutional Neural Network and Vision Transformer architectures to classify between the Russell's viper and the Indian Rock Python. Five different image classification models were trained using the pre-trained architectures ResNet-50, ResNet-100, EfficientNet B0, EfficientNet B7 and Data-Efficient Image Transformers. We were able to gain a testing accuracy of 94.5% by using an ensemble approach for the mentioned classifiers. Furthermore, this study presents the first web-based application in Sri Lanka enabling the automatic identification between Russell's Viper and the Indian Rock Python.

Keywords*: Vision transformer, Convolutional neural networks, Herpetology, Ensemble classifier*

Paper ID: 106

Real-Time Trajectory Prediction and Localization of Omni-directional Badminton Robot

Avinash Kumar, Prathamesh Vhatkar, Hrijul Shende, Ashitosh Chavan and Kaliprasad Mahapatro

Abstract*:* This paper proposes a strategy to predict the accurate shuttlecock trajectory and motion planning of the badminton robot using Kalman filter and Proportional-Integral-Derivative (PID) control. A PID control is used to accurately control and hold the position of the robot in a standard indoor badminton court. The conventional Kalman Filter and its various versions are mostly used to acquire the current state of the system, but the proposed modified Kalman Filter in this paper is used to predict the accurate trajectory of the shuttlecock. The effectiveness of the proposed strategy is validated experimentally for different trajectories and motion planning.

Keywords*: Kalman Filter, PID, Holonomic Drive, Projectile*

Paper ID: 107

Detection of Malicious Activities and Connections for Network Security using Deep Learning

Dr. Monika Rokade and Dr. Sunil Khatal

Abstract*:* Computer attacks are growing in both number and diversity as a result of the ongoing growth of the Internet: ransomware is more prevalent than ever before, and zero-day vulnerabilities are gaining so much importance that they are attracting media attention. Antivirus software and firewalls are no longer sufficient to safeguard a company's network; instead, many layers of security are required. One of the most important layers, an intrusion detection system, is designed to protect its target from any potential attack by continually

monitoring the system (IDS). IDSs may currently be classified into two basic categories: anomaly detection and signature-based detection. For signature-based detection, the IDS compares the data it is watching to known attack patterns. Although this method has gained popularity because to tools like Snort, it has a serious drawback: it can only detect known threats that have already been described in a database. On the other hand, anomaly detection builds a model of the system's typical behaviour before searching for anomalies in the observed data. As a consequence, while it often generates a great deal of false alarms, this approach may reveal undiscovered risks.

***Keywords**: Intrusion Detection System, NIDS, Knowledge Discovery and Data mining, Intrusion Detection Expert System, Convolutional Neural Network, Host-based Intrusion Detection System.*

Paper ID: 111

IoT Based Theft Detection in Three Phase Distribution Line

Dr. Vilas Bugade, Omkar Shinde, Pranav Potdar and Aditya Patil

***Abstract**:* Power theft is the most common cause of losses in transmission and distribution global electricity supply. This issue is not exclusive to Indian enterprises; it also affects electricity providers in other countries. Every year, electricity companies lose money due to theft. Transmission loss and non-transmission loss are the two forms of losses; some research publications refer to them as technical loss and non-technical loss, respectively. Transmission loss happens when energy is transferred from the generator to the consumer. Non-transmission losses arise as a result of incorrect billing, erroneous meter readings, and electricity theft, among other things. The first two losses can be avoided by obtaining good meter readings and generating an exact bill for power consumption, but energy theft is difficult to prevent because no one knows who is honest and who is not. Even yet, losses due to power theft can be reduced by discovering theft or consumer fraud and taking appropriate action. As we all know, because the cost of fuel is rising every day, the number of people stealing power and utilizing it as a substitute is also rising, so this system is used to combat this type of It is very useful for the authorized agency to control its income loss by preventing electricity theft. As we all know, as the cost of fuel rises, so does the frequency of stealing power and using it as a substitute, making it extremely helpful for the permitted agency to keep track of its revenue loss. As a result, it is critical to develop a system that can identify electricity theft.

***Keywords**: Master-Slave, IOT, LED, Theft detect indicator*

Paper ID: 114

The Secure E-Wallet Powered by Blockchain and Distributed Ledger Technology

Nilesh Sable, vijay rathod, Rachana Sable and Gitanjali.R Shinde

***Abstract**:* Last decade had been worst for humanity as it faced Covid-19. The pandemic invited many things unknown to humans such as lockdown, compulsory mask and no contact with other people or things. The 'No Contact' initiated much awaited progress in payment from being entity exchange to being digital. The digitization of payment became biggest transformation; every common citizen realized the use of digital payment. The evolution of cash payment to internet banking and internet banking to e-wallet has made transaction easier for all the services without exhibiting physical form. Payment Gateways, Digital Wallet, Internet Banking use has risen as being fast and instant. Though the recent payments are secure on theft front with the use of digital money by many users at many times online payment system might face problem on digital money transfer with issues such as wrong payment, link failure or single point failure. There might be more problems such as insider problem and transaction being transparent. For such situations more secure and private

path towards security is needed as insufficiency will give rise to risk mitigation. The paper recommends a payment system which will be based on privacy and permission laid by blocks to blocks for use in financial sector. The architecture proposed integrates the digital wallet with different banks to give foundation of Blockchain for secure transactions. The peer to peer network will share transactions as well share load to minimize load on central banking system keep the load distributed and secure overall data centres.

***Keywords**: Blockchain, E-wallet, Digital Ledger.*

Paper ID: 123

Bibliometric Analysis of Online Food Delivery: A Study on Pre (COVID-19) and Current Scenario

Dilip Kumar, Rohit Singh, Deepak Kumar, Manoj Patkar, Shailendra Tiwari and Amita Singh

***Abstract**:* Increasing disposable income of society and the individual, time-saving attitude, health safety (during COVID-19), and innovation have increased consumer inclination from offline to online food delivery (OFD). Before COVID-19, eating out the home was the fashion and hangout, but after COVID-19, consumers feel safe while sitting at home. This study aims to explore the pre and current publications on online food delivery, find out the most studied country in OFD, find out the top-cited research publications in OFD, and find out the most dominant research terms in OFD. The present study reviews previous research published during the last 11 years (2012-March 2022) extracted from the www.dimensions.ai free web app. A drastic increase in publications since 2020 explains researchers' inclination toward the OFD. Two hundred twenty research articles were published during the pandemic out of 253 published in the last 11 years. The maximum researched country in OFD is the United States, followed by India and the United Kingdom. The most cited research publication has 255 citations. The most visible keywords in the present study were "Zomato," followed by "SEM" and "OFD." The present study has some limitations, like the database used in the study (dimensions) may not be as good as Scopus or WoS, which may give a better result. More study is required to understand the OFD topic and its survival. It is recommended that the catering industry take OFD as an opportunity along with the regular business generated through steady footfall of the customer/guest. It can be improved through proper logistics, software support, and merging with artificial intelligence.

***Keywords**: Online Food Delivery, Pandemic, Catering industry, Innovation, Food safety*

Paper ID: 134

Crop Yield Prediction And Recommendation System

Nachiket Pethe, Sagar Raskar, Aditya Abhang and Vahida Attar

***Abstract**:* Crop yield prediction is a highly composite task influenced by several factors such as state, district, area, rainfall, temperature, soil factors, and many more. For accurate yield prediction, we are required to figure out the functional relationship between the yield and the above-mentioned factors. Comprehensive datasets and powerful algorithms are required to reveal such relationships. This paper is focused mainly on predicting the yield of the crop along with crop recommendations by applying various machine learning techniques. The models going to be used here include Decision Tree and Random Forest. The prediction made by these models will help the farmers to come to a decision on which crop to grow to induce the most yield by considering factors like temperature, rainfall, area, etc. Most of the times farmers consistently grow one crop on one soil for years which reduces the nutrients of the soil, hence a crop recommendation system influenced by the factors such as rainfall, annual temperature, soil content, and type, etc becomes important

which saves the soil from getting exhausted while also giving a good return to the farmers.

***Keywords**: Decision Tree Regression, Random Forest Regression, Decision Tree Classification, Random Forest Classification, Machine Learning*

Paper ID: 139

A Modified Approach Of Hyper-parameter Optimization to Assess the Classifier Performance

Krishna Sriharsha G, D.Lakshmi Padmaja, G.N.V.Ramana Rao and Surya Deepak G

***Abstract**:* Modern algorithms are remarkably adept at identifying data that is too large or complex for humans to comprehend. It has become difficult to identify the list of hyperparameters that deliver an improvement in performance for a given geometry of the data set. This has shifted the emphasis from processing data (model improvement) to the hyper parameters (tuning) of the classifier. Since hyper parameters are set to default values for a generic case, they need not be specially tuned to the given classification task. The purpose of this paper is to demonstrate a strategy that avoids unnecessary tuning attempts and shows the best performance for various classifiers on various shapes of geometry. The findings of this experiment will assist the user in determining whether hyper parameter tuning activities is worth the time and computational resources.

***Keywords**: Classifier Performance, Hyper Parameter Tuning, Data Mining, Dimensionality Reduction, Deep Learning, Meta Learning.*

Paper ID: 146

Preview of trained Manpower in Electric Vehicle Sector

Gayatri K Palnitkar, Ankur Karandikar, P.B.Karandikar and S.N.Chaphekar

***Abstract**:* Segment of electrically operated vehicles will rise in coming years. Future transportation will be battery operated electric vehicles or fuel cell driven electric vehicles. There will be a huge demand for trained manpower to cater all kinds of requirements of such change in the transportation sector. Infrastructure development, vehicle development, software and IoT, service after sales requires different kinds of trained manpower. Generating such manpower is the responsibility of education policy makers. Correct predictions about growth of industry and their needs are very important. This paper presents the current situation of the electric vehicle sector and present as well as near future trained manpower available in this domain. It also discusses issues associated with scaling up of trained manpower in the electric vehicle sector. Various aspects of manpower planning, requirements, and challenges in it are brought out clearly so that policy makers can use them to transform the education sector.

***Keywords**: Training, Electric Vehicles, Education*

Paper ID: 153

IoT based Intelligent Healthcare Monitoring System

Anuradha Bakare, Neha Dutte and Asha Sanap

***Abstract**:* IoT and sensor networks will be the best choice for Information gathering and monitoring in the current situation. IoT provides a number of applications on the basis of sensors in the field of research as well as educational fields. For Health care system monitoring and management Wireless body area network (WBAN) mostly used in recent applications. This paper proposed a monitoring system to help patients and doctors within the hospital area. It focuses on evaluating scalability, reliability, convenience and effectiveness for the IoT based system. Real time health related information collection, monitoring, prescription management and analysis discussed in this paper. Network simulator used to determine performance of proposed system and it compares with different communication protocols for determining better technique for Health monitoring.

***Keywords**: Sensor network, WBAN, IoT, Health monitoring system*

Paper ID: 155

Photoplethysmography Sensors Concept and Advancements: A review

Shaunak Shiralkar, Atharv Bahulekar, Shardul Dhumal and Surbhi Razdan

***Abstract**:* With the healthcare industry growing at a rapid pace, advancements in medical diagnostics are taking high strides. One of the most eminent developments in this field, is the concept of Photoplethysmography. It is a very simple and inexpensive optical method to measure the Heart rate. PPG uses a non-invasive method that uses a light source along with a photodetector placed near the surface of the skin to measure changes in the volume of blood during its circulation. In recent times there is an increasing need of devices to measure heart- rate and other important vitals of patients in a very comfortable way. Devices employing PPG sensors are the solution to this requirement. Since they can be placed at a single location and still give quite accurate readings, they also have the potential to detect many other defects such as vascular ageing, arterial stiffness etc. along with heart rate and Spo2 oxygen level measurement. The second derivative PPG wave can give this important information, thus studying this wave can be very beneficial to doctors to predict future possible cardiac diseases. Here a comprehensive review of PPG devices is done reviewing the most prominent developments in this field. Although the PPG technology is very promising for the healthcare industry, it still poses many challenges. As PPG sensors are greatly affected by the presence of motion artifacts (MA), they are not completely reliable. The true potential of the concept of Photoplethysmography is immense, hence with this review we finally conclude that the PPG technology is indeed very promising and an upcoming concept which, with a few improvements can prove to be a boon to the health care industry.

***Keywords**: Photoplethysmography, Sensors, Heart rate, Motion Artifacts*

Paper ID: 157

A Strategy to Identify Loyalty Using Elbow Curve Method for Customer Segmentation

Baljeet Kaur and Dr. Jatinderkumar Saini

***Abstract**:* Customer segmentation is a very strong way to identify unsatisfied customers as well as loyal customers. It has become very crucial and mandatory for businesses to understand the customers and segment them according to their needs and desires. Many businesses struggle to manage cancellations and delays. The high number of cancellations is always a challenge for business houses. Every instance of cancellation can be a learning experience and an opportunity to understand the customers better. These insights can help businesses to improve their products and services. Now, as the usage of online gadgets has increased among customers and smart technologies are used in designing web applications, more data is available to understand customer behavior and predict their buying patterns. In the current era, customers are exposed to many online applications which pose tough competition among service providers. Businesses spend a lot to attract new customers. On the other side, retaining loyal customers is as crucial as identifying new customers. Identifying loyal customers helps to create a personalized approach that makes them feel valued. Understanding current customer priorities are more important than identifying the new customer. Machine learning is an effective technique to help segment loyal customers into actionable customers. This paper outlines the use of the K-means algorithm to identify loyal and prospective customers along with strategies to lower the cancellation rate. The current study uses the elbow curve method to identify the optimum number of clusters into which the customers could be segmented. This study will help businesses to seize new opportunities and gain customers for life.

***Keywords**: Clustering, Customer loyalty, Elbow curve, K-means, Segmentation*

Paper ID: 169

Empowering Nonprofit Organization to Reduce Donation Attrition with Machine Learning

Rishabh Singh, Piyush Sonewar, Manish Kumar, Ashwini Shingare, Anand Deshpande , Kumar Satyam, Joseph Colorafi, Sunilkumar Kakade and Karen Colorafi

***Abstract**:* Many Nonprofit organizations (NPOs) have a mission to empower vulnerable populations by providing safety and support services to build a healthier social community. The critical success factor for these organizations is generous and consistent donations from individuals, organizations, businesses, and governments. To remain financially viable and effective in mission, NPOs must achieve donation objectives. This demands a better understanding of donation activities and more specifically propensity/churn of existing donors. An Artificial Intelligence (AI) technique, Machine Learning can play a vital role in gaining insight into patterns of donors' response over the time and for various campaigns. Such data driven insights can help organizations design effective and personalized campaigns that result in reduced donor churn, attract new donors, and increase per donor donation amount. In this paper, we present an innovative application of unsupervised machine learning technique (K-Means) used with a Recency, Frequency, and Monetary (RFM) model to help improve outcomes of a US-based NPO with a mission to help families in need.

***Keywords**: Donor Segmentation, Recency Frequency Monetary Value, Unsupervised Machine Learning, K-Means Clustering, Targeted Marketing*

Paper ID: 180

Predictions of Energy Consumption of Buildings' Life Cycle to Mitigate the Effects of Climate Change With a Focus on Energy Efficiency

Prajyot Patil and Shilpa Sondkar

***Abstract**:* Climate change and Energy are the prominent topics addressed by researchers in the 21st century. One of the concerns shown by the researchers is the amount of CO2 emitted by buildings across the globe. In 2020, the construction and demolition of buildings accounted for 37% of all energy- and process-related CO2 emissions worldwide. There are methods to reduce the effect of buildings' construction and demolition on climate. Intelligent infrastructure could be one of the solutions for energy efficiency. Energy Usage Intensity, which measures how much energy a building uses annually per total gross floor area, must be known before implementing any solutions. Contribution of this proposed work is to predict Energy Usage Intensity for buildings of different states in different weather conditions in the United States while comparing three different statistical models of machine learning to find best results of prediction.

***Keywords**: Energy Usage Intensity, Machine Learning, Random Forest Regression, Buildings, Climate Change*

Paper ID: 182

Personality Prediction with Natural Language Processing using Questionnaire Responses

Atharva Pansare, Prabhat Panwar and Pranali Kosamkar

***Abstract**:* As the modern IT revolution is booming at a rapid growth speed, organizations and recruiters are finding it increasingly challenging to select the ideal applicant from a large number of applicants with diverse skill sets and personalities. Hence, selecting a candidate with a suitable personality for respective job profiles is a very important and great challenge for the HR department nowadays. Out of various personality prediction methods available out there, Myers–Briggs Type Indicator or MBTI is famous and accurate for our purpose of creating a personality prediction system for selecting candidates based on their personality. This study took into account all sixteen MB-Model coordinates. A comparative study of Random Forest, Logistic Regression, SVM, XGBoost has been done to perform personality prediction, and accuracy and confusion matrix for performance measurement of the models. While using TF-IDF, for the personality categories like Introversion/Extroversion the accuracy is 80.46%, for Sensing/Intuition it is 88.70%, for Thinking/Feeling it is 81.21% and for Perceiving vs Judging it is 72.97% with the Logistic Regression algorithm. Using Count vectorization for tokenizing, the accuracy is 80.97% for Introversion/Extroversion, for Sensing/Intuition it is 88.93%, for Thinking/Feeling it is 77.92% and for Perceiving vs Judging it is 73.48% with XGBoost algorithm, which gave the best performance.

***Keywords**: Logistic Regression, MBTI, NLP, Random Forest, SVM, Stemming, XGBoost*

Paper ID: 183

Best-Fit: Best Fit Employee Recommendation

Sumit Raut, Aniket Rathod, Piyush Sharma, Pranil Bhosale and Bhushan Zope

***Abstract**:* In this fast-growing world, there is huge competition in the market for employees. It becomes a tough task from an HR perspective to keep the most talented resources in the company to benefit the productivity of the company because every employee is a valuable asset. Employees tend to shift their current jobs numerous times due to various reasons and therefore employee turnover becomes a serious issue in this challenging world. This paper focuses on resolving the problem of employee attrition using classification algorithms like random forest, logistic regression and SVM on the IBM attrition dataset. If a valuable employee leaves an organization or gets promoted it becomes a difficult and tedious task to replace the employee. Architecture has been proposed in this paper which uses Random forest, SVM, Decision tree classifiers and similarity techniques to find the closest employees suitable for the vacancy. This

includes finding similarities in the skills, qualifications and experience. Pre-trained word vectors are used to generate GloVe embeddings for finding document similarity. A personality match between two employees is calculated by taking a big five personality test, followed by clustering and finding the euclidean distance between two answer vectors in the same cluster. Best-Fit will finally recommend best-fit employees on the basis of resume match, personality match and retention probability.

***Keywords**: Document similarity, Classification, Unsupervised Learning, Cosine Similarity, Attrition, Retention, Personality traits, K-means clustering, GloVe, Document Embedding.*

Paper ID: 185

Human Emotion Recognition Using Gabor Variance Features with Back Propagation Neural Network Classifier

Kanchan Vaidya, Pradeep Patil, Mukil Alagirisamy and Babasaheb Pansambal

***Abstract**:* It is natural as stimuli-response humans always express their feelings & reaction to any certain event automatically appears on the 'face'. Facial expression is an important medium for human communication as it express human thinking, feelings and his or her current mental situation, thus it is being used in many application areas. This paper aims to introduce a novel method for human emotion recognition using average variance as the feature vectors obtained from the Gabor filter convolved 'n' images which helps in classifying those emotions. Based on the Gabor variance features, a three layer back propagation neural network (BPNN) has been used as a classifier. The BPNN architecture used in the experimentation work contains 210 input units in the input layer, which corresponds to the displacement information of the Gabor variance feature vectors. There are 6 units in the output layer and one hidden layer of 256 units. Training terminates as soon as 'error function' falls below a predetermined constant (determined empirically as 0.001) or when the number of iterations reaches a predetermined value. Once the model successfully trains the images, weights 'w' of the networks will not change. Using confusion matrices and mean accuracy calculation one can evaluate the performance of the algorithm. Images from JAFEE, CK and FER-2013 are used for training. Using these databases one can have clarity for the 'n' classes generated from the databases. According to the JAFFE database, the average accuracy of the proposed emotion recognition algorithm was the highest with 94.66%. Timing analysis using the same database shows that the template response time is lower because the BPNN is only 3-tier architecture which requires a single training as emphasis is on recall time. Because network training is only needed once, recall time is more important than training time.

***Keywords**: Facial emotion recognition, Gabor filter, average variance, confusion matrix, Back propagation neural network.*

Paper ID: 186

Search-based Feature Selection for Cross-Project Fault Prediction

Yogita Khatri and Sandeep Kumar Singh

***Abstract**:* Cross-project fault prediction (CPFP) is a current field of research in the realm of software engineering. CPFP comes into play when there is a scarcity of within-project training data. In particular, it involves constructing a fault prediction model for software project 'X' using the defect/fault data of software project 'Y'. However, the distribution dissimilarity between the two project's data creates a bottleneck in its success. Many existing approaches addressed this issue by selecting relevant instances from the training data without giving any attention to feature selection (FS). Thus, to assess the power of FS for effective CPFP, we investigated two search-based FS algorithms namely Binary Genetic Algorithm (BGA) and Binary Particle Swarm Optimization (BPSO) algorithm. We performed 26 CPFP

experiments based on 8 software projects and compared their performance with a CPFP model (ALL_CPFP), built with all features. Although both BPSO_CPFP and BGA_CPFP showed their potential of over ALL_CPFP, BPSO_CPFP performed better than BGA_CPFP in capturing the important features for effective CPFP.

***Keywords**: Search-based feature selection, Cross-project fault prediction, Binary genetic algorithm, Binary particle swarm optimization algorithm*

Paper ID: 187

Apollo XXI - An Astronomy Portal

Spurthi Bhat, Rutuja Bhirud, Vaishnavi Bhokare and Pushkar Joglekar

***Abstract**:* Astronomers have to deal with complex data to gain important insights which is a time-consuming task. Machine Learning techniques can help astronomers to analyze astronomical data in a simplified manner. The proposed web application consists of three different models. The first model can predict whether some meteor shower can be seen from a particular location along with the date and the name of the meteors. The proposed model is found to be 100% reliable in the experiments carried out so far. The second model can predict whether a celestial body is a candidate, confirmed or false positive instance of an exoplanet, based on the Kepler telescope data. This model uses random forest classifier and the accuracy achieved is 90.1%. The third model can predict whether there will be a delay in rocket launch according to different weather conditions. This model is based on decision tree classifier and has an accuracy of 98.3%.

***Keywords**: Astronomy, Exoplanets, Kepler Mission, Meteor Showers, Rocket Launch Delays*

Paper ID: 193

Leveraging the Fullest Potential of Online Teaching Learning: A Design Thinking Framework Approach

R. S. Kamath and R. K. Kamat

***Abstract**:* COVID-19 pandemic has resulted in the switching of educational organizations into online learning serving platforms. The moment online education moved from an optional to the only form of learning and that too long term, the issues, and challenges become evident. Online learning will be more sustainable while learners become part of the solution framework. This is possible with the adoption of Design Thinking (DT). Learners' inclusion in problem-solving opens up a lot of possibilities. This can transform challenges in online learning into opportunities. The present article portrays the research carried out to improve students' learning effectiveness in online classes. The authors have proposed a Design Thinking framework that is in line with the high-order thinking skills of Bloom's taxonomy. This research has showcased the application of the five phases of the DT framework for attaining the optimum solution to the general issues of the online paradigm for teaching-learning. The study recommends that peer collaboration, timely feedback, and taking the learners along for co-designing the learning content are the essence borrowed from the DT framework and help in increasing learning engagement.

***Keywords**: Online education, Design thinking, COVID-19 pandemic, Wicked problem, Bloom's taxonomy, Conducive learning*

Paper ID: 194

Magnitude Prediction Model for Japan Seismic Tremors Using Artificial Neural Network

R. S. Kamath and R.K. Kamat

Abstract*:* The artificial neural network (ANN) model for predicting seismic tremor magnitudes for Japan is portrayed in this paper. The authors have retrieved the earthquake dataset from European-Mediterranean Seismological Center for this study. The dataset comprises a list of 5000 quake events that occurred from 1st July 2010 to 14th April 2016 in the region of Japan. Different neural network structures and ANN configurations exemplify the ANN model construction. The experiment is carried out by fine-tuning network variables such as type, transfer function, training function, and hidden neurons. The forecast accuracies of each of these network configurations are compared. The resultant ANN model features Levenberg-Marquardt backpropagation method for training the model, the nonlinear sigmoid activation function for the hidden layer, and the model's performance is evaluated concerning Mean Squared Error (MSE) and Gradient (g).

Keywords*: Artificial Neural Network, Earthquake magnitude prediction, Backpropagation algorithm, Soft computing, Natural disaster*

Paper ID: 196

Design and Development of Autonomous Mobile Robot for Mapping and Navigation system

Kiran B, Karthikeyan S, Suhel Pasha M A, Manjunatha K N, Manoj Kumar S and Sharvin Vivian Moras

Abstract*:* Mobile Robot for Mapping and Navigation is one of the challenging researches in the area of robotics. An unknown indoor and outdoor mapping in dynamic environment is used for navigation of robot. This research focuses on mapping utilizing a GMapping approach that uses simultaneous localization and mapping (SLAM). The concept of navigation or autonomous driving is used in SLAM it helps for mobile robot to move independently. SLAM and RVIZ GMapping software that is available an open source, along with the Robotic Operating System (ROS) and RPLiDAR camera, is required to map an unknown dynamic indoor environment. The laser data and navigation messages are passed to mapping in an unknowable environment, the SLAM GMapping function is taken into account. The command for autonomous navigation will be designed and delivered by the navigation stack after the mapping has been generated.

Keywords*: Mobile robot, SLAM, GMapping, RPLiDAR, ROS, Indoor mapping, RViz.*

Paper ID: 202

Effective Utilization of Machine Learning Techniques to Classify Breast Cancer tumors

Gauri Prakash Kamath and Anuradha Phadke

Abstract*:* Breast Cancer occurs when alterations called mutations to take place in the genes that cause anomalous cell ad- advancement in the breast. One of the ways to achieve success in this field of cancer is by digging deep into machine learning techniques to diagnose the disease better as well as attempt to cure it. This paper aims at identifying breast cancer tumors fast and efficiently. The system suggested in the research uses the Wisconsin Breast Cancer Dataset, which was downloaded from the UCI repository, and allows binary

classification, classifying tumors as malignant or benign. Techniques used to implement classification are Support Vector Machines and Random Forest. In order to comprehend the trends and patterns in the Wisconsin Breast Cancer Dataset, a thorough data visualization of the dataset has been conducted. The system employs data processing techniques to retrieve useful data, followed by Principal Component Analysis to carry out feature extraction. For SVM, to reiterate through the predefined hyperparameters, Grid Search CV has been implemented. For the Random Forest algorithm, k-fold cross-validation has been applied to achieve a unique set of results. The highest accuracy achieved using the random forest algorithm is 99.7% and the same for SVM is 98.2%. The following algorithms have been highlighted since their implementation has helped to retrieve significant accuracy levels. The models have been evaluated by computing the precision, recall score, f1 score, and confusion matrix. Models have also been compared using true positive rate, true negative rate, false positive rate, and false negative rate.

***Keywords**: Breast Cancer, Machine Learning, Support Vector Machines, Random Forest, Data Visualization, Scaling, Grid Search CV, K fold Cross Validation*

Paper ID: 203

Machine Learning Approach: Consumer Buying Behavior Analysis

Sashikala Mishra, Anjali Sharma, Aradhana Pratap and Kishan Vyas

***Abstract**:* The rise of multiple company competitors during the COVID-19 outbreak resulted in fierce competition among competing firms for new clients and the retention of current ones. As a result of the foregoing, exceptional customer service is required, regardless of the size of the organization. Furthermore, any company's ability to know each of its customers' desires will provide it an advantage when it comes to providing specialized customer care and establishing customized marketing plans for them. The term "Consumer Buying Behavior Analysis" refers to a comprehensive assessment of the company's ideal clients/customers. In this project, we're utilizing the K-Means Algorithm to divide clients into two groups: "Highly Active Customers" and "Least Active Customers." The model achieved accuracy and an f1 score of 100% for the clustering algorithm. Then, utilizing the Apriori Algorithm, we use Association Rule Mining to recommend the best goods to clients based on their purchasing history and associations. We take one step further and use Logistic Regression to validate our Clustering operation by doing Binary Classification with our clusters as the label, resulting in accuracy and an F1 score of 91%.

***Keywords**: Consumer Buying Behavior; K-Means Algorithm; Clustering; Association Rule Mining; Apriori Algorithm; Binary Classification; Logistic Regression*

Paper ID: 204

Heart Failure Prediction with Ensembled Learning

Deepali Vora, Sashikala Mishra, Anindita Mukherjee, Shivanshi T, Sudhanshu T and Swapnil B

***Abstract**:* Cardiovascular disease is becoming an increasingly problematic world today. Sudden arrest of Aldous can lead to serious illnesses such as brain damage, nervous system disorders and even death. This makes heart failure disorder to be predicted on an early stage rather than repenting later[8]. A proposed decision support system based on machine learning helps physicians efficiently diagnose patients with heart disease. However, these diseases can be predicted using various machine learning models. Performance is evaluated using logistic regression, K-nearest neighbor method, random forest, and ANN. The accuracy of the random forest algorithm

is 83.15%. This was far more accurate than the other algorithms described earlier. The proposed Ensemble learning is used to improve where more classification algorithms can be used simultaneously on a single dataset. The accuracy of the proposed model is 86.41%. The proposed model helps in predicting the heart disease of various people with various complications.

***Keywords**: Heart Disease-HD, Machine Learning-ML, Cardiovascular Disease-CD, Logistic Regression (LR), Decision Tree(DT), Validated Introduction*

Paper ID: 206

Autonomous Metro - A Step Towards Automation

Aniket D. Kulkarni, Bhagyesh B. Joshi, Anushree A. Panse and Krishna M. Shah

***Abstract**:* India's transport sector is large and diverse. How- ever, this sector is still not able to match the pace of the rising demands. Significant improvements in this sector are in progress and development phases to modernise and meet the rising demands. With the introduction of metros nowadays, modern technologies and improved transport are changing the existing transportation scenario. However, there is a huge scope for improvement in existing metro operations in terms of automation. The existing metro systems are manually operated and, in a way, prone to human errors or faults, causing accidents and are inefficient in terms of accuracy, fuel consumption, comfort, safety and security. The proposed system aims to develop a prototype and eliminate the need for drivers by making it autonomous. Various experiments on the prototype are conducted to ensure all the objectives of the proposed system are met and results of the same are discussed in the paper in brief.

***Keywords**: Transport, Metro, Automation, Autonomous, Efficient*

Paper ID: 217

High-Level Design and Rapid Implementation of Blockchain-Based Real Time Supply Chain Platform

Ketki Nirantar, Rishabh Karmakar, Pooja Hiremath and Deptii Chaudhari

***Abstract**:* Blockchain technology as a foundation for dis- tributed ledgers provides a cutting-edge foundation for a brand- new, transparent, decentralised transaction system across in- dustries and businesses. The features of this technology that are intrinsic increase confidence by providing transparency and traceability in any data, products, or financial resource transac- tion. Real-time monitoring and tracking are critical for delivering a unified perspective of global supply chains management (SCM) that involves multiple stakeholders.

This study suggests a blockchain-based supply chain platform that secures all the transactions with Identity Access Management (IAM) and works with multiple stakeholders while establishing transparency and traceability amongst them. This paper focuses on the platform that the authors have created to keep all the data secure pertaining to the parties involved with the supply chain like a producer, retailer, distributor, auditor, and customer at a single place whose access to that is being protected and private at the same time. We discuss Security Handling and Privacy, as well as how the smart contract plays a role in this SCM. We also look at the test outputs, implementation areas, and a brief discussion about the findings.

***Keywords**: Decentralized Application, E-commerce, Supply chain management, Asset Management, Blockchain, Distributed ledger, Smart contract, Solidity*

Paper ID: 218

Youtube Trend Analysis

Artika Singh, Arushi Pathik, Saumya Patni, Vaibhav Patel and Jash Patel

***Abstract**:* Nowadays, online video streaming platforms are very popular. Content creators can use YouTube to share their knowledge, ideas, and interesting material with their audience. YouTube has a trending tab on its website that showcases videos that are currently popular in order to guarantee that a video gets the broadest possible audience. Aside from a few viral videos with a big number of views that are guaranteed to be in the trending section, the rest of the videos are unpredictable. In today's world, data mining and analysis are critical, and businesses are using social media to improve their operations. The goal of this paper is to look at YouTube's trending video data. Views, Comments, Likes, and Dislikes are all used by users in the app. Linear Regression, Decision Tree, and other Machine Learning models, as well as Python libraries such as pandas and matplotlib, can be used to classify and analyse YouTube data and collect useful information.

***Keywords**: YouTube Trend, Machine Learning, Python, Linear Regression, Social Media, Views*

Paper ID: 220

An EEG Based BCI System to Detect Hook and Span Hand Grip

Swati Shilaskar, Shripad Bhatlawande, Sumitsaurabh Singh, Shreyas Talwekar and Rajesh Jalnekar

***Abstract**:* Brain-Computer Interfaces (BCI) make use of Electroencephalogram (EEG) signals to classify limb movements and other motor activities in various biomedical applications. This paper presents an EEG-based system to distinguish span and hook hand gestures. The proposed model consists of various signal processing techniques to extract features of interest and machine learning-based classification algorithms. We have extracted features based on statistical parameters calculated from the EEG readings. Fast Fourier Transform (FFT) along with the Windowing technique is implemented. 4 different classifying models namely Support Vector Machine (SVM), Adaboost, Decision Tree, and Random Forest, have been compared. The proposed method accurately classifies hook and span-hand gestures. The Random Forest classifier achieved the highest accuracy of 78.62% followed by Decision Tree and Adaboost.

***Keywords**: Electroencephalogram, Brain-Computer Interfaces, Detection of Hook Gesture, Detection of Span Gesture, Machine Learning.*

Paper ID: 221

Phishing Attack Detection on Text Messages Using Machine Learning Techniques

Swarangi Uplenchwar, Varsha Sawant, Prajakta Surve, Shilpa Deshpande and Supriya Kelkar

***Abstract**:* Phishing is the exceedingly prevalent type of social engineering attack which attempts to manipulate or exploit computer users. By performing phishing especially on text messages, attackers try to get information about someone or something. Since such phishing attacks on text messages are evolving continuously, it is essential to design an effective mechanism for the detection of the same. This paper presents a phishing attack detection system for text messages (PADSTM) which concentrates on detection of phishing attacks in text messages using Machine Learning (ML). It makes use of ML techniques which include Naive Bayes' Classifier, Support Vector Classification, Random Forest Classifier, and K-Nearest Neighbor Algorithm (KNN) to detect the phished messages. PADSTM focuses on the blacklist of URLs and various customized keywords in the text messages for efficient detection of phishing attack. Experimental results show that the performance of Random Forest Classifier is superior to the other ML techniques in respect to accuracy and F1-score in detecting the phished messages.

***Keywords**: Cyber security, Machine Learning (ML), Phishing, Text classification, URL blacklist*

Paper ID: 222

Small-Scale Relational Database Management System

Spurthi Bhat, Rutuja Bhirud and Vaishnavi Bhokare

***Abstract**:* In the proposed system, an implementation of a small-scale relational database management system (DBMS) has been presented. In this system, database is defined as a group of relations or tables and their corresponding schemas. A relational database maintains data in relations, which the user sees as tables. The proposed model has been developed using Java programming language and it stores data in the form of serializable files. JavaCC has been used as the parser generator. Each relation consists of tuples or records, and attributes or fields. Beginners find it difficult to learn and install commercial database management systems. The proposed system is easy to use and does not require an active internet connection. This system supports several SQL commands such as CREATE, SELECT, INSERT INTO, DELETE FROM, UPDATE, etc. This system also ensures preservation of data and referential integrity.

***Keywords**: Constraint, Referential Integrity, Relational Database Management System, Schema, Structured Query Language*

Paper ID: 226

Image-dev : An Advance Text to Image AI Model

Manavkumar Patel, Sonal Fatangare, Aryaman Nasare and Abhijeet Pachpute

***Abstract**:* In the recent years, with the rapid growth of Artificial Intelligence, there is increasing interest in Text-to-Image models. High-quality images can be generated with state-ofart text-to-image AI models such as Imagen, DALL.E-2, Draw- Bench. However, these models struggle with generating well aligned images for conflict category and low database. Therefore, Image-dev is a Text-To-Image model that blends TF-IDF(Term Frequency – Inverse Document Frequency) model along with preposition model, to evaluate the relation between the data object. Proposed model output images have an unparalleled level of artistic finish and an added level of language understanding and interpretation further enhance model to produce conflict category images. Image-dev help user's to generate a high-quality, photorealistic images without any pre-context based on GANs, VAEs and diffusion model. Image-dev is based on diffusion model. Diffusion model is more relevant because of its high quality and realistic output generation capacity.

***Keywords**: DALL.E-2, Diffusion, Imagen, Preposition model, Photorealism, Text-to-Image, TF-IDF*

Paper ID: 227

Vecma : An Advance Chess Engine

Manavkumar Patel, Harshit Pandey, Tarush Wagh, Ameya Deepak Hujare and Rahul Dangi

***Abstract**:* With the rapid development of personal computers and the widespread use of the world wide web, the Internet has emerge as an information carrier and has gradually replaced the traditional media such as newspapers and television, becoming the main source of information. Thus effecting the popularity of traditional games like chess. As, various chess website and app appear to be on web, but there is a gap between players and Ai bots as various challenges occurs like efficiency, intelligence of the engine and engine level to mimic different player's depth. This paper propose a unique implementation on the previously based chess AI engines which increases the efficiency of computation of every move of the game tree. Vecma engine is unique Negamax implementation of game tree along with the Ideal vector value map. Proposed model focuses on parameters which are usually excluded from the other AI engines like positional king safety, optimal Queen positional advantage and the complex pawn advancement with the vector map integration for every piece. This engine also keeps a check on heuristic functional values of the future checkmate or stalemate probabilities. We have also develop a GUI which can be used as a base for developing other AI variations. With both Vector map and Negamax tree the chess engine is far more computationally efficient as compare to other chess engines.

***Keywords**: Alpha-beta pruning, Chess, GUI, Google colab, Min-max algorithm, Negamax, Positional Value Tables (PVTs), Python, Stockfish, Vector hash map*

Paper ID: 229

Various Aspects and Progression of Group-Based Emotion Recognition Methods: A Review

Prajyot Mohite and Pratibha Shingare

***Abstract**:* The technological gap between humans and machines has shrunk with the development of artificial intelligence and in many technological developments human emotion interfacing is in demand. Traditionally, emotions have been treated as an individual-level phenomenon. However, the recent advancement in the technology more generously looking at emotion recognition as an asset which can be useful for developing many advance techniques in variety of fields and for many applications. It is important fact that facial expressions are the major contributors to estimate overall emotion. Therefore, this review explains the face emotion recognition (FER) systems and focuses on the recent developments in group-based emotion recognition (GER). The key point in FER or GER system is, emotion-specified expressions have corresponding prototypic facial expressions. As the FER systems improved gradually, the advancement in the technology revealed the importance of GER. This review focus on all such developments and viewpoints which are extremely important to consider when the topic of emotion recognition and related technology development is under discussion. In essence this review is useful when background knowledge is to be gained for further development in this topic. The progression in this field is summarized to develop understanding of the different approached which are used for the advancement of various GER systems.

***Keywords**: Facial behaviour analysis, Facial emotion recognition, Group-based emotion recognition.*

Paper ID: 230

Vehicle Characteristic Recognition by Appearance: Computer Vision Methods for Vehicle Make, Color, and License Plate Classification

Aayush Agarwal, Swati Jadhav, Sandeep Shinde and Sagar Mohite

Abstract: This paper intends to analyze the recognition of vehicle characteristics from appearance. In comparison to other use cases, like facial recognition, where image-based target recognition has been thoroughly researched, the field of vehicle characteristic recognition has not gotten as much attention in the literature. We use object identification algorithms and image classification methods to determine the make (manufacturer), color, and license plate information of the car. We use vehicle logos as one of the criteria so that we can distinguish between cars with similar forms from different manufacturers. Additionally, we created a scenario for recognizing car attributes in the actual world. An intelligent method for classifying various car types and detecting vehicles from traffic camera images was suggested in this study. We have shown that elements of a car, such as manufacturer and license plates, are capable of being precisely detected. The performance of the current traffic camera systems might be improved by the suggested approach.

Keywords*: Vehicle Characteristic recognition, Image classification models, Object Detection Algorithm.*

Paper ID: 233

A Forensic Methodology for the Analysis of Twitter Application in Android Devices

Priyanka V S and Satheesh Kumar S

Abstract: Twitter is one of the major social networking platforms used by millions of users every day. On every second, around 6000 tweets are sent through Twitter. The forensic analysis of Twitter application is of utmost importance to crime investigators as it can contain a rich set of evidential artefacts. The physical acquisition of Android devices can unveil the forensic artefacts stored in the Twitter application database, but only the most recent tweets and messages. This paper introduces a new methodology to forensically extract Twitter cloud data using the access tokens present in Android devices. The tokens enable investigators to get authenticated access to Twitter cloud servers and further access to the entire data using Twitter APIs. The response data is encoded in JavaScript Object Notation (JSON) format, which is further analyzed to identify the attributes of each tweet object.

Keywords*: Twitter, Forensics, Android Devices, API, Tokens*

Paper ID: 234

Hand Gesture Identification and Voice Command Based Hardware Reduction

Amogh Godbole, Vishal Gondke and Kailas Devadkar

Abstract: The use of physical devices like mouse and keyboard to communicate to our computer has hindered the natural interface between the computer and its user. To eradicate this barrier, we have designed a virtual mouse which will act upon the various hand gestures the user provides and will help them interact with the computer in a better way. The virtual mouse control of our system will

keep a track of the movements of the fingers and palm, thus providing us with a specific output based on the recognized action of our hand. The proposed model will recognize both static as well as dynamic hand gestures and the results will show that the model that has been proposed and built will intuitively interact with the computer and it can be achieved the minimum usage of any hardware requirements. Our model will also have a major advantage over the current existing models, which is, it also has the feature of voice command recognition, meaning that even if the user if not able to provide appropriate gestures using their hand due to some medical condition, they will still be able to interact with the computer via voice commands.

***Keywords**: Virtual mouse, Human Computer Interaction, Hand gestures, Finger tracking, Voice Command Recognition*

Paper ID: 242

Forest Cover Change Detection of Sahyadri Ranges, India

Jyoti Madake, Bhavin Shah, Mihir Rakhonde, Mohit Ramdham, Shripad Bhatlawande and Swati Shilaskar

***Abstract**:* One of the eight most significant biodiversity hotspots, the Western Ghats of India extend from the western coast of Peninsular India inland. This paper details the use of satellite data and remote sensing techniques to investigate potential hotspots for detecting shifts in forest cover. Satellite images are important for enhancing the analysis of a large area due to their higher spectral resolution. This study includes the forest cover change in the western ghats of India from 2014 to 2022. Sahyadri ranges or western ghats are one of the most verdant and densely forested mountain ranges in India; hence, even a little shift in flora can aid in deciphering and predicting numerous topographical changes. We have utilized the Normalized Difference Vegetation Index (NDVI) for determining vegetation in a particular patch of land. The forest land cover classification has been done on into three categories like low, moderate, high vegetation as well as bare areas, and tropical forests. We evaluated the values of NDVI of every image of the dataset from 2014 to 2022 to determine the definitive change in the forest cover.

***Keywords**: Remote sensing, GIS, NDVI, Forest cover, Landsat*

Paper ID: 243

Vision-based Monitoring of Student Attentiveness in an e-learning Environment

Jyoti Madake, Sandesh Shende, Rohit Shinde, Shripad Govekar, Shripad Bhatlawande and Swati Shilaskar

***Abstract**:* Due to the global spread of COVID-19, the world's educational institutions had been ordered to close. As a direct result of this, the time-tested method of acquiring knowledge by visiting classes is gradually being replaced by online education. In virtual classrooms, teachers had difficulty detecting student postures and determining whether or not students were comprehending the material. This research suggests using a computationally efficient method based on computer vision and machine learning to determine the attention levels of e-learning students. The method extracts characteristics using HoG and SIFT. Using K-means and PCA, the resulting feature vector is optimized for dimension reduction. The attentiveness is classified using the classifiers Decision Tree, KNN, Random Forest, and SVM. Random Forest yielded the best accuracy at 99.2% with a dataset of 15000 images.

***Keywords**: Attentiveness detection, HOG, SIFT, Decision Tree, KNN, Random Forest, SVM.*

Paper ID: 244

A Case Study on Use of Blockchain Technology as a Dominant Feature to Issue and Verify Documents Required for Admission to UG/PG Technical Programs in Maharashtra (India)

Anandkumar Jain, Dr. Darshana Desai and Rajkamal Sangole

***Abstract**:* Paper-based documents are required at the time of admission to UG/PG programs in Maharashtra. Candidates are eligible for admission if they are fulfilling all eligibility criteria and possess all the required documents. These documents are verified by the verification officer at prescribed centers. This manual verification of documents is error-prone. Also, the candidate may not have all the required documents at the time of admission because of the delay in issuing those documents from concerned authorities of the government. Documents in physical form are also prone to manipulation and are vulnerable to fraud. There are industries and institutes that are working on a blockchain-based solution to issue the certificates, but there are many other documents that are required for the admission such as SSC and HSC certificates, Domicile and Nationality Certificates, Caste related certificates, and other proformas and certificates as applicable. Many times, candidates are not able to produce these documents on time and also these documents are vulnerable to fraud. The framework proposed in this study addresses the challenges related to issuing of the documents by government and education-institute authorities; availability of documents with candidates; and verification of the documents by admission-related authorities. Blockchain provides a secure and reliable way for saving data, running transactions, performing activities, and trust-building. For many, Blockchain is a thoroughgoing technology in the crypto domain, its applications range from Banking, Supply Chain Management, Cryptocurrency, Governance, etc. Publications by industries and scholars, website resources, and UG/PG admission brochures by DTE are utilized to develop this study.

***Keywords**: Blockchain, Academic Documents, Education, Digital Certificate, Security, Privacy*

Paper ID: 245

Selection of Digital Learning Platforms for Future Education 4.0 in India

Rajkamal Sangole, Dr. Darshana Desai and Anandkumar Jain

***Abstract**:* Due to Industry 4.0, new jobs are on trend, which needs the implementation of concepts. Industries require new skills, such as digital skills. There is a need to change new learning methodologies and educational techniques in all educational institutions. Digital Learning Platforms will provide focus on a broader overview, as there is a need for systematic and interdisciplinary thinking in individuals. The main aim of the research is to identify areas in which digital learning platforms or e-Learning platforms are selected by individuals to start self-learning through these platforms in terms of supporting Education 4.0 and Industry 4.0. As research methods, a questionnaire survey was conducted with statistical methods. The survey was done by random selection; more than 1000 individuals, including students and faculties of different educational institutions across India, were contacted for the study. Out of them, 350 responses were received. The research outcomes predict that the selection of digital learning tools or e-learning tools is based on their effectiveness, personalized experience, ease of use, user-friendliness, and user experience in support of Education 4.0 and Industry 4.0.

***Keywords**: Digital Learning, Effective Learning, Industrial Revolution 4.0, Education 4.0 Digital Technologies.*

Paper ID: 246

Education 4.0: Case Study on Selection of Digital Learning Platform and Communication Tools for Future Education 4.0 in India

Rajkamal Sangole, Dr. Darshana Desai and Anandkumar Jain

Abstract: This Industrial Revolution 4.0 is in boom across the globe; which is an indication for Universities and Colleges to adopt the future i.e. Education 4.0. Since the Last Decade, there has been a drastic change in the field of education. It has changed from physical learning to digital learning due to Covid-19. As digital learning came into the picture many developments have happened in using industrial revolution 4.0. This transformation has taught all of us how to use ICT effectively for conducting the lectures for the students remotely and smoothly. ICT has enabled new ways of student learning with the challenge of the availability of good learning platforms and tools. Industrial Revolution 4.0 and Education 4.0 work hand in hand for bringing new ways of learning. Industry 4.0 is majorly working on Robotic Process Automation, Industrial Internet of Things, Artificial Intelligence, and Smart Technologies. All the Technologies which are associated with Industry 4.0 have a massive impact on individuals' everyday lifestyles. To improve education, learning skills, and personal skills in students, universities and colleges need to adopt Education 4.0 which is an evolution in the Education System. Teaching students digital technologies in their current syllabus will change the learning habits of the students which will in turn improve universities and colleges. Future of Education will be completely based on Education 4.0 which will restructure the current education system. This case study will be focusing on the selection of Digital Learning Platform and Communication Tools for Future Education 4.0 in India on the basis of different parameters.

Keywords*: Digital Learning, Effective Learning, Industrial Revolution 4.0, Education 4.0 Digital Technologies.*

Paper ID: 250

Simulation of a Grid Integration With Hybrid (Solar + Wind) Energy Systems by Using SPWM Inverter

Shubhangi Pawar and Vandana Kulkarni

Abstract: A hybrid PV system is a system that uses at least one additional source other than PV to provide the power needs of the loads. The other sources that are commonly used in conjunction with the PV source are diesel generators, wind generators, microturbines, fuel cells, etc. Such hybrid systems are more relevant for standalone, island, or microgrid operations. The change in wind speed leads to significant changes in the generator's output power and frequency in the case of the PV-wind hybrid system. Therefore, it is desirable to convert the AC output to DC and also convert it back to AC through the inverter as revealed in the block diagram below. This arrangement represents one of the alternative ways of generating clean and forward-thinking electricity for the future generation. The 2 sources employed to generate electricity are wind and solar. The PV module's DC output and the WECS rectified DC output are fed into the boost converter, which operates in Closed Loop control to keep constant power O/P under all environmental conditions. It comprises wind turbines connected to PMSG (Permanent Magnet Synchronous Generators). A three-phase SPWM inverter uses its DC input to create a 3-phase AC output, while the O/P of the other boost converter is fed into the common link of DC, which is linked to it. The three-phase AC output is connected to the grid-tied load. The entire hybrid energy system simulation is served in MATLAB/SIMULINK.

Keywords*: Hybrid Energy Systems, Sinusoidal Pulse Width Modulation (SPWM) Inverter, Wind Energy Conversion Systems, Maximum Power Point Tracking Algorithm, Photovoltaic System.*

Paper ID: 254

RAKSHAK - An Energy Efficient Intelligent Helmet

Aditya Sheshu, Prakash Tunga, Sumukha M and Vineeth Kori

Abstract*:* Wearable technology is gaining popularity, being employed in a variety of applications, and wearable safety devices have found high demand in the market as of late. This project work relates to an important area of application for wearable devices, which is road safety. The roads of developing and underdeveloped countries tend to be largely unsafe and vulnerable to accidents especially for two wheeler users. Apart from the riders own safety, the chaotic environment in roads and highways in such countries also poses safety concerns for the public which is often overlooked. Another key issue with the use of wearable devices is minimizing electronic waste. As environmental issues are a growing concern, it is crucial to use energy efficient methods wherever possible in developing technology. Our proposed device RAKSHAK (meaning 'protector' in Hindi) is a secure riding helmet that strives to strike an immaculate balance between incorporating several novel and thoughtful intelligent features involving Machine Learning and the Internet of Things for safety and convenience, as well as taking an environment friendly approach to consumer electronics by using a renewable energy source.

Keywords*: Energy fficient embedded systems, Internet of Things, Machine Learning, Wearable devices, Road Safety*

Paper ID: 255

A Review of Deep Learning Application in Oral Cancer Prognosis

Sayyada Hajera Begum and P Vidyullatha

Abstract*:* Oral Cancer is one of the most common cancers caused in the oral cavity region that damages oral epithelial cells due to uncontrolled growth of the cells. Chewing tobacco, smoking and betel quid are potential reasons for oral cancer. With the advancement of Deep learning (DL) in biomedical image classification, automated image classification can aid in effective and early treatment of oral cancer. This paper discusses the technical aspects and applications of DL techniques in oral cancer detection. We also present a comprehensive comparison of various studies related to oral cancer detection and prediction in the paper.

Keywords*: CNN, DNN, RNN, Deep Learning, Oral cancer*

Paper ID: 258

AI and Deep Learning based Mask Detection System using Generic Camera

Chandrashekhar Patil, Harshali Patil and Shankar Mali

Abstract*:* In the past two years 2020 and 2021, the COVID-19 outburst has had a serious effect on human life. The effects and side effects of COVID-19 are being stroked in almost every discipline relevant to survival and development. The healthcare system was in a problematic situation during this tough time in pandemic situation all over the world. One of the many precautions and protections used to break the chain of spreading of this virus is wearing a mask and keeping safe distance. In a network of smart cities where entirely public spaces are monitored by Closed-Circuit Television (CCTV) cameras, we are offering a strategy in this study that restricts the spread

of COVID-19 by identifying people not wearing mask. The network alerts the proper authority whenever a person without a mask is discovered. It is believed that our research will help many countries throughout the world stop the spread of this infectious disease. We've examined this on 200 real people in the present, with a 100% success rate. It is also observed that when more than one person in front of CCTV success rate reduced exponentially

***Keywords**: Deep learning, Mask Detection, Artificial Intelligence, CNN, COVID-19*

Paper ID: 259

Watermelon Ripeness Detector Using Signal Processing

Shivaraj Karjagi, Sneha Neelappagol, Sushmitha P S, Vishruth S and Veena Karjigi

***Abstract**:* The gifts from nature always help those who are suffering from the sweltering heat and glaring sunlight. Watermelon is one of the summer's most wanted fruits, but we fail to judge the ripeness level. The present work aims at categorizing the state of ripeness of watermelons using recorded tapping sounds and photographed visuals. This prevents farmers from picking immature fruit. By manually hitting the watermelon and recording the sound, the sound file dataset is produced. In the case of image processing technology, a digital camera is used to capture the textures on the watermelon's exterior layers. These images have been augmented. The data gathered will assist in assessing the watermelon's ripeness. The experiments demonstrate acoustic signal processing and image processing techniques. The watermelon datasets have been divided into ripe and unripe categories with greater accuracy of 89 percent out of 336 audio samples and 93 percent out of 4864 image samples respectively.

***Keywords**: Watermelon, Processing technique, Augmented, Classification model, Acoustic signal.*

Paper ID: 261

AI Virtual Hardware

Tummala Sravya, Sakshi Bhargava, Shravani S, Rugveda Bodke and Dr. Nilima Kulkarni

***Abstract**:* The computer is one of the wonderful and fascinating inventions of technology and has come to significant use to humans in every sector. The existing computer technology is already advanced and modern. Even so, this proposed system will provide better ease of technology to humans. The proposed system is an Artificial Intelligence (AI) application with three combined features that are AI Virtual Mouse, Keyboard and Painter.

These three features (AI Virtual Mouse, Keyboard and Painter) use a common hand tracking module. Hand tracking module is a python file which has a class name Hand Detector and it contains 4 member functions that are findDistance, findHands, findPosition and fingerUp. Using this module the three features work successfully.

The proposed system opens with a main window which is a GUI screen made with the help of module Tkinter. This main GUI page contains all the three features (AI Virtual Mouse, Keyboard and Painter) combined. The common libraries used for system execution are OpenCV, CVZone, numpy, autopy, mediapipe, etc.

***Keywords**: AI, Mediapipe, Autopy, CVZone, Hand Tracking Module, GUI.*

Paper ID: 265

Green Synthesis and Characterization of Ag-PANI (Polyaniline) Nanocomposite and its Application as a Carboxylate Vapour Sensor

Sharda Gadale, Pooja More, Shobha Waghmode and Madhura Walujkar

***Abstract**:* This article explains the detection of carboxylate vapour in low quantities, which is crucial for both human health and the chemical industry (minimum 30 ppm and maximum 130 ppm). Results of the production of a silver-polyaniline (Ag-PANI) nanocomposite and an analysis of an optical fibre gas sensor using an evanescent wave were discussed. Here, the sensor was created by depositing Ag-PANI nanocomposite on the cladding of an optical fibre and testing it in the range of 30 ppm to 130 ppm carboxylate vapour concentration from natural extracts. Through the use of X ray diffraction analysis (XRD), field emission scanning electron microscopy (FESEM), and Fourier-transform infrared spectroscopy (FTIR) , structural, morphological, and optical features of the produced nanocomposites were examined. A 2.0 mM mole concentration of Ag-PANI nanocomposite was optimised for the experiment. Researchers looked at the fluctuation in carboxylate vapour concentration and the sensing response of optical fibre cladding coated with an improved Ag-PANI nanocomposite (2.0 mM) on carboxylate vapours from a natural extract of lemon juice. At lower concentrations (12 ppm) acetic acid, acetone, ammonia, and ethyl alcohol were detected using the performance of manufactured nanocomposites as a sensor. The Ag-PANI nanocomposite appears to be a promising, economical, and environmentally friendly nanocomposite for high performance carboxylate vapour sensors, and it may be further developed as a prototype in the future for the market.

***Keywords**: Carboxylate vapor, Polyaniline, Nanocomposite, Optical fiber sensor*

Paper ID: 269

Brain Tumor Detection System using Convolutional Neural Network

Shubham Koshti, Varsha Degaonkar, Ishan Modi, Ishan Srivastava, Janhavi Panambor and Anjali Jagtap

***Abstract**:* Brain tumours, in medical terms, are the intentional or unintentional growth of mass cells which hamper the conventional functioning of the shape of a brain. For correct diagnosis and efficient treatment planning, it is necessary to detect the brain tumour in the early stages. The tumour within the brain is one of the most dangerous diseases and might be diagnosed easily and reliably with the assistance of detection of the tumour using automated techniques on MRI Images. Positron Emission Tomography, Cerebral Arteriogram, spinal tap, and Molecular testing are used for tumour detection. Digital image processing plays an important role in the analysis of medical images. Segmentation of tumours involves the separation of abnormal brain tissues from normal tissues of the brain. Over the few past years, various researchers have proposed semi and fullyautomatic methods for the detection and segmentation of Brain tumours. The motivation behind the paper is to detect neoplasm and supply the better treatment for the suffering. The objectives of the paper are to develop an end-product (Web Application) that can be installed at hospitals. To facilitate this a detection model is developed that may accurately predict if an uploaded MRI scan of the brain shows it is affected by a tumour or not. To implement the paper a Convolutional Neural Network(CNN) was used to define the model. Transfer Learning is implemented to efficiently train the model. The data set used is split into 3 sets which are train, test and validation, in the ratio 80:10:10. The model is meant to be trained for 12 epochs. Callbacks also have been given to automate the model save process. The test accuracy of 97% is achieved. This trained

model will be connected with an online Application via API. Within the proposed Web App the user is having access to four routes; which is a welcome page and which contains information about the system, the second route is information and awareness about the brain tumour in medical terms, third the detection page, in which the trained model is deployed. The user can provide an input image, MRI images in our case, and the last route is the team information. Images which are fed to the model route will be processed by the developed convolutional neural network which can then confirm if a tumour is present or not and intimidate the user for the same through an output Display. The advantage of using this system is that it will automate the detection process, and ease the workload of the hospital staff. However for the advantage to become a reality, careful selection of accurate data is needed, or else there is a chance of false results.

***Keywords**: Brain Tumour Detection, Medical Image Processing, Brain tumour, MRI, CNN, Web Application, Case History*

Paper ID: 276

Online Examination and Evaluation System

Deepak Uplaonkar, Harshad Dandage, Ankita Shete, Avani Shete, Lavanya Bodele and Shruti Jadhav

***Abstract**:* Currently, online test systems have adapted easily to today's technologically advanced world. Examinations are an essential part of the educational process.Even though the test are conducted online the teacher has to do manual evaluation.The examinations can be classified into two main types of evalua- tion, objective answer and subjective answer.As of now, online evaluation is available for the objective questions, hence the manual assessment of the theory answer,is a tedious task for the teacher. The teacher checks the answer manually and gives the marks.In this paper, a method is proposed by authors wherein theoretical as well as objective based answers could be evaluated automatically and marks would be assign accordingly.

***Keywords**: Cosine similarity, Nltk*

Paper ID: 277

Flood Risk and Inundation Mapping of Assam using a GIS-based Approach

Anna Berlin, V. Rajesh Chowdhary and N. Vinod C. Menon

***Abstract**:* Flooding is one of the most prevalent natural disasters in Assam, India, occurring on a yearly basis. In this paper, a Geographic Information System (GIS) approach is applied, with the help of remote sensing data, to create a flood risk map of the state of Assam. This map is based on five important parameters: population, land use/land cover, elevation, precipitation and distance to the nearest water body. Furthermore, Sentinel-1 data is used to create an inundation map of the most recent flood, which occurred during June of 2022. Both aspects of this research help to assess the situation on ground during a flood and to improve the flood management and preparedness for future flood scenarios.

***Keywords**: Flood, GIS, Remote sensing, Flood management*

Paper ID: 280

A Covid-19 Tracker for Medical Front-liners

Rajeev Ramesh, Sandeep Patil, Akshansh Jaiswal, Vikramjit Banerjee, Aman Shinde and Manali Kaswa

***Abstract**:* The management of Covid-19 affected patients is a very difficult task. The current healthcare system of India is not able to cope with the enormous flow of patients and is in a dire need for improvement. This implementation paper provides a system which will manage all the affected patients right from the time they are Covid-19 positive till the time they are treated and discharged. This paper includes all the technical details of a fully implemented healthcare management system which is a significant improvement in the current system. The proposed system is a cross platform multi user web app which can be used by multiple stakeholders to carry out smooth management of the patients. It consists of a lot of key features like dynamic location-wise patient status, an accurate tracking system of ambulances, a statistical trend analysis of patients and categorical report generation of patients. This system aims to help the medical Front-liners in efficient management of Covid-19 patients, and it is a common site for all the different health workers like field workers and medical officers to work togetherand fight against this deadly disease affecting our country.

***Keywords**: Covid-19, Geocoding, Analysis, Pandemic, Tracking, Ambulance, Maps, Clustering, Patients, Hospital.*

Paper ID: 281

Study and Analysis of 4G-5G Spectrum Mobile Signals on Germination Seed and Further Growth

Sharad Pustake, Dr. Vivek Upadhyaya and Dr Mahesh Bundele

***Abstract**: Day by day the number of Radio Frequency Transmitting User Devices (RUD), mobile or static, are getting increased in and around living objects (LO). The near exposure of these Radio Frequencies Radiations to a specific LO, at a given place, under given environmental conditions, at unscheduled time of intervals, may affect its growth and survival, positively or negatively, as compared to the growth and survival of LO without presence or far presence of these RUDs is subject of study. The impact of effect will depend on the surface of exposure, field strength of signal at the surface of exposure, both these factors depend on Frequency, distance and radius of first Fresnel zone. Considering commonness of 800/1700/1800 MHz frequency band for 4 G & 5G communication system, the impact of RUD radiations in this band have been planned, the uplink and down link RF radiation pattern studied and accordingly test set-up has been designed and first experiment conducted on Butter Bean seeds and observed the impact on the biochemistry parameters after two to three weeks of exposure at regular interval during germination and growth. The first set of readings exhibit low values as compared to control.*

***Keywords**: 4G, 4GLTE, 5G, Living objects, Radio Frequency Transmitting User Devices, Butter Bean, RF, Mobile handset, smart phones, Biochemistry, FSL, Fresnel Zone..*

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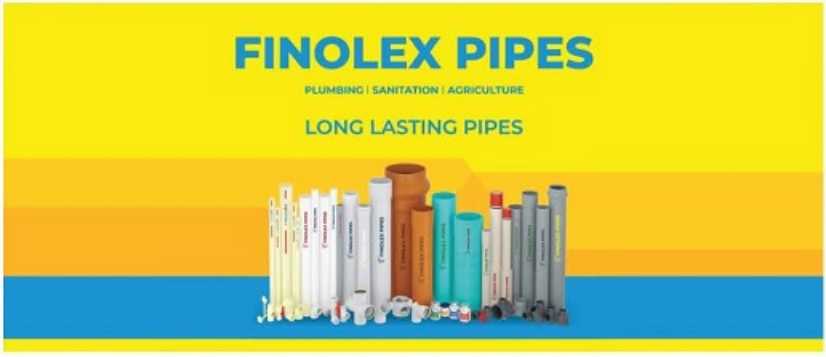

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