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Samvaad
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Samvaad Editorial : 21st Century Vehicles

Over the last decade, there is technological paradigm shift in automotive sector. Traditional patterns have been exploding as the digital revolution forces automobile manufacturers to rethink their whole hardware and software architecture. It's possible that an automobile will look nothing like it does now in a few years. Every piece of electronics in our life already has a smarter equivalent in today's fast-paced society. Light switches, doorbells, coffee brewers, refrigerators, washing machines, watches, and phones are all examples of electronic devices. Cars are no exception to this trend, and over the last decade, they have become smarter than their drivers, as well as safer and more efficient in many circumstances. Thus today's car can be termed as 'Internet Car'.

Car enthusiasts all around the world have been closely following the news surrounding Elon Musk's company Tesla in recent years, anticipating to hear about more ground-breaking technologies that could improve the autonomy of their electric, self-driving cars. For a long time, a car's main job was to transport us from point A to point B as quickly as traffic would allow. However, rapid technological improvements have prompted a surge in demand from many of us: we want more comfort, entertainment, functionality, and other features in our cars than ever before. Perhaps, in the same way that phones have evolved into smartphones, automobiles should evolve into 'smart' automobiles with futuristic and practical functions. Some of the smart features are Enhance gesture control, Augmented reality head-up display, apps and firmware updates, sheet thin batteries, communication between the vehicles, smart fuel saving tips, perfect integration with smartphones, long term evolution, self-healing paint, Autofocusing, etc. Automobile safety systems have emerged as the most significant topic of R&D in today's globe. The number of on-road accidents is growing as a result of increased population and excessive traffic. According to many roads safety surveys, the majority of road accidents occur as a result of driver mistake, human behaviour, traffic congestion, lane cha-

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-nge over, and so on. Advanced driver assistance systems (ADAS) are primarily concerned with automating and improving different vehicle-related duties in order to deliver a better driving experience, hence increasing the safety of the driver, passengers, and other road users. The clever ADAS system takes suitable actions to remedy transmission difficulties by offering automated controls for altering the vehicle's speed or stopping it in emergency scenarios.

Some of the features of smart vehicles are: **Assisted parking mechanism:** this feature enables user for self-car parking. Simply press the button, relax, and your smart car will do the rest. Thanks to a series of cameras that capture your car's surroundings in 360 degrees, you can even observe the entire procedure from a bird's eye view.

Adaptive front light control system: A lighting system that detects pedestrians and animals Doesn't it sound incredibly posh? This system consists of an infrared camera, strong LED lights, and, of course, artificial intelligence. The camera monitors the distance in front of the car, and if AI detects an object that could be a human or a wild animal, the LED beams will be focused on it at the same time.

Pedestrian detection and autonomous breaking: While driving a vehicle on diverse roads, drivers may miss pedestrians. The average driver's reaction time for detecting danger and applying the brake is roughly 3 seconds, which is insufficient, which is why engineers devised the combination of pedestrian detection and autonomous braking technology. A camera mounted on your windshield and a radar mounted on your bumper constantly scan your surroundings. When a collision is suspected, the system alerts the driver by sounding an alarm and flashing a warning light. If the driver does not respond, the vehicle stops on its own, saving numerous incidents that could have been avoided. In this context, the 21st on protecting vulnerable road users (VRU) that have reduce mobility. This VRU category may include pedestrians, cyclists, motorcyclists, roadside workers, older people and children. Extensive research projects are

being carried out all over the world, and newer technologies are getting developed to make use of sensor supplied information and integration in the vehicle control system for effective collision avoidance. These systems detect vulnerable road side users in various driving scenarios including poor weather conditions, vehicle speed, VRU behaviour, traffic situations, etc. through artificial intelligence-based algorithms.

Self-Driving Cars: Braking isn't the only self-driving feature available in today's automobiles. You can also use adaptive cruise control to allow your car monitor traffic and keep a safe distance from the car ahead of you, or use a lane assistant to stay in the same lane without using the steering wheel. Modern automobiles can almost drive themselves, however we are still years away from safely utilising AI as our personal chauffeurs, as evidenced by recent Tesla accidents.

Connected Vehicles: While you may not be able to read the daily paper while driving to work in your car, you may at least listen to music from the cloud while driving. You can also use online voice-enabled search, surf the internet, and obtain real-time traffic information shown on the navigation screen thanks to internet connections embedded into smart automobiles. You may even unlock your garage door or turn on the air conditioning in your office while driving with IoT-enabled equipment.

Electrical Vehicles: Electric vehicles (EVs) rely on electricity as a pri-mary fuel source or to increase the efficiency of traditional vehicle designs. All electric vehicles, also known as battery electric vehicles (BEVs), and plug-in hybrid electric vehicles (PHEVs) are examples of EVs (PHEVs). Even though some of these vehicles still use liquid fuels in addition to electricity, these vehicles are commonly referred to as electric automobiles, or simply EVs. Electric vehicles are noted for their rapid torque and peaceful driving experience.

As a consumer, an electric car can be a terrific way to save a lot of money on gas. However, there are other reasons why you should purchase an electric vehicle in today's technological age such as no gas required, more convenient, more savings, no emissions, safe to drive, cost-effective, low maintenance, reduced noise pollution, good battery life etc.

Today's civilization is reliant on growing technology to better our way of life as well as the lives of others. As vehicular technology advances, so does the need for safer and more efficient transportation vehicles. Today, the goal of automobiles is to get to and from the intended destination as efficiently and effectively as feasible. With technological advancements throughout the decades, we discovered a number of viable solutions. When devising alternatives, it is critical that they do not compromise economic development or the present way of living. As a result, one of the best suited solutions is the development of the electric automobile.

Guest Article: Spintronics—The Future of Electronic Devices

Electronic devices have shaped the life of humans in the past century. The discovery of vacuum tubes to the development of integrated circuits have shaped the utility and scaling for electronics. In this field one develops a performing unit with specific purpose (Device) using charge of electrons. Specifically, the current voltage characteristic is the fingerprint of a given electronic device. The current can be manipulated by use of electric field modulation in thin films of solids leading to different device architectures. Along with charge, spin of electrons can also be used for manipulating the current in a solid[1].

The spin being a fundamental property related to probability current, can be used to regulate the device characteristics based on polarization dependent scattering. If the electrons are passed through an oriented magnetic field, they get polarized. If we pass these polarized electrons into a magnetic solid with the same polarization as that of the electron beam then the scattering is less and the charge flows. If the polarization of the solid is different than the charge flow will be less because of increased scattering. This is like a Polarizer- Analyzer experiment. This asymmetry in scattering allows us to regulate charge current, opening a new arena for designing electronic devices[2]. This new branch is Spintronics. The area received a Nobel Prize in physics in the year 2007. This field of research is contributing to basic science as well as technology. This makes us think of essential dimensions of research to contribute to the field of electronics. The first dimension is device architecture like diode or transistor

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architecture in regular electronics. In spintronics, one can look for similar or equivalent architectures as well as innovate them.

An important class of devices in this field is the device based on waves of macrospins (Big spin vector?). These work like the light based devices (photonic) except that their characteristics can be tuned using magnetic field[3]. This branch is called magnonics.

One can develop resistors with very large change in resistance when a magnetic field is applied. This architecture is called a Giant Magneto Resistor (GMR) which is presently used in computers as memory[4]. Furthermore, one can tune the device characteristics using magnetic as well as eclectic field in some classes of devices. These architectures are achieved due to magneto-electrically coupled materials or thin film layers. The research has developed the possibility to fabricate quantum computers, the computers of the future with infinite possibilities.

Spintronics is believed to be the field of hope for the future, the future field with information, data, computation and communication. It is an area of research to quench your quest to explore the limitless possibilities at the horizon of human thinking.

1. Chambers, S.A., Mater. Today 2002, 2, 34.

2. Wolf, S.A.; Awschalom, D.D.; Buhrman, R.A.; Daughton, J.M.; von Molnar, S.; Roukes, M.L.; Chtchelkanova, A.Y.; Treger, D.M., Science, 2001, 294, 1488.

3. Parkin, S.; Jiang, X. ; Kaiser, C.; Panchula, A.; Roche, K.; Samant, M., Proc. IEEE 2003, 91, 661.

4. Venkateswarlu, D.; P. V. Mohanan, Rajeev S. Joshi, and P. S. Anil Kumar, IEEE Transactions On Magnetics, 48-11(2012) 1-4

Scientific Breakthrough: Correlation between consciousness and Quantum mechanics

Establishment of consciousness is one of the most important open questions in science. One of the foremost thing that comes to mind is what is consciousness? Consciousness can be considered as a by-product of enormous computations that occurs in one's brain. Neuroscientist Giulio Tononi, proposed that consciousness is an culmination of vast amount of information that comes into our brain. Our brain is a complex web which correlates sophisticated information received from our sensory and cognitive inputs. Roger Penrose a notable physicist and Stuart Hameroff an anaesthesiologist proposed that brain's neuronal system comprises of a complex network and the consciousness produced from it should obey the rules of quantum mechanics. Penrose uses quantum mechanics to explain "quantum coherence," which states that qubits of information remain in multiple states until they coalesce together into an instantaneous calculation. Penrose's further stated that quantum coherence occurs in protein structures known as "microtubules". These microtubules are present inside the neurons

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-in our brains and can store and process information and memory. According to Penrose and Hameroff the microtubules are quantum devices that helps in creating and imbibing our consciousness. Although some critics say that brain is not suitable and cannot sustain a quantum process. Another physicist, Max Tegmark, even calculated that the brain cannot possibly think as fast as this idea requires. However, Japanese scientists added proof to the theory by Penrose and Hameroff as researchers detected vibrations in the microtubules.

Penrose and Hameroff then proposed that by focusing brain stimulation on these vibrations one could conceivably "benefit a host of mental, neurological, and cognitive conditions." It seems that there is a strong correlation between Quantum Consciousness and Quantum physics, and we will see new developments unfolding in the coming future.

https://theconversation.com ,
https://bigthink.com/life/consciousness-at-the-quantum-level/

Faculty Achievements

1. Mr. S. P. Banne Nominated as Executive Committee member in Indian Geotechnical Society Pune Chapter Main Body .
2. Mr. R. S. Chaudhari Successfully defended PhD work under the guidance of Dr. P. P. Bhangale from SSSUTMS, Bhopal.
3. Mr. S.B. Matekar Successfully defended PhD work under the guidance of Dr. A.M. Phulamberkar from SPPU, Pune.
4. Dr. A. Awale got National Post-Doctoral Fellowship at IIT Kanpur.
5. Prof. Anjana R.A. received "PMI Pune Deccan India Chapter Collaboration Award 2021" on 27th November 2021
6. Mr. Nikhil Subhash Thorve received the award in the state level essay competition Sharad Pawar in my words organized by Sharad Kala & Krida Pratishthan, Pune. Mr. Nikhil Thorve's article "Streemuktidata Sharad Pawar" was included in the book "Sharad Pawar in My Words" published in four languages English, Marathi, Urdu and Hindi. The book was published on 12 December 2021 at Nehru Center, Mumbai in the presence of Mr. Sharad Pawar and other dignitaries. Mr. Nikhil Thorve was honored by the Minister of Water Resources of the State of Maharashtra Mr. Jayant Patil for this special achievement.
7. One Week ISTE Approved Induction /Refresher Program on " 3D Interaction Design using AR/VR (Online Mode) was successfully organized at Department of IT from 23- 29 December ,2021 and Dr. Jayshree Katti is the Co-ordinator for this FDP.
8. Dr. Jaya Goyal has qualified BEE's certification examination for Energy Managers and energy Auditors.

PCCoE Technical Feast

1. Dr. G. D. Upadhye published a research paper on "Improved Model Configuration Strategies For Kannada Handwritten Numeral Recognition " in the Journal of Image Analysis & Stereology; Vol 40, No 3 (2021); ISSN: 1580-3139; https://doi.org/10.5566/ias.2586
2. Sushma Vispute, Dr. Madan Lal Saini published a research paper on "Automation In Agriculture: A Systematic Survey Of Research Activities In Agriculture Decision Support Systems Using Machine Learning " In proceedings of FTNCT 2021; ISSN:1876-1119
3. Sushma Vispute, K. Rajeswari, Pratik Adhav, Avadhoot Autade, Abhimanyu Babarpatil, Aditya Dhumal published a research paper on "A Comprehensive Review for Smart Attendance Monitoring System using Machine Learning and Deep Learning " International Research Journal of Engineering and Technology (IRJET), Google scholar, Volume 8, Issue 12, December 2021 https://www.irjet.net/volume8-issue12 S.No: 73; ISSN: 2395-0072
4. S. S. Sambare,.Utkarsh Pramod Pathak, Venu Sonavane, Suyash Musale, Mitali Gadiya published a research paper on "Comparative Study Of Machine Learning Algorithms For Stock Market Prediction " in IEEESEM Journal; *ISSN 2320-9151*
5. Akriti Singh, Chirag Kriplani, Tanuj Balkhande, Shweta Kale, Prof. Santosh Sambare, published a research paper on "Automation of the Onboarding Process " in Aegaeum Journal, Volume 9, Issue 11, 2021, Page No:159, ISSN: 0776-3808
6. Prof. Santosh Sambare and Dr. Madan Kharat published a research paper on "Mobility Management in Heterogeneous Network Using Systematic Hierarchy Process and Seagull Optimization Algorithm", In proceedings of FTNCT 2021; ISSN:1876-1119
7. Yash Bhandari, Mrunal Ingale, Mayur Jagtap, Avi Raghuvanshi, Prof. Pallavi Dhade published a research paper on "A Survey on Precision Agriculture: Crop Health Monitoring and Protection", in International Journal of Engineering Research and Technology (IJERT); Volume 10 , Issue 12 , ISSN:2278-0181.
8. Atharv Deshmukh, Aditi Thakre, Unnati Bhalekar, Hrishikesh Badakh, Manjiri Ranjanikar published a research paper on "Automated Hand Sanitizer with Mask Detection", in Aegaeum Journal ; Vol IX, issue XI, Nov-21 PP-151-157.
9. Samprati Katariya, Shreyas Bhoyar, Shrikant Pawar, Swati Jaiswal, Om Kalbhor published a research paper on " Ant Path Following Robot " in ICCIS 21, Book Chapter SCRS, Springer; ISBN 978-81-95502-00-4; https://doi.org/10.52458/978-81-95502-00-4
10. Dhanashree Munot, Dhiraj Wakharde, Vrushali Kamble, Charudatta Potdar, Sushma Vispute, Rajeswari Kannan published a research paper on " An Application of Data Analytics for Social Media Platforms and e-Governance: An Overview", in ICCIS 21, Book Chapter SCRS, Springer; ISBN 978-81-95502-00-4; https://doi.org/10.52458/978-81-95502-00-4
11. Mr.Rahul S.Chaudhari presented research paper in An International Conference on Structures, Material and Construction 2021 (ICSMC), Springer. Organized by:Department of Civil Engineering, Jaypee University of Information Technology, Waknaghat, Solan 173234, Himachal Pradesh, India on 12th and 13th November 2021
12. Mr.Rahul S.Chaudhari attended a conference "Field and Institute Liaison in Education -2021" organized by Water Resource Department ,Government of Maharashtra in association with K.K.Wagh Institute of Engineering Education and Research ,Nashik on December 17 , 2021
13. Prof. Anand Jain successfully completed online training program on "Digital Marketing" on 29th December 2021. The course was conducted by Udemy for the duration of 23hrs. The course covered various aspects of the digital marketing such as Google Analytics, Facebook Marketing, Email Marketing, SEO, SEM, SMO etc
14. Dr Roshani Raut delivered expert talk on "Machine Learning for IOT", in five days AICTE-ATAL Faculty Development Program on "IOT for Emerging Technical Applications", organized by the Indian Institute of Information Technology (IIIT), Kalyani, West Bengal, on 15th December, 2021
15. Dr Roshani Raut delivered an invited talk on "Machine Learning in Healthcare", in AICTE-ISTE sponsored induction refresher programme, on recent trends in AI, organized by JIT, Nagpur, on 10th December, 2021
16. Dr Roshani Raut delivered an invited talk on "Indian Patent Drafting and Filing Procedure" , for faculty of Symbiosis Institute of Technology, Lavale, Pune on 8th October, 2021.
17. Dr Rajesh Phursule delivered a guest lecture on " Theory of Computation" for TE (Computer) students of Imperial College of Engineering and Research on 19th November to 21 November 2021
18. Dr. M. B. Kadam of Dept of AS&H received copyright for article "Be a part of Indian Quantum work force". ROC: L-109644/2021 (23-12-21)
19. Dr. S.K. Kale received best research paper award for paper entitled "Emerging Agriculture Applications of Silver Nanoparticles", published in ES Food & Agroforestry, 2021.

Students Achievements

PCCOE Basketball Girls Team	Won the Inter College Basketball Competition jointly organized by Pune District Zonal Sports Committee & Dr. D.Y.Patil Arts, Science & Commerce College, Pimpri. In the final PCCOE, Nigdi beat PCCOE&R, Ravet by 24/7 Score.
Jagtap Arya, Hingmire Apurva, Makhar Sneha & Shinde Yashashree	Girls were selected in Pune District Team for Inter Zonal Competition being held at ICCS, Tathawade. Arya Jagtap (SY Comp) got selected in Savitribai Phule Pune University Basketball Team for West Zone Inter University Competition being held at, Shri Vaishnav University, Indor.
Vishal Pange (BE Comp), Yashwant Telang (TE IT), Yashodeep Khandagale (TE Mech) Pruthviraj Chaudhari (TE Mech).	PCCOE Boys Chess Team Won the Inter College Chess Competition. Consecutive 5 years we the winners of this competition.
Apurva Hingmire (TE E&TC) & Isha Lahane (TE E&TC)	PCCoE student were selected in Maharashtra Korfball Team for Korfball National Competition being held at Patiala, Punjab.
Suyash Sonawane	Won International level hackthon Cloud native hackthon in Best Innovation for Datree Category
Team Comrades Bhavesh Kabade, Omkar Fulari, Adesh Gele, Wrushikesh Patil, Atharv Joshi	**2nd Runner Up in La Trobe University Technology Infusion Grand Innovation Challenge (TIGC -2021),** Announced at Grand Finale on 15 December. **Faculty Mentor**— Mrs. Ashvini Ladekar
Rohit Suryawanshi (MTech HPE)	Received project grant of Rs. 1,00,000/- under SPRG PG scheme of ISHRAE. Project guide:- Mr. Nilesh Gaikwad
Saloni Bokare (BE IT)	Winner at National Level College Festival **"Impression -2021" at College of Engineering Pune.**
Nupur Kulkarni (BE IT)	Received "**Outstanding Volunteer Award**" at All India Student YP-WIE-LM Congress 2021, 19 December 2021.
PCCoE IEEE Student Branch	2nd Winner in **"IEEE Student Branch Video Contest"** at All India Student YP-WIE-LM Congress 2021 , 19 December 2021

2nd Runner-up of the 2020-21 Grand Challenge

Team THE COMRADES for the Smart City concept titled
"Flexi-Auto Pathway"
Savitribai Phule Pune University – India

Adesh Gele   Atharva Joshi   Bhavesh Kabade   Wrushikesh Patil   Omkar Fulari

Problem: Challenges faced by physically disabled commuters and other commuters to cross between railway platforms.

Solution: An automated escalator joining platforms through interlocking mechanisms with the help of Absolute Block Signalling System.

Lab Development: AICTE Funded Artificial Intelligence , Robotics and Vision Lab

Prof. Dr. K. Rajeswari, and Prof. Pallavi Dhade developed Artificial Intelligence , Robotics and Vision Lab in Computer Engineering department through funding received from AICTE . Following equipment's are purchased through the and accommodated in the lab.

Name of the Equipment	Cost (in Rs.)	Applications
AI Vision Developer Kit	1,16,000/-	The device is capable of AI processing locally on the device, analyzing what seen and sending the relevant data for cloud for insights and action. AN IP Camera is used in the kit , It uses machine learning services to build, train and deploy AI model. All AI computations done on AI camera. Applications are : Workplace Safety Identification, Enable audio and train an audio ML model etc.
NVIDIA® Jetson TX2 Developer Kit	65,440/-	NVIDIA® Jetson Nano™ Developer Kit is a small, powerful computer. It runs multiple neural networks in parallel for applications like image classification, object detection, segmentation, and speech processing.
Arducam 8MP Sony IMX219 Camera Module w/ CS lens 2718	22,500/-	Camera based on the Sony IMX219 image sensor. It's capable of 3280 x 2464 pixels static images, and also supports 1080p30, 720p60 and 640x480p90 video. It attaches to Pi by the dedicated standard CSi interface.
Full HD WIFI Sports Camera	10,998/-	This is a wireless wifi full HD sports camera used in different imaging / photography purposes.
MAC Systems	2,37,000/-	Apple Mac System is very useful to develop Mobile Applications for Cross Platforms such as iOS, Android, Debian, etc. MAC machine will be useful to develop high performance applicationfor all types of Operating System .It can also be used to create animations games/ video editing with the professionalsoftware which are only available on MAC machine
HP-High end configured Server	4,08,010/-	A user may set up a server to control access to a network, send/receive e-mail, manage print jobs, or host a website. It can used as one of the function as mentioned above in the types of servers. Some servers are committed to a specific task, often referred to as dedicated. Many parallel and distributed complex problems can be run on high end configured servers.
Arduino Mega ADK board with USB	16,000/-	The Arduino MEGA ADK is a microcontroller board based on the ATmega2560 (datasheet). It has a USB host interface to connect with Android based phones, based on the MAX3421e IC. Making it easier to put into DFU mode.

PCCoE Expressions

Painting by Mr. Shriyash Shinde, Dept. of Mechanical Engineering   **Clay Art by Mr. Manoj Thorat, E&TC Department**

PCCoE Announcements

Pimpri Chinchwad Education Trust's
Pimpri Chinchwad College of Engineering, Nigdi
and
Pune District Zonal Sports Committee
Jointly Organized
Inter College Table Tennis (Men & Women) Competition
Date: 5th and 6th December 2021
Welcome You All

Prof.Santosh Pacharane
Director of Phy.Edu.& Sports

Dr. Pravin Kale
Dean, SDW

Dr. Govind Kulkarni
Director

PCCOE, has successfully organized Inter College Table Tennis (men and women) competition under Pune District Zonal Sports Committee, SPPU, on 5th December 2021.

Pimpri Chinchwad College Of Engineering, Pune
Ranked 25th in All India Level, and Ranked 6th in West India

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Education
TOP ENGINEERING
100 COLLEGES IN INDIA - 2021

An annual recognition in 'Top 100 Engineering Colleges in India - 2021' not only represents the colleges & institutes reinventing high-quality & outcome driven engineering studies, but also their strive to develop innovation, creativity and knowledge in shaping the future of an individual.

Emmanuel Christi Das
Managing Editor

CONGRATULATIONS: PCCoE Ranked 6th in west zone and 25th in India in *"SiliconIndia Education Engineering Rankings 2021"*

FIRST ANNOUNCEMENT AND CALL FOR PAPERS
International Conference on Innovations in Mechanical and Civil Engineering
(26th and 27th August 2022)
Jointly Organized by
Department of Mechanical Engineering and
Department of Civil Engineering
Pimpri Chinchwad College of Engineering, Pune (INDIA)

i-MACE

International Conference on Innovations in Mechanical and Civil Engineering (i-MACE)

Organized by Department of Mechanical and Civil Engineering

(26th and 27th August 2022)

Website link:- http://i-mace.pccoepune.com/