

Jayawant Shikshan Prasarak Mandal's

JSPM NARHE TECHNICAL CAMPUS



Narhe, Pune (Maharashtra) - 411041

ENTC DIGITAL SPECTRUM

2023-2024

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION

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ESTC DEPARTMENT FACULTY S STUDENTS

Department

of Electronics and Telecommunication Engineering established in 2012-13 runs UG and PG program in VLSI and Embedded System. The department has highly qualified, experienced and dedicated teaching and non teaching staff to help and support the student in developing a dynamic and leading E & TC engineer. Department has state-of-the-art laboratories namely;

Signal processing, Embedded, Communication Lab I, VLSI, Project, Communication Lab II, Analog Electronics, Digital Electronics and Basic Electronics. Our classrooms are equipped with modern Teaching aids like LCD Projector, computer with Internet Connectivity and Smart boards. Computer labs are available with adequate no. of latest computers and advanced software. The department has state of art Electronics Automation Museum and Self learning laboratory which is unique facility at the department. This help student to nurture the skills of experimental learning and participative learning. The department uses the Learning management system (MOODLE) actively. Students are also motivated to participate in to co curricular and extracurricular activities. Department had strong industry collaboration to explore the student the current trend and industry environment. We have filed 8 patents and published around 100 papers in the reputed journal and conference. As a outcome of all this the department had excellent track record of result and placement.







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Artificial Intelligence in Healthcare

Artificial Intelligence (AI) is revolutionizing industries worldwide, and healthcare is no exception. From diagnosing diseases faster to discovering new drugs, AI is transforming how healthcare providers deliver care and how patients experience it. As AI technology continues to evolve, it promises to make healthcare more efficient, accurate, and personalized, ultimately improving patient outcomes and reducing costs.

AI in Diagnostics: Faster and More Accurate

One of the most significant impacts AI is having in healthcare is in diagnostics. Traditional methods of diagnosing diseases heart conditions, like cancer, or disorders often rely neurological on extensive testing, imaging, and expert interpretation, which can take time and may lead to human error. AI-powered diagnostic tools are changing this by analyzing medical data with incredible speed and accuracy.

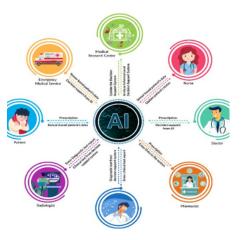
Take medical imaging, for example. AI algorithms can scan thousands of images-X-rays, MRIs, or CT scans-identifying patterns and abnormalities that may not be immediately visible to the human eye. For have instance. AI systems shown exceptional success in detecting early-stage cancers, sometimes surpassing the performance of expert radiologists. This rapid, precise analysis allows doctors to make faster, more informed decisions, leading to earlier treatments and better patient outcomes.

Al is also being applied in pathology, where algorithms can analyze tissue samples to identify markers of diseases such as cancer.



Al in Patient Care and Management

AI is also reshaping how patients are and cared for outside managed of hospitals. Virtual health assistants, chatbots, and Al-driven apps are becoming common tools for managing chronic conditions, reminding patients to take medication, or offering personalized health advice. These technologies help bridge the gap between doctor visits, ensuring that patients stay on track with their care plans and receive timely support when needed.



Telemedicine has also been enhanced by AI, allowing doctors to remotely monitor patients' health through wearable devices that continuously track vital signs. This data is analyzed in real-time by AI systems, alerting healthcare providers to potential problems before they become serious. For patients with chronic conditions like diabetes or heart disease, AI-powered monitoring can be life-saving, reducing the need for frequent hospital visits and ensuring proactive care.

Smart Traffic Control System Using Image Processing

With the rapid increase in urbanization, managing traffic efficiently has become a growing concern in cities worldwide. Traditional traffic systems, which rely on fixed-timed signals, are often inefficient, causing delays and congestion, especially during peak hours. A Smart Traffic Control System using Image Processing promises to revolutionize urban mobility by making traffic management more dynamic, efficient, and responsive to real-time conditions. By leveraging cameras and image processing algorithms, this system can adapt traffic signals based on actual traffic flow, reducing congestion, improving safety, and enhancing overall efficiency.



Image processing techniques like edge detection, object recognition, and optical flow analysis play a crucial role in smart traffic systems. These techniques allow the system to:

- **Count vehicles:** The system uses image processing algorithms to count the number of vehicles at an intersection in real-time, which helps in optimizing the traffic signal duration.
- **Detect lane changes:** By tracking vehicle movements, the system can detect illegal or dangerous lane changes, improving road safety.
- **Monitor pedestrian crossings:** The system can identify pedestrians waiting at crosswalks and adjust traffic signals accordingly to prioritize pedestrian safety.



How Smart Traffic Systems Work

A smart traffic control system powered by image processing relies on cameras installed at intersections to capture real-time footage of vehicles, pedestrians, and other road users. The footage is processed using advanced algorithms that can detect vehicle density, speed, and movement patterns. Based on this data, the system can dynamically adjust traffic signals, extending green lights for congested lanes or reducing wait times for empty roads.

One of the key technologies used in this system is object detection, where algorithms identify and classify vehicles, bicycles, and pedestrians. These algorithms can also track moving objects to measure traffic flow and detect potential anomalies, such as accidents or stalled vehicles.

By analyzing traffic density in real-time, the smart traffic system can make data-driven decisions to optimize the traffic signal timings at every junction. For instance, if one road has significantly more vehicles waiting compared to another, the system can prioritize traffic flow on that road, reducing unnecessary delays and keeping the traffic moving smoothly.



THE EDITING TEAM



1. BHOSALE GIRIRAJ



3.LAMJANE OMKAR



2.PAWAR PRATIKSHA



4.KSHIRSAGAR AAKANKSHA



5.SAWANT OMKAR





7.WANKHADE GARGI

IETE Students Forum (ISF) Inauguration

IETE Students Forum (ISF) Inauguration at JSPM Narhe Technical Campus

Date: 17th October 2023 Venue: JSPM Narhe Technical Campus, Pune-411041 Chief Guest: Prof. Dr. Sunil Somani (Treasurer, IETE Pune)



The program began with an introduction to IETE and its mission, emphasizing its pivotal role in shaping the future of technology. Esteemed dignitaries graced the occasion, including Prof. Dr. S. A. Choudhari (Director, JSPM NTC), Dr. M. M. Sardeshmukh (HOD E&TC Department), Prof. Dr. Sajid Shaikh (Assistant Professor), Prof. Mrs. M. P. Hajare (IETE Coordinator), and other faculty members from JSPM NTC, all of whom contributed significantly to the event's success.



On October 17, 2023, JSPM Narhe Technical Campus proudly hosted the inauguration of the IETE Students Forum (ISF). The event commenced with a heartfelt Saraswati Pujan, symbolizing our quest for wisdom and knowledge as we embarked on this exciting journey into the world of electronics and telecommunications.



The highlight of the inauguration was the inspiring speech delivered by the chief guest, Prof. Dr. Sunil Somani. He addressed the theme "IoT and 5G Convergence: Transforming the Future of Connectivity," showcasing how the integration of Internet of Things (IoT) and 5G technology is revolutionizing connectivity. His insightful discussion highlighted the potential for real-time data exchange, the empowerment of cloud computing, and the harnessing of Big Data for innovation and efficiency.

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The event also featured the formal felicitation of the ISF committee, who received their badges as a symbol of their dedication and commitment to advancing the goals of the forum. The speeches from provided invaluable the dignitaries perspectives on the advancements in the field electronics of and telecommunications, inspiring students and faculty alike.

In conclusion, the IETE Inauguration at JSPM Narhe Technical Campus was a resounding success, reflecting IETE Pune's commitment to fostering technological innovation and enhancing connectivity. The event left an indelible mark on all attendees, igniting enthusiasm for future initiatives in the realm of electronics and telecommunications.



AI-Based Emotion Recognition Using EEG Signals



How EEG Signals Work

EEG is a non-invasive method of measuring electrical activity in the brain. It uses electrodes placed on the scalp to detect brainwaves, which are generated by neural activity. These brainwaves are categorized into different frequency bands-Delta, Theta, Alpha, Beta, and Gamma-each associated with different states of brain activity, such as relaxation, concentration, or deep sleep. Emotional states, such as happiness, anger, or sadness, also trigger distinct patterns in these brainwave frequencies. The challenge, however, is that raw EEG data is complex and difficult for humans to interpret. This is where AI comes into play. Using machine learning algorithms, AI can be trained to analyze EEG signals and identify patterns that correspond to specific emotions. By recognizing these patterns, AI can accurately detect and classify a person's emotional state in real-time.

Al and Emotion Recognition

Emotion recognition through EEG signals is accomplished using a combination of AI techniques, particularly machine learning and deep learning. The process begins by collecting EEG data from subjects while they experience various emotional stimuli—such as watching emotionally charged videos or listening to music. The AI system then processes this data and trains itself to recognize the specific brainwave patterns associated with each emotion. Artificial Intelligence (AI) is transforming a wide array of industries, and one of its most exciting frontiers is in the field of human-computer interaction, particularly emotion recognition. AI-based emotion recognition using Electroencephalography (EEG) signals is a growing area of research that promises to revolutionize fields ranging from mental health to immersive gaming. By leveraging the power of AI to analyze brain activity, we can gain insights into a person's emotional state, opening up a world of possibilities for healthcare, education, and entertainment.



The Future of Emotion Recognition

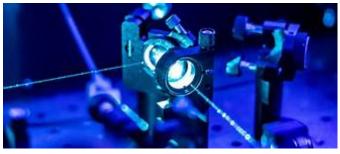
AI-based emotion recognition using EEG signals is still in its early stages, but the future looks promising. As AI algorithms become more sophisticated and EEG technology becomes more accessible, we can expect to see a wide range of applications emerge in healthcare, entertainment, and education. Emotion-aware systems could become an integral part of our daily lives, improving mental health care, creating more engaging learning environments, and delivering personalized entertainment experiences.

For engineering students and researchers, this field presents an exciting opportunity to explore the intersection of AI, neuroscience, and human behavior. As we continue to unravel the complexities of the human brain, AI-driven emotion recognition could offer new ways of understanding and interacting with the world around us-making technology not just smarter, but more empathetic too.

Photonics: The Science of Light and Its Applications

What is Photonics?

Photonics is a branch of physics and engineering that focuses on the properties and applications of light. It includes the study of visible, ultraviolet, and infrared light, as well as the development of devices that utilize these light waves. Photonics integrates principles from optics, electronics, and materials science, leading to innovations in communication, medicine, and manufacturing.



Future of The Photonics

technology advances, the field As of photonics is poised for significant growth. Researchers are exploring new materials, such as photonic crystals and meta-materials, to light manipulation. enhance Quantum photonics, which combines quantum mechanics with photonics, holds promise for ultra-secure developing communication systems and advanced computing technologies.

Conclusion

Photonics is a dynamic and rapidly evolving field that plays a crucial role in our daily lives. From enabling high-speed communication to advancing medical technologies, the applications of photonics are vast and varied. Embracing this technology not only prepares us for future careers but also equips us to contribute to solving some of the most pressing challenges in society today.



Key Components of Photonics:

- 1. Light Sources: These include lasers, LEDs, and other devices that emit light. Lasers are particularly significant due to their coherence and monochromatic properties, making them ideal for various applications.
- 2.Optical Components: Lenses, mirrors, and prisms manipulate light for various uses. These components are essential in instruments like microscopes and telescopes.
- 3. Detectors: Photodetectors convert light signals into electrical signals, enabling the detection and measurement of light. Common examples include photodiodes and chargecoupled devices (CCDs).



Challenges Ahead

Despite its potential, the field of photonics faces several challenges. These include the need for standardized manufacturing processes, integration with existing technologies, and the development of costeffective solutions for widespread adoption.

In our increasingly connected world, the demand for faster and more reliable internet connections is greater than ever. While WiFi has dominated the wireless communication landscape for years, a revolutionary technology called LiFi (Light Fidelity) is emerging as a potential game-changer. This article explores what LiFi is, how it works, its advantages, and the challenges it faces in becoming a mainstream technology.

Posteriffic and Sambhashan Competitions

Engaging Minds: Posteriffic and Sambhashan Competitions at the IETE Students Forum

IETE Students Forum at JSPM Narhe Technical Campus recently organized two exciting competitions—"Posteriffic" and "Sambhashan"—aimed at promoting creativity, critical thinking, and effective communication among students in the Electronics and Telecommunication (E&TC) department. These events provided a platform for students to showcase their knowledge and skills in a competitive yet collaborative environment The.

Posteriffic Competition

"Posteriffic" The competition encouraged participants to design informative and visually appealing posters on various topics related to technology and electronics. Students displayed their creativity research and skills, highlighting contemporary issues and innovations in the field. The posters were evaluated based on clarity, originality, and presentation, fostering a spirit of healthy competition among the participants.



Sambhashan Competition

Complementing the poster event, the "Sambhashan" competition featured group discussions where participants engaged in meaningful dialogues relevant on technological topics. This activity not only enhanced their communication skills but also encouraged teamwork and the exchange of diverse ideas. The discussions were lively and reflecting the informative, participants' understanding and passion for the subject matter.



Conclusion

Both competitions were a resounding success, with students actively participating and demonstrating their capabilities. The IETE Students Forum aims to continue providing such enriching experiences that empower students in the E&TC department to excel academically and professionally. Events like these play a crucial role in shaping the future of aspiring engineers, fostering a culture of innovation and collaboration.

The Crucial Role of Statistics in Data Science

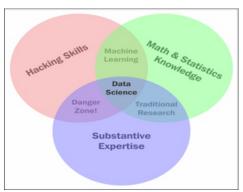
Data science is a multidisciplinary field that leverages various techniques to extract insights from data and drive informed decision-making. At the heart of data science lies statistics, a foundational discipline that provides the tools and methodologies for collecting, analysing, interpreting, and drawing meaningful conclusions from data.

Data plays a huge role in today's tech world. All technologies are data-driven, and humongous amounts of data are produced on a daily basis. A data scientist is a professional who is able to analyse data sources, clean and process the data, understand why and how such data has been generated, take insights from it, and make changes such that they profit the organization.

The data science Venn diagram:

The following Venn diagram provides a visual representation of how the three areas of data science intersect:

- · Math/statistics: This is the use of equations and formulas to perform analysis
- **Computer programming:** This is the ability to use code to create outcomes on the computer
- **Domain knowledge**: This refers to understanding the problem domain (medicine, finance, social science, and so on)



How does analyzing data using statistics help gain deep insights into data?

Statistics serve as a foundation while dealing with data and its analysis in data science. There are certain core concepts and basics which need to be thoroughly understood before jumping into advanced algorithms. Not everyone understands the performance metrics of machine learning algorithms like f-score, recall, precision, accuracy, root mean squared error, and so on. Instead, visual representation of the data and the performance of the algorithm on the data serves as a good metric for the layperson to understand the same.

How the basics of statistics will serve as a foundation to manipulate data in data science?

The basics of statistics include terminologies and methods of applying statistics in <u>data</u> <u>science</u>. In order to analyse the data, the important tool is statistics. The concepts involved in statistics help provide insights into the data to perform quantitative analysis on it. In addition to this, as a foundation, the basics and working of linear regression and classification algorithms must also be known to a data science aspirant. Terminologies associated with statistics

IOT and Embedded system

The world is undergoing constant transformations that somehow change the trajectory and history of humanity. We can illustrate with the first and second industrial revolutions and the information revolution. The introduction of the Internet of Things and Services into the manufacturing environment is ushering in a fourth industrial revolution: Industry 4.0.

Internet of Things (IOT) can be understood as the ubiquitous and global network that helps and provides the functionality of integrating the physical world. This is done through the collection, processing and analysis of data generated by IOT sensors, which will be present in all things and will be integrated through the public communication network. Some projections estimate that in 2020 the number of connected equipment will grow exponentially to 50 billion





Internet of Things (IoT)

The Internet of Things (IoT) is a new paradigm that is rapidly gaining ground in the modern wireless telecommunications landscape, the concept is the widespread presence around us of a variety of things or objects such as radio frequency identification (RFID) tags, Sensors, actuators, cell phones, etc. - that through unique addressing schemes can interact with each other and cooperate with their neighbors to achieve common goals. The main strength of the IOT idea is the high impact it will have on various aspects of everyday life and the behavior of potential users The model consists of services that are commodities and delivered in this way, cloud computing would provide the virtual infrastructure for such utility computing that integrates monitoring devices, storage devices. analytics tools, visualization platforms and customer delivery.

We classify as applications in four application domains: (1) Personal and Home; (2) Enterprise; (3) Public services; and (4) Mobile. This is represented in Fig. 1, which represents Personal and Home IOT in the scale of an individual at home, Enterprise IOT in the scale of a community, Utility IOT on a national or regional scale and Mobile IOT that is spread across other domains also due to the nature of connectivity and scale There is a huge crossover in applications and data usage across domains.







National Centre for Radio Astrophysics (NCRA) Pune organized a grand Science Exhibition at the Giant Metrewave Radio Telescope (GMRT) in Khodad on February 28 and 29, 2024. This prestigious event was attended by students from various educational institutions across the country, including the Electronics and Telecommunication (E&TC) department of JSPM Narhe Technical Campus. In keeping with a 20-year tradition of celebrating National Science Day, the





The Giant Metrewave Radio Telescope (GMRT), locatednear <u>Narayangaon, Pune</u>



Industrial Visit to MAHAGENCO Solar Power Plant

On March 12, 2024, students of the third-year E&TC department, accompanied by faculty members from JSPM Narhe Technical Campus, Narhe, visited the MAHAGENCO 36 MW Solar Power Plant located at Shirsuphal, Baramati, Pune. The visit was organized to provide students with practical exposure to the functioning of renewable energy systems and gain insights into large-scale solar energy operations.

The power plant, a key contributor to Maharashtra's renewable energy goals, features an impressive array of 1.24 lakh polycrystalline solar panels. Each panel generates 305 Watts of power, with a strategic inclination and south-facing alignment to optimize sunlight absorption. The students learned about different types of solar panels, such as polycrystalline, monocrystalline, and thin-film, and their advantages and drawbacks.



Key highlights of the visit:

• Real-time Monitoring: The plant uses an advanced string monitoring system to track the performance of individual panels and overall electricity generation in real-time. The data is relayed to the central control station via PLC/SCADA, ensuring efficiency and operational stability.

 \cdot Inverter Technology: The facility consists of 18 blocks of inverters, converting DC to AC power with the help of IGBT technology, surge arresters, and vacuum circuit breakers for added safety and stability.

 \cdot Weather Monitoring: A comprehensive weather monitoring system continuously gathers data on solar irradiation, temperature, humidity, wind speed, and rainfall to optimize power generation.

Faculty members attending the visit included: ·Prof. Mrs. T. D. Rane ·Prof. Mrs. S. P. Kurlekar ·Prof. Mr. V.S. Tupe



he students also gained valuable knowledge on the sustainability aspects of the plant. The solar panels are designed to withstand extreme temperatures and maintain efficient performance throughout their lifecycle, with the project offering a costeffective solution for generating electricity at Rs. 8.98 per unit for the next 25 years.

This visit provided students with a practical understanding of the critical role renewable plays in reducing energy carbon footprints and promoting sustainability. The hands-on experience was instrumental in expanding their knowledge of clean energy technologies, making it an enriching learning experience for everyone involved.







Student Placement









The ENTC branch emerged victorious in the football final at JSPM NTC, showcasing exceptional teamwork and skill. Their dedication and strategic play throughout the tournament led them to this well-deserved win. The final match was intense, with ENTC players displaying resilience and coordination, ultimately securing the championship title. This victory highlights their hard work, unity, and sportsmanship, making the entire branch proud.



SHIVJAYANTI 23-24







Shivjayanti 2024 was celebrated at JSPM NTC with great enthusiasm, paying tribute to legacy of Chhatrapati the Maharaj. The Shivaji event included various cultural and educational activities highlighting Shivaji's leadership, administrative bravery, and Students faculty skills. and in participated speeches, performances, and discussions that focused on his contributions to the Maratha Empire and Indian history. The celebration fostered a sense of pride and unity, inspiring everyone to imbibe the values of courage, justice, and integrity exemplified by Shivaji Maharaj.



किर्मत

हर आदमी के मुक़इर में घर नहीं होता सभी का यूप से बचने को सर नहीं होता हर आदमी के मुक्कहर में बर नहीं होता

कमी लडू से भी तारीख लियानी पड़ती है हर एक मा'रका बातों से सर नहीं होना

भें उस की आँख का आँस न बन सक बन मुझे भी आह के मिलने का डर नहीं होता

मुझे नखाश करोगे तो फिर न पाझोगे में रक खरा दूँ सपाओं का घर नहीं होता

हमारी आँग्न के आंसू की आपनी दुनिया है किसी फकीर को शाहों का उर नहीं होना

में उस नकान में रहता हूँ और लिवा हूँ 'वसीम' लिस में हवा का जुजर नहीं होता

जार्जी वानव्येडे

स्ती

स्त्री की नाजुक रचना रचकर साथ भाग्य में शिकस्त दिया। बरदान स्वरूप मातृत्व देकर स्वयं ईश्वर ने पराजित किया।

मोम-सा कोमल दिल देकर क्यों लुटने पर मजबूर किया? घिसट-घिसट कर जीवन जीने हाय, क्यों इतना कमज़ोर किया?

कई शिकायतें ईश्वर से हुई सुरक्षा स्वयं की मुंहवाये खड़ी। नहीं दिया क्यूं जिस्म लौह-सा पग-पग लुट, अपमानित हुई।

कभी देवी बन पूजी गई कभी पैरों तले कुचली गई। कभी माता बन पुचकारी गई कभी गर्भ में ही मारी गई।

आदिकाल से सताई गई पांव की जूती मानी गई। जैसी जरूरत आन पड़ी वैसी महिमा गाई गई।

हे ईश्वर यह तेरी रचना सुन ले उसकी करुण पुकार, भस्म हो जाए श्राप से ही करे जो उसकी शर्म तार-तार।

जीने दो सम्मान से उसको गुलाब-सी खिल जाने दो। गर उजाड़ें उसके तन को बना देगी शमशान धरा को।

विन उसके वीरान ये दुनिया खुशियों को तरस जायेगी। जब गूंजेगी चीत्कार उसकी प्रकृति खंडहर हो जायेगी।

अब तो माफ़ करो उसको बह भी अंश प्रकृति का है। इस धरा पर जीने का उसे भी हक़ बराबरी का है।











