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TULSIRAMJI GAIKWAD-PATIL
College of Engineering & Technology
AN AUTONOMOUS INSTITUTE

Department of Information Technology

IT INSIGHT

"Your Bridge to the Digital Era."

ANNUAL MAGAZINE 2024-25
Volume: 06 Session: 2

GAIKWAD-PATIL
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VISION AND MISSION

VISION OF THE INSTITUTE

To emerge as a learning Center of Excellence in the National Ethos in domains of Science, Technology and Management.

MISSION OF THE INSTITUTE

- To strive for rearing standard and stature of the students by practicing high standards of Professional ethics, transparency and accountability.
- To provide facilities and services to meet the challenges of Industry and Society.
- To facilitate socially responsive research, innovation and entrepreneurship.
- To ascertain holistic development of the students and staff members by inculcating Knowledge and profession as work practices.

VISION OF THE DEPARTMENT

To emerge as a learning hub and centre of excellence in the domain of Information Technology

MISSION OF THE DEPARTMENT

- To impart quality technical education through effective teaching learning process.
- To provide a platform to address societal issues as well as challenges faced by IT industries.
- To foster a culture of research and impart innovative and entrepreneurial skills in the field of IT.
- To ensure overall development of students and staff by inculcating knowledge and professional ethics as a part of lifelong learning.

PEO's

Graduate will be able to

PEO1: Demonstrate essential technical skills to identify, analyze, and solve problems and design issues in IT sector.

PEO2: Apply field knowledge, research and professional practices to meet the requirements of industries.

PEO3: Imbibe lifelong learning practices and entrepreneurship skills in tune with emerging technologies.

PEO4: Inculcate professional ethics and managerial skills to satisfy real life problems for serving the needs of society and environment

PSO's

Graduate will be able to

PSO1: Develop and apply logical and programing skills to solve real-world challenges.

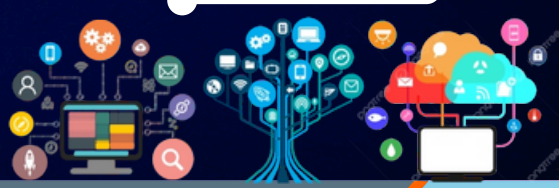
PSO2: Utilize knowledge of software engineering and network techniques to design and implement efficient solutions.

PSO3: Leverage computing knowledge to conduct research and adopt emerging technologies in the development of IT systems.

Program Outcomes

PO

- Engineering knowledge 💡
- Problem analysis 🔍
- Design/development of solutions 🎨
- Conduct investigations of complex problems 🔬
- Modern tool usage 💻
- The engineer and society 👥
- Environment and sustainability 🌎
- Ethics ⚖️
- Individual and team work 👫
- Communication 🗣️
- Project management and finance 📈
- Life-long learning 📚



About TGPCET

Tulsiramji Gaikwad-Patil College of Engineering and Technology (TGPCET) was established in the year 2007 by Vidarbha Bahu-uddeshiya Shikshan Sanstha (VBSS), a registered society. It is a self financed Private Engineering College, which is affiliated to Rashtrasant Tukadoji Maharaj Nagpur University (RTMNU) Nagpur and is approved by All India Council for Technical Education, New Delhi. Also college is approved by Directorate of Technical Education (DTE), Mumbai, Maharashtra State. The Institute is Accredited with A+ (3.32 CGPA) by NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL (NAAC). An Autonomous Institute affiliated to RTM Nagpur University, Nagpur.

About Department

The Department of Information Technology offers a B.Tech program since 2007 and a newly launched M.Tech in Artificial Intelligence & Machine Learning (Intake: 18). Backed by experienced faculty, the department is committed to delivering quality, value-based technical education.

With a dedicated departmental library of over 100 reference books, the department focuses on areas like Software Development, Testing, E-Governance, and E-Commerce, ensuring students are industry-ready through hands-on training and exposure to cutting-edge technologies.

Key Highlights:

- Industry-sponsored and innovative student projects
- Strong industry-academia collaboration
- Active professional society chapters (IEI, ISTE, CSI)
- Regular STTPs, FDPs, and hands-on workshops

Message From Management

Message from Management

Dr. Mohan Gaikwad Patil
Chairman, Gaikwad Patil Group

Dr. Mohan Gaikwad-Patil, with more than 35 years of experience in the education system to his credit, established the Gaikwad-Patil Group of Institutions in Nagpur to cater to the quality education needs of the youth in Vidarbha. His early experience teaching in an engineering college made him acutely aware of the dissonance between engineering education in the country and the requirements of the industry.

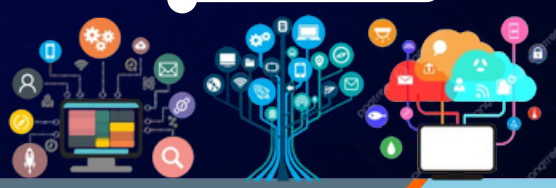
He therefore began with the dream of starting an engineering college that equips students with knowledge, skills, and attitudes relevant to the industry. That dream has manifested today in the form of an educational group well known in the region for its constant striving to impart quality and industry-relevant education to the students by teaching courses like B.Tech, M.Tech, Architecture, Polytechnic, MBA, MCA, Pharmacy, BAMS, Physiotherapy and Nursing. Hardly in his early forties,

Dr. Mohan Gaikwad-Patil is the young and dynamic face of the group. His contagious enthusiasm and unflagging drive are truly inspiring.

Message From Management

Mr. Akash Gaikwad Patil
Vice-Chairman, Gaikwad Patil Group

In a world brimming with challenges, the need for brilliant engineers who can think critically, solve problems creatively, and adapt to a rapidly evolving technological landscape has never been greater. At TGPCET, we are committed to providing an education that goes beyond textbooks. Our curriculum is meticulously crafted to equip students with the technical expertise, soft skills, and design thinking abilities necessary to thrive in the ever-changing engineering landscape. We believe in nurturing well-rounded individuals with a strong foundation in ethics, social responsibility, and a passion for making a positive impact on the world. Our state-of-the-art facilities, coupled with a dedicated and experienced faculty, provide a stimulating learning environment that ignites curiosity and encourages exploration. We don't just produce engineers; we empower future leaders, innovators, and entrepreneurs who will shape the world of tomorrow. We are confident that our graduates will be at the forefront of technological advancements, tackling global challenges, and building a future brimming with possibilities.



Message from Management

From Principal Desk

Dr. P. L. Naktode
Principal, Tulsiramji Gaikwad Patil College of Engg.

It is my privilege to warmly welcome you to the college, which is an autonomous institution, committing to quality education. We work on the principle of "Learn to Grow" With this very inspiring thought, Vidarbha Bahu Uddeshiya Shikshan Sanstha Nagpur has laid a foundation to provide education in the field of engineering to the students to enable them to become good practicingengineers, capable managers and above all a good human being to build a stronger, vibrant and skilled India. We dream that TGPCET should play a definite role in shaping the careers of tomorrow's leaders and developing individuals to have an impact on global development.

Looking at our track records, TGPCET has achieved many feathers in terms of consistently good results, placements, and extracurricular activities too. We are continuously in the process of imparting quality education to our budding engineers. This journey is succeeding more gloriously year after year making our Engineers rule the world. Success depends on opportunity. Try to get the maximum from the available resources. I wish best of luck in all your endeavors.

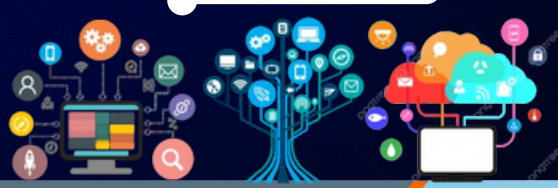
Message from Management

From Vice-Principal Desk

Dr. Pragati Patil
Vice-Principal, Tulsiramji Gaikwad Patil College of Engg.

Welcome to Tulsiramji Gaikwad Patil College of Engineering and Technology (TGPCET) in Nagpur, Maharashtra, a leading educational institution. Inspired by the words of Shri. APJ Abdul Kalam, "Dreams are not those which we see while sleeping, but dreams are those which do not let us sleep,". TGPCET strives for ambitious goals through knowledge acquisition, hard work, and perseverance. Our institution has quickly emerged as one of Maharashtra's premier technical education institutions. We emphasize academic excellence and technical skill development to meet industry demands while instilling values of integrity, morality, and sustainability.

At TGPCET, we leverage cutting-edge technology to foster an innovative learning environment, encouraging students to think critically and explore new ideas. Our students engage in national and international competitions to tackle real-world challenges, supported by faculty who stay updated with the latest technologies. Professional organizations like IEEE, CSI, ISTE, SAE-India, and SESI enhance skills through robust platforms. Beyond academics, we promote holistic development through sports, cultural activities, and social initiatives, nurturing responsible citizens. Join TGPCET to excel, innovate, and lead in a supportive environment where growth and transformation are limitless.



From HoD's Desk

Dr. Deepak Kapgate
Head, Deaprtment of Information Trechnology
Tulsiramji Gaikwad Patil College of Engg.

Message from HOD Desk

Dear Esteemed Readers,

It is with great pleasure and pride that I extend my warmest greetings through this esteemed technical magazine. As Head of the Information Department, I am thrilled to share some of our key achievements over the past year.

Our students have successfully completed numerous NPTEL courses, reflecting both their dedication and the quality of education we provide. Our faculty have secured copyrights for their innovative research, validating the uniqueness of our contributions and enabling further advancements in Information Technology.

We are proud to have consistently produced university toppers, demonstrating our commitment to high academic standards and effective teaching. Our faculty members have also been actively involved in impactful, cutting-edge research that has enriched the field of Information Technology.

These accomplishments are the result of the collective efforts of our dedicated students, passionate faculty, and the unwavering support of our institute's administration.

Looking ahead, we remain committed to fostering innovation, excellence, and continuous learning within our department. I extend my heartfelt gratitude to all who have contributed to our journey, and I invite you to explore the pages of this magazine to discover more about our achievements and vision for the future.

Editorial Body

Editorial Body

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Mr. Bhupesh Indurkar II Year
Student Member IT-Insights
Department of Information Technology,
Tulsiramji Gaikwad Patil College of Engg.

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Research Articles

Student Research Articles

Title: Development of a Smart Motion Detection and Object Classification System Using Radar Sensing and Edge AI
Author: Mr. Suraj Kiran Borkute, III Year
Abstract: This resrach presents the development of a smart motion detection and object classification system utilizing the Raspberry Pi 4 and RCWL-0516 microwave radar sensor. The system is designed to detect motion and classify objects in real-time using lightweight AI models, all processed locally without the need for cloud computing. Python-based scripts manage the motion detection and data logging, which is used to train an optimized TensorFlow Lite model. OpenCV aids in image preprocessing and visualization. This edge-AI solution is low-cost, energy-efficient, and highly suitable for smart surveillance, home automation, and other IoT applications. The project provides a detailed, step-by-step implementation guide, making it accessible to students, researchers, and hobbyists aiming to explore embedded AI and intelligent sensing technologies.
Keywords:Raspberry Pi, RCWL-0516, Radar Sensor, Motion Detection, Object Classification, TensorFlow Lite, OpenCV, Edge AI, IoT, Smart Surveillance.

Title: AI-Powered Virtual Health Assistant Using Natural Language Processing
Authors: Ms. Sakshi Sanjay Dahake, III Year
Abstract: With the increasing demand for remote healthcare services, this project introduces an AI-powered virtual health assistant that interacts with users in natural language and provides basic health guidance. Built using Python, the system integrates Natural Language Processing (NLP) with healthcare databases to answer queries related to symptoms, medications, and lifestyle. OpenAI's GPT-based model is utilized for understanding user input, while the system ensures data privacy and offline functionality through local model deployment. This innovation bridges the gap between healthcare access and technology, especially for rural and underserved populations.
Keywords: Virtual Health Assistant, NLP, GPT, AI in Healthcare, Chatbot, Python, HealthTech, Machine Learning, Remote Diagnosis, Data Privacy

Research Articles

Student Research Articles

Title: Holistic AI Wellness System
Authors: Ms. Sakshi Vilas Kalokar , IV Year
Abstract: Family-Centric Care with Ayurvedic Insights Integrating Artificial Intelligence, Internet of Things, and Ayurveda for overall health solutions
There is a huge growth in artificial intelligence and IOT in recent times. Recent advancements in artificial intelligence (AI) and the Internet of Things (IoT) have enabled innovative health solutions. This research highlights a comprehensive AI-based wellness system that integrates traditional Ayurvedic principals with cutting edge technology. By offering personalized health tracking, early disease detection, and emotionally supportive interactions, the system provides a family-centric approach to holistic well-being. The study outlines the system's features, working methodology, results, and future potential.
AI powered IoT based virtual device will facilitates features for easy of daily life activities, which includes assistances for dietary suggestions, stress management techniques, and daily wellness routines derived from ayurvedic texts. Also, IoT-based device will monitor various parameters to provide timely prevention and home made treatments which is continuing from past(nuskas- Indian word for homemade preventive measures)
This research contributes to ongoing transformation of healthcare by bridging ancient wisdom with modern intelligence, paving the way for a smarter, holistic, and family-oriented healthcare ecosystem.
Keywords: Holistic AI, Ayurveda, IoT based device, preventive measures.

Title: AI-Based Waste Segregation System Using Image Classification on Edge Devices
Authors: Ms. Saniya Alam, II Year
Abstract: This project proposes an intelligent waste segregation system that classifies waste into biodegradable, recyclable, and hazardous categories using image classification. The system is powered by a Raspberry Pi and a camera module, running a
TensorFlow Lite model trained on a custom waste image dataset. The aim is to promote automated waste management and reduce human intervention in segregation. OpenCV is used for preprocessing, while the lightweight model ensures smooth operation on edge devices. This eco-tech solution can significantly contribute to sustainable smart cities and waste management initiatives.
Keywords: Waste Segregation, Image Classification, TensorFlow Lite, Edge AI, Smart Cities, Raspberry Pi, OpenCV, Sustainability, IoT, Environmental Tech

Research Articles

Student Research Articles

Title: Sales Forecasting Using Time Series Analysis and Machine Learning Models
Authors: Mr. Ayush Mangal Bambure, IV Year
Abstract: This research focuses on developing a predictive analytics model to forecast sales trends using historical data. The project uses time series analysis techniques like ARIMA, Prophet, and LSTM-based deep learning models to evaluate performance and accuracy. Data preprocessing, seasonal decomposition, and model training are conducted using Python libraries such as Pandas, scikit-learn, and TensorFlow. The results provide actionable insights for inventory planning and marketing strategies. This solution demonstrates how data analytics can enhance decision-making in retail and e-commerce domains.
Keywords: Sales Forecasting, Time Series Analysis, LSTM, ARIMA, Prophet, Predictive Analytics, Business Intelligence, Data Science, Python, Retail Analytics

Title: A Real-Time Sentiment Analysis Dashboard for Social Media Monitoring
Authors: Mr. Prajwal Gulabrao Tekale, III Year
Abstract: This project presents a real-time sentiment analysis system that collects, analyzes, and visualizes public opinion on trending topics from platforms like Twitter. Built using Python and Streamlit, the system uses the Tweepy API for data collection and a fine-tuned BERT model for sentiment classification. The dashboard provides live sentiment metrics, word clouds, and trend graphs. Designed for use in political campaigns, brand monitoring, and customer feedback, this project exemplifies the power of real-time data analytics in understanding public perception and guiding strategy.
Keywords: Sentiment Analysis, Social Media Analytics, BERT, Twitter API, Streamlit, Real-Time Dashboard, NLP, Data Visualization, Public Opinion, Python

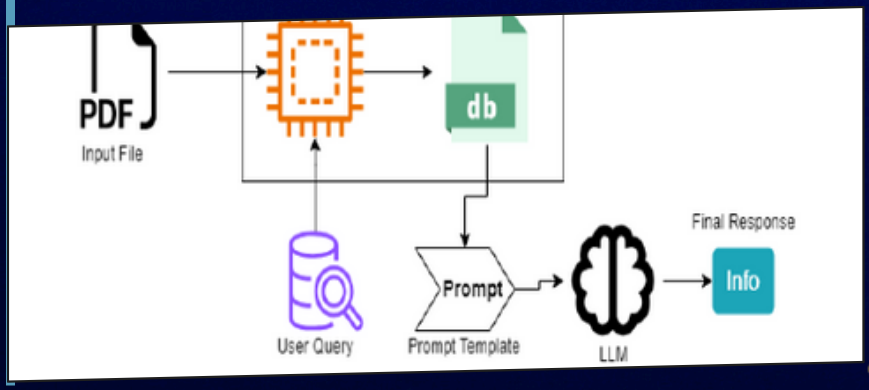
Research Articles

Title: Integrating Open-Source LLMs with Retrieval-Augmented Generation for Obstetrics and Gynecology Domain

Authors: Dr. Pragati Patil, Department of Information Technology

Abstract: In this research paper, we address the integration of Large Language Models (LLM) with Retrieval Augmented Generation (RAG) to enhance clinical decision support and address patient doubts in the Obstetrics and Gynecology (OBGYN) domain. The research mainly tries to explore on How open source LLM's can effectively retrieve and generate the relevant responses in the OBGYN domain. The research methodology includes two components: Data Ingestion, which reads the input text data and stores it to a vector database in an embedded format and Data Retriever-Generation, which retrieves the relevant information from the vector database and use it for accurate response generation. The method includes data collection from esteemed medical databases, LLM model selection, integration with RAG and evaluation of the generated outputs. The methodology uses Bio-Mistral 7B fine-tuned LLM with PubMed Bert embeddings. The LLM responses are evaluated using the Ragas framework, context precision and context recall to measure the performance of retrieval system, faithfulness to measure hallucinations and answer relevancy to measure how relevant the answers are to the input query. The evaluated results confirm that the research has improved the accuracy as well as the contextual relevancy of the information in the OBGYN domain. This research provides a robust architecture for integration of Artificial Intelligence for supporting clinical decision making and information retrieval in specialized medical domains. This research can be extended with the upcoming advancements in the field of Artificial Intelligence and Data Science.

Keywords: Natural Language Processing, Machine Learning, AI in Healthcare, Large Language Models, Text Generation, Information Retrieval, Clinical Decision Support, Retrieval Augmented Generation, OBGYN, Women's Health



Research Articles

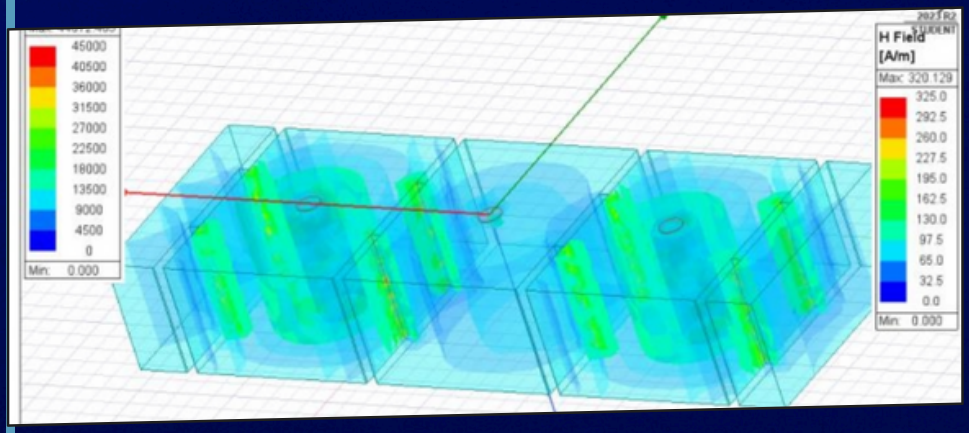
Faculty Research Articles

Title: 3-Pole Waveguide Band Pass Filter used for Microwave P2P in 5G Application

Authors: Mr. Nilesh Nagrale, Department of Information Technology

Abstract: The use of 5G applications has become increasingly significant in recent years. Since the Transmitter and Receiver antennas are located many kilometers apart, effective microwave components are required to bridge this distance. The 3-Pole Waveguide Band Pass filter design, which is utilized for microwave Point to Point, was reported in this study. The pass band frequency range in millimeter wave range is 27 GHz to 31 GHz. This filter is helpful because there isn't a regularly used active filter in the millimeter-wave frequency range. In this paper, an optimized Waveguide Band pass filter design with good Insertion loss is presented. This filter will be employed in Point to Point 5G applications. Additionally, the suggested filter exhibits improved return losses of -21.02 dB, -22.03 dB, and -23.07 dB, while the insertion loss does not surpass -0.02 dB in all three bands.

Keywords: Microwave P2P link, Band Pass filter, 3-Pole etc



Research Articles

Faculty Research Articles

Title: Optimizing Satellite Data Utilization for Crop Monitoring in Variable Environmental Conditions using AI/ML

Authors: Mr. Abhay Rewatkar, Department of Information Technology

Abstract: The technology showed real potential for increasing crop production and ensuring food security given climate change and variability in environmental conditions. The use of satellite data offers a reliable opportunity for huge scale crop surveillance, yet its advantage can be offset by variable factors including cloudiness, differences in atmospheric conditions, and development phases. The present study aims to analyze how satellite data may be enhanced by Artificial Intelligence and Machine Learning in order to improve crop monitoring under changing environmental conditions. We examine the different approaches of data preprocessing, cloud removal, feature extraction, and predictive modeling to improve the efficacy of the crop monitoring systems.
This research also examines the prospects and limitations in this fast-growing area of study.

Keywords: Satellite, AIML, Crop Monitoring, Environment, Atmosphere

Research Articles

Faculty Research Articles

Title: A Novel Approach for Development of Anti-Reflective Coatings for Next-Gen Immersion Lithography

Authors: Ms. Sayara Bano Sheikh, Department of Information Technology

Abstract: As semiconductor manufacturing pushes the boundaries of miniaturization, immersion lithography faces critical challenges in achieving high-resolution patterning due to unwanted reflections and light scattering. This paper presents the development of advanced antireflective coatings specifically engineered for next-generation immersion lithography systems with high numerical apertures. By employing optimized materials and novel multi-layered coating structures, these coatings effectively reduce reflection, enhance image contrast, and support better pattern transfer fidelity. Experimental results demonstrate significant improvement in reflectance reduction and coating durability under the demanding conditions of immersion lithography. This work provides insights into material innovations, including hybrid organic-inorganic layers, and proposes scalable fabrication methods that meet the stringent requirements of modern lithographic processes. The findings underscore the critical role of antireflective coatings in advancing the performance and reliability of next-gen lithographic technologies, highlighting their potential for broader applications in high-precision optical systems.

Keywords: Next-Gen, Anti-reflecting Coating, Semiconductor, Litography, Optical system, Fabrication

Research- Corner Publication

Faculty Publication

Sr. No	Name of Participation	Title of Research Paper	Publication Details	Date of Published	ISSN/ISBN No
1	Dr. Pragati Patil	Integrating Open-source LLMS with Retrieval-Augumented generation for Obstetrics and Gyneocology Domain	SCEECS 2025	1-Jan-25	979-8-3315-2983
2	Mr. Nilesh Nagrale	Integrating Open-source LLMS with Retrieval-Augumented generation for Obstetrics and Gyneocology Domain	SCEECS 2025	1-Jan-25	979-8-3315-2983
3	Ms. Sayara Bano Sheikh	3-Pole Waveguide Band Pass filter used for Microwave P2P in 5G Aplication	SCEECS 2025	1-Jan-25	979-8-3315-2983
4	Mr. Nilesh Nagrale	3-Pole Waveguide Band Pass filter used for Microwave P2P in 5G Aplication	SCEECS 2025	1-Jan-25	979-8-3315-2983
5	Ms. Sayara Bano Sheikh	Integrating Open-source LLMS with Retrieval-Augumented generation for Obstetrics and Gyneocology Domain	SCEECS 2025	1-Jan-25	979-8-3315-2983

Research- Corner Publication

Student Publication

Sr. No	Name of Participation	Title of Research Paper	Publication Details	Date of Published
1	Pratham Wankhade	FaceSnap: Revolutionizing Student Attendance with Advanced Facial Recognition	ICAIA 2025	26-27-March-25
2	Pranav Ladole	FaceSnap: Revolutionizing Student Attendance with Advanced Facial Recognition	CPSHS 2025	21-22-Feb-25
3	Anurodh Kanojiya	Chatbot Library	CPSHS 2025	21-22-Feb -25
4	Sumit Kumar	Spin Rentals	CPSHS 2025	21-22-Feb-25

Research- Corner Publication

Certificates

ICAIA 2025

Springer

CERTIFICATE OF PARTICIPATION

This is to certify that Prof./Dr./Mr./Ms. Pratham Wankhade of Tulsiramji Gaikwad-Patil College of Engineering and Technology has participated/presented a paper titled FaceSnap : Revolutionizing Student Attendance with Advanced Facial Recognition

in the "3rd International Conference on Artificial Intelligence and Applications" held on 26th-27th March, 2025 at Maharaja Surajmal Institute of Technology, Delhi.

Prof.(Dr.) Archana Balyan
Organising Chair

Prof.(Dr.) Tripti Sharma
Convenor

SCEECS 2025

CERTIFICATE
OF PRESENTATION

The Institute of Electrical and Electronics Engineers - MANIT Student Branch (IEEE-MSB) proudly extends this **Certificate of Authorship** to

Nilesh Nagrale

for their research paper titled

Integrating Open source LLMs with retrieval augmented generation for obstetrics and gynecology domain

acknowledging their exceptional impact on the realm of research and technology held during IEEE International Students' Conference SCEECS'25 on 18th-19th

Copyrights and Patents

Copyrights and Patents

Sr. No	Name of Participation	Title of Work	Publication Details	Date of Published
1	Dr. Anup Gade	LAB FILE FORMAT	Copyright	25/02/2025
2	Dr. Pragati Patil	Intelligent System For Financial Risk Analysis And Prediction Using Advanced Computational Techniques	Patent	07/02/2025
3	Dr. Pragati Patil	AI-DRIVEN SYSTEM FOR PROJECT ALLOCATION AND SUPERVISION IN PREDETERMINED PROGRAMS	Patent	07/02/2025
4	Dr. Pragati Patil	AI-BASED SYSTEM AND METHOD FOR AUTOMATED BUSINESS PROCESS RE-ENGINEERING	Patent	07/02/2025
5	Dr. Pragati Patil	SYSTEM AND METHOD FOR CLOUD-BASED INTEGRATED MANAGEMENT OF STUDENTS CURRICULUM	Patent	21/02/2025

Copyrights and Patents

Sr. No	Name of Participation	Title of Work	Publication Details	Date of Published
6	Ms. Sayara Bano Sheikh	Arduino- Based Decentralized Air Quality Improvement System Using Swarm Robotics	Patent	21/02/2025
7	Mr. Jayesh Fating			
8	Dr. Pragati Patil	Intelligent System For Financial Risk Analysis And Prediction Using Advanced Computational Techniques	Patent	07/02/2025

Copyrights and Patents

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Register of Copyrights

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Diary Dated 25/02/2025

1.	Registration Number	L-161383/2025
2.	Name, address and nationality of the applicant	ANUP GADE , TULSIRAMJI GAIKWAD-PATIL COLLEGE OF ENGINEERING AND TECHNOLOGY, MOHAGAON, NAWARDEHA ROAD, NAGPUR-441108 INDIAN
3.	Nature of the applicant's interest in the copyright of the work	AUTHOR
4.	Class and description of the work	LITERARY/ DRAMATIC WORK A LAB FILE FOR ENGINEERING BRANCHES SHOULD INCLUDE A TITLE PAGE, OBJECTIVE, INTRODUCTION, MATERIALS, THEORY, PROCEDURE, OBSERVATIONS, CALCULATIONS, RESULTS, DISCUSSION, CONCLUSION, REFERENCES
5.	Title of the work	LAB FILE FORMAT
6.	Language of the work	ENGLISH
7.	Name, address and nationality of the author and if the author is deceased, date of his decease	ANUP GADE , TULSIRAMJI GAIKWAD-PATIL COLLEGE OF ENGINEERING AND TECHNOLOGY, MOHAGAON, NAWARDEHA ROAD, NAGPUR-441108 INDIAN
8.	Whether the work is published or unpublished	UNPUBLISHED
9.	Year and country of first publication and name, address and nationality of the publisher	N.A.
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers	N.A.
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	ANUP GADE , TULSIRAMJI GAIKWAD-PATIL COLLEGE OF ENGINEERING AND TECHNOLOGY, MOHAGAON, NAWARDEHA ROAD, NAGPUR-441108 INDIAN
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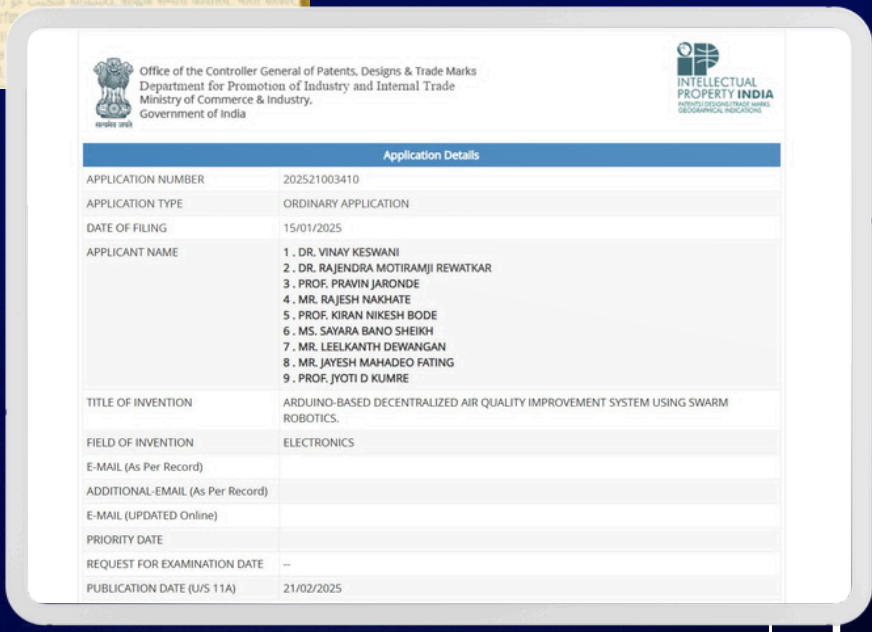
16.	If the work is an 'Artistic work', capable of being registered as a design under the Designs Act 2000 whether it has been applied to an article though an industrial process and , if yes , the number of times	N.A.



Office of the Controller General of Patents, Designs & Trade Marks
Department for Promotion of Industry and Internal Trade
Ministry of Commerce & Industry,
Government of India

INTELLECTUAL PROPERTY INDIA

Application Details	
APPLICATION NUMBER	202521003410
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	15/01/2025
APPLICANT NAME	1 . DR. VINAY KESWANI 2 . DR. RAJENDRA MOTIRAMJI REWATKAR 3 . PROF. PRAVIN JARONDE 4 . MR. RAJESH NAKHATE 5 . PROF. KIRAN NIKESH BODE 6 . MS. SAYARA BANO SHEIKH 7 . MR. LEELKANTH DEWANGAN 8 . MR. JAYESH MAHADEO FATING 9 . PROF. JYOTI D KUMRE
TITLE OF INVENTION	ARDUINO-BASED DECENTRALIZED AIR QUALITY IMPROVEMENT SYSTEM USING SWARM ROBOTICS.
FIELD OF INVENTION	ELECTRONICS
E-MAIL (As Per Record)	
ADDITIONAL-EMAIL (As Per Record)	
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REQUEST FOR EXAMINATION DATE	--
PUBLICATION DATE (U/S 11A)	21/02/2025

Technical Projects •••

Best- Projects

Sr. No	Name of Members	Title of Project	Name of Guide
1	Mr. Pratik Sable, Mr. Aniket Narnaware, Mr. Anurodh Kanojiya, Mr. Ranat Mendhe and Mr. Anil Yadav	Tethered drone for rogue drone triangulation	Dr. Mukul Pande
2	Ms. Sakshi Dahake, Ms. Twinkal Ramteke, Ms. Bhumika Warhade, Ms. Bhavika Lanjewar and Ms. Ayushi Dongre	Predictive Antenna performance using machine learning alogorithm of reconfigurable reflector antenna	Prof. Abhay Rewatkar
3	Mr. Suraj Borkute, Mr. Pratham Wankhade, Mr. Pranav Ladole, Mr. Harsh Banode	AI powered autonomous radar system for enemy tracking and missile deployment:SkyVex	Dr. Anup Gade

Technical Projects ...

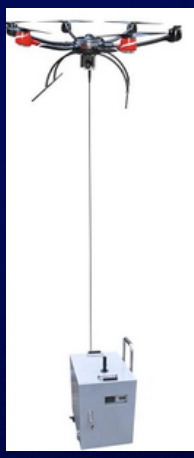
Best Projects

Title: Tethered drone for rogue drone triangulation

Name of Guide: Dr. Mukul Pande, Department of Information Technology

Name of Students: Mr. Pratik Sable, Mr. Aniket Narnaware, Mr. Anurodh Kanojiya, Mr. Ranat Mendhe and Mr. Anil Yadav

Abstract: Drones are becoming more common in many fields, but some people use them for illegal activities like spying or flying in restricted areas. Detecting and tracking these rogue drones can be difficult, especially in real time. This paper presents a solution using a tethered drone one that is connected to the ground by a cable—to help locate and track rogue drones more accurately. The tethered drone stays in the air for long periods and is equipped with special sensors and radio signal detectors.
By staying in a fixed position, it provides a stable and clear view of the area, improving the accuracy of tracking rogue drones.
We explain how this system works, its key parts, and how it can be used in real-world situations. Tests show that this method improves airspace security by providing continuous monitoring and accurate drone detection.



Keywords: Drone, Detection, Rogue Drones, Accuracy, Cable

Key Highlights: Our student project has been selected to represent the department at the Final Stage of the State-Level “Maha Hackathon Challenge 1.0”, organized by the Government of Maharashtra at Mumbai.

Technical Projects ...

Best Projects

Title: Predictive Antenna performance using machine learning alogorithm of reconfigurable reflector antenna

Name of Guide: Prof. Abhay Rewatkar Department of Information Technology

Name of Students: Ms. Sakshi Dahake, Ms. Twinkal Ramteke, Ms. Bhumika Warhade, Ms. Bhavika Lanjewar and Ms. Ayushi Dongre

Abstract: This project presents a machine learning-based approach to predict the performance of a reconfigurable reflector antenna, offering a faster and more cost-effective alternative to traditional electromagnetic simulations and prototyping. Conventional methods for evaluating antenna parameters—such as gain, return loss (S_{11}), and beam direction—are often time-consuming and computationally intensive. To overcome these challenges, a comprehensive dataset was generated by systematically varying parameters including operating frequency, reflector shape, spacing between the antenna and reflector, and material properties. Supervised learning algorithms—Random Forest, Support Vector Machine (SVM), and Neural Networks—were employed to model the antenna's behavior. Among these, the Random Forest model demonstrated the highest predictive accuracy across diverse configurations. The integration of machine learning into antenna design workflows enables rapid prototyping, reduces development costs, and accelerates innovation in adaptive antenna technologies critical to modern communication systems such as 5G, IoT, and satellite communications.

Keywords: Reconfigurable reflector antenna, machine learning, Random Forest, antenna performance prediction, electromagnetic simulation, 5G, IoT, satellite communication, return loss (S_{11}), beam direction, antenna design, antenna gain.

Technical Projects

Best Projects

Title: AI powered autonomous radar system for enemy tracking and missile deployment: SkyVex

Name of Guide: Dr. Anup Gade, Department of Information Technology

Name of Students: Mr. Suraj Borkute, Mr. Pratham Wankhade, Mr. Pranav Ladole, and Mr. Harsh Banode

Abstract: This project presents the development of a smart motion detection and object classification system using a Raspberry Pi 4 and the RCWL-0516 microwave radar sensor. The system detects motion and logs data using Python-based scripts, which are then used to train a lightweight AI model using TensorFlow Lite. The trained model runs on the Raspberry Pi, enabling real-time object classification without reliance on external servers. OpenCV is used for basic image processing and visualization. Designed to be low-cost, energy-efficient, and easy to implement, the system is ideal for applications in smart surveillance, home automation, and IoT environments. This project offers a step-by-step approach to building the system—from hardware setup to AI deployment—making it accessible for students, hobbyists, and developers. By combining radar sensing with edge AI, the project demonstrates how intelligent, real-time systems can be created using readily available components.

Keywords: Raspberry Pi, RCWL-0516, Radar Sensor, Motion Detection, Object Classification, TensorFlow Lite, OpenCV, Edge AI, IoT, Smart Surveillance.

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- Their three-pronged engine targets social and business impact by working holistically on Education, Employment and Entrepreneurship.

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Cohort- 11

Sr. No	Name of Students	Domain
1	Tejas Khope	Juniper Networking Cloud Virtual Internship
2	Rushikesh Dattuji Ambore	Aws Data Engineering Virtual Internship
3	Kartik Suresh Ramde	Aws Data Engineering Virtual Internship
4	Rohan Ravishankar Fande	Google Ai-Ml Virtual Internship
5	Abhijit Vijay Sapakal	Aws Data Engineering Virtual Internship
6	Tannu Rohit Goswami	Aws Data Engineering Virtual Internship
7	Prashik Ravindra Hiwarkar	Aws Data Engineering Virtual Internship
8	Sharad Dilip Dhotre	Palo Alto Cybersecurity Virtual Internship
9	Tejas Bandu Shembekar	Aws Ai-Ml Virtual Internship
10	Aryan Sanmohan Keshwan	Uipath Rpa Developer Virtual Internship
11	Arti Prayag Totawar	Google Android Developer Virtual Internship
12	Durga Gajanan Bavane	Aws Data Engineering Virtual Internship
13	Rajkumari Ashok Bagde	Google Ai-Ml Virtual Internship
14	Harshal Bhoyar	Google Ai-Ml Virtual Internship
15	Chaitrali Ramesh Jadhav	Google Android Developer Virtual Internship

Eduskill

Cohort- 11

Sr. No	Name of Students	Domain
16	Gaurav Sunil Gujar	Aws Ai-Ml Virtual Internship
17	Shreyash Khetre	Google Android Developer Virtual Internship
18	Prathmesh Shyamkumar Dubey	Microchip Embedded System Developer Virtual Internship
19	Pratik Vinod Sable	Aws Ai-Ml Virtual Internship
20	Priyanshu Madan Nagle	Google Android Developer Virtual Internship
21	Sahil Siddharth Sawarkar	Employability Skill Job Ready Virtual Internship
22	Divya Moreshwar Mahurkar	Aws Data Engineering Virtual Internship
23	Ashwini Rameshwar Jadhav	Juniper Networking Cloud Virtual Internship
24	Ayush Vikas Sathawane	Aws Data Engineering Virtual Internship
25	Tejas Pradip Taksande	Palo Alto Cybersecurity Virtual Internship
26	Roshan Manohar Kandekar	Google Ai-Ml Virtual Internship
27	Riya Ramesh Wankhede	Aws Data Engineering Virtual Internship
28	Aditya Khushal Kale	Google Android Developer Virtual Internship
29	Yash Ganesh Durugkar	Aws Data Engineering Virtual Internship
30	Anshul Dipak Ramteke	Google Ai-Ml Virtual Internship

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Cohort- 11

Sr. No	Name of Students	Domain
31	Rachit Dashrath Nakhate	Google Ai-Ml Virtual Internship
32	Vivek Prashant Rathod	Aws Data Engineering Virtual Internship
33	Vaishnavi Arvind Choudhary	Aws Data Engineering Virtual Internship
34	Kshitij Rajesh Shahakar	Google Ai-Ml Virtual Internship
35	Kalash Baban Bhasme	Google Ai-Ml Virtual Internship
36	Bhupesh Kamlesh Indurkar	Aws Data Engineering Virtual Internship
37	Triveni Naneshwar Patle	Google Android Developer Virtual Internship
38	Chiya Sandeep Nandeshwar	Google Android Developer Virtual Internship
39	Dhrup Sunil Sonkar	Google Ai-Ml Virtual Internship
40	Omkar Chatrabhuj Mundhe	Aws Ai-Ml Virtual Internship
41	Aryan Vikas Poharkar	Juniper Networking Cloud Virtual Internship

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Cohort- 10

Sr. No	Name of Students	Domain
1	Chaitanya Maroti Jogi	Altair Data Science Master Virtual Internship
2	Nihal Ramdas Dharpure	Java Full Stack Developer Virtual Internship
3	Sumit Kumar	Google Android Developer Virtual Internship
4	Apeksha Raut	Aws Cloud Virtual Internship
5	Palash Diwakar Mahakalkar	Java Full Stack Developer Virtual Internship
6	Sujal Santosh Humane	Python Fullstack Developer Virtual Internship
7	Vedanti Vinod Yerkar	Alteryx Data Analytics Process Automation Virtual Internship
8	Aryan Vikas Poharkar	Juniper Mist-Ai Virtual Internship

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Cohort- 12

Sr. No	Name of Students	Domain
1	Arya Deshmukh	Google Android Developer Virtual Internship
2	Mayur Katre	Aws Data Engineering Virtual Internship
3	Aryan Vikas Poharkar	Google Cloud Generative-Ai Virtual Internship
4	Rohan Ravishankar Fande	Aws Data Engineering Virtual Internship
5	KAMRAN ABDUL HAFIJ SHEIKH	Aws Ai-Ml Virtual Internship
6	ANANTA SUBHASH RAJEGORE	Java Full Stack Developer Virtual Internship
7	PIYUSH PRASHANT BODELE	Google Cloud Engineering Virtual Internship
8	TRIVENI NANESHWAR PATLE	Python Fullstack Developer Virtual Internship
9	Sumit Kumar	Google Cloud Generative-Ai Virtual Internship
10	Utkarsha Ahinsak Bhagat	Java Full Stack Developer Virtual Internship
11	Radhika Shyam Hage	Web Full Stack Developer Virtual Internship

Eduskill- Certificates

Student's Certificate

NPTEL

NPTEL Achievements

- The National Programme on Technology Enhanced Learning (NPTEL) is an Indian e-learning platform for university-level science, technology, engineering, and mathematics (STEM) subjects.
- NPTEL is the largest e-repository in the world of courses in engineering, basic sciences and selected humanities and management subjects.
- The platform and materials have been jointly developed by Indian Institutes of Technology (IITs) and Indian Institute of Science.
- The initiative is funded by the central Ministry of Education. The project's central idea is to put recorded lectures taught by its member institutes online for open access. It operates an educational YouTube channel covering engineering, basic sciences, and some humanities and social science subjects.
- Popular NPTEL courses are being translated into popular local languages.
- The local languages which the translation are available in include Assamese, Bengali, Gujarati, Hindi, Kannada, Malayalam, Marathi, Odia, Punjabi, Tamil and Telugu.[4]

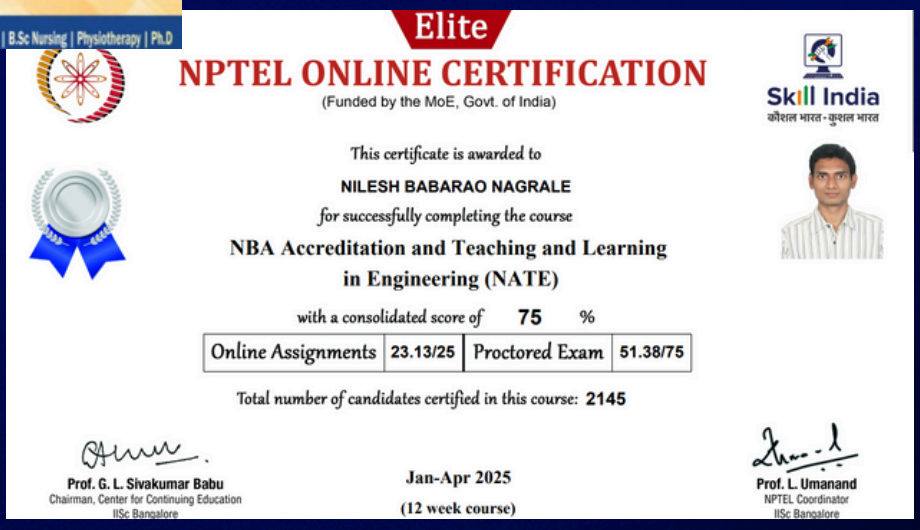
NPTEL

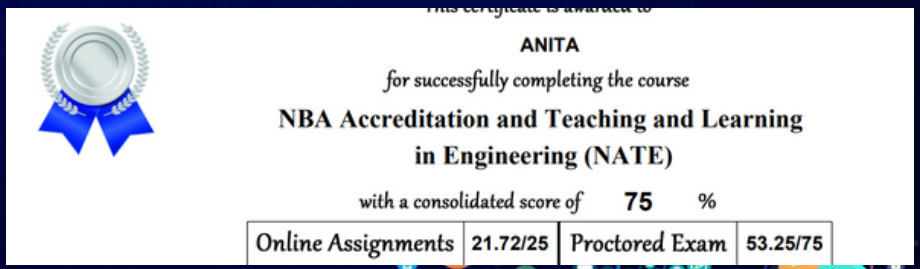
NPTEL Achievements

Sr. No	Name of Students/Faculty	Course	Position
1	Mr. Nilesh Nagrale	NBA Accreditation and Teaching Learning in Engineering	Silver Elite
2	Ms. Anita Yadav	NBA Accreditation and Teaching Learning in Engineering	Silver Elite
3	Mr. Abhay Rewatkar	NBA Accreditation and Teaching Learning in Engineering	Elite
4	Ms. Sayara Bano Sheikh	NBA Accreditation and Teaching Learning in Engineering	Elite
5	Mr. Jayesh Fating	NBA Accreditation and Teaching Learning in Engineering	Elite
6	Mr. Suraj Borkute	Privacy and Security	Elite
7	Ms. Renuka Raut	Cryptography and Network Security	Elite
8	Mr. Kapish Bagde	Introduction to IOT	Elite
9	Mr. Pranav Ladole	Data Analytics with Python	Elite
10	Mr. Ranat Mendhe	Cloud Computing	Succesfully Completed
11	Ms. Renuka Raut	Real Time Operating System	Succesfully Completed

NPTEL

NPTEL Achievements





Internship

As a part of academic curriclum students of all semester are encouraged to pursue internship, also for the students of final year one semester internship is mandatory.

Internship

Sr. No	Name of Student	Internship Company	Project
1	CHETAN SANJAY RAUT	Qloros Pvt. Ltd, Hyderabad	Backend For User Management and Access Control For Movie Ticket Booking Service
2	AYUSH MANGAL BAMBURE	Infocepts Pvt. Ltd, Nagpur	Business Insight 360 [Sales and Finance View] Dashboard
3	JAYANT PRAMOD NAGPURE	Infocepts Pvt. Ltd, Nagpur	Business Insight 360 [Supply Chain View] Dashboard & Ad - Hoc Request
4	TEJAS RAJU THAWARI	Qlorons Pvt. Ltd, Hyderabad	Backend System Design for Administrative Control in Online Movie Reservation Applications
5	SAKSHI VILAS KALOKAR	Clustor Computing Pvt. Ltd, Nagpur	A comprehensive Performance Analysis of IPL
6	PRIYANSHU NATTHU SHAMBHARKAR	Automechano Pvt. Ltd, Nagpur	E- commerce Web Application
7	SAYALI SUSHIL DETHE	Clustor Computing Pvt. Ltd, Nagpur	Goods Cabs
8	VISHAKHA RAJKUMAR ZALKE	Clustor Computing Pvt. Ltd, Nagpur	Analysis NextGen insurance platform
9	ABDUL GAFAR FIROJKHA PATHAN	Pragymatic solutions, Nagpur	E-Commerce Multivendor System
10	AKSHAY NARESH MESHRAM	Clustor Computing Pvt. Ltd, Nagpur	CI/CD Pipeline Implementation For Spring Boot Applications

Internship

Sr. No	Name of Student	Internship Company	Project
11	CHETAN LAXMAN DAFARE	Clustor Computing Pvt. Ltd, Nagpur	AWS using CI/CD Pipeline Implementation For Spring Boot Applications
12	ADITYA SHANKARRAO YELANE	NU Intelligence, Nagpur	Human Resources Management System
13	PALLAVI ASHOK MADAVI	Clustor Computing Pvt. Ltd, Nagpur	Stock market analysis
14	PAYAL RAJESH YEOLE	Info Origin Pvt. Ltd, Gondia	Electricity Booking System using spring boot
15	DEVESH SUBHELAL PARDHI	Clustor Computing Pvt. Ltd, Nagpur	Atliq Mart
16	DINESH DIPANKAR ROY	SS Infotech Pvt. Ltd, Nagpur	Trendware web based application
17	GAURAV RAGHOJI KORANGE	Sournaksh Buildsoft Pvt. Ltd	The Smart Hotel Booking and Recommendation Engine
18	SAHIL PRAVIN PARATE	Sournaksh Buildsoft Pvt. Ltd	The Smart Hotel Booking and Recommendation Engine
19	MANISH RAJENDRA BHAGAT	Clustor Computing Pvt. Ltd, Nagpur	Dine & Finder: A Smart Meal Recommender
20	MANISH YADAV	Clustor Computing Pvt. Ltd, Nagpur	Application tracking system
21	PRATIK PITAMBAR LANJEWAR	Clustor Computing Pvt. Ltd, Nagpur	Bank Dabit Recovery Analysis. with Excel & Power BI

Internship

Sr. No	Name of Student	Internship Company	Project
22	NIRAJKUMAR KISHOR JADHAV	Clustor Computing Pvt. Ltd, Nagpur	Ci/Cd Pipeline implementation for spring boot applications
23	PALASH DIWAKAR MAHAKALKAR	Clustor Computing Pvt. Ltd, Nagpur	Doctore Appoiment System
24	PIYUSH VIJAY RAUT	Clustor Computing Pvt. Ltd, Nagpur	DarkMind AI-Chat Bot
25	PRAVIN SHANTARAM KHADASE	Clustor Computing Pvt. Ltd, Nagpur	Fruits Bazar E-commerce Platform
26	NIHAL RAMDAS DHARPURE	Clustor Computing Pvt. Ltd, Nagpur	Human Resources Management System
27	POOJA MOHAN DHARME	ICEICO Pvt. Ltd, Nagpur	Digital Marketing"Muse Match"
28	SAKSHI VIKAS RATHOD	Clustor Computing Pvt. Ltd, Nagpur	Doctor Appointment Management System
29	Smit Sudhir Rajurkar	Clustor Computing Pvt. Ltd, Nagpur	Business Insight 360 [Executive View and Marketing View] Dashboard
30	ANISHA GAUTAM PANDIT	Clustor Computing Pvt. Ltd, Nagpur	Unified Platform for Corporate Recruitment

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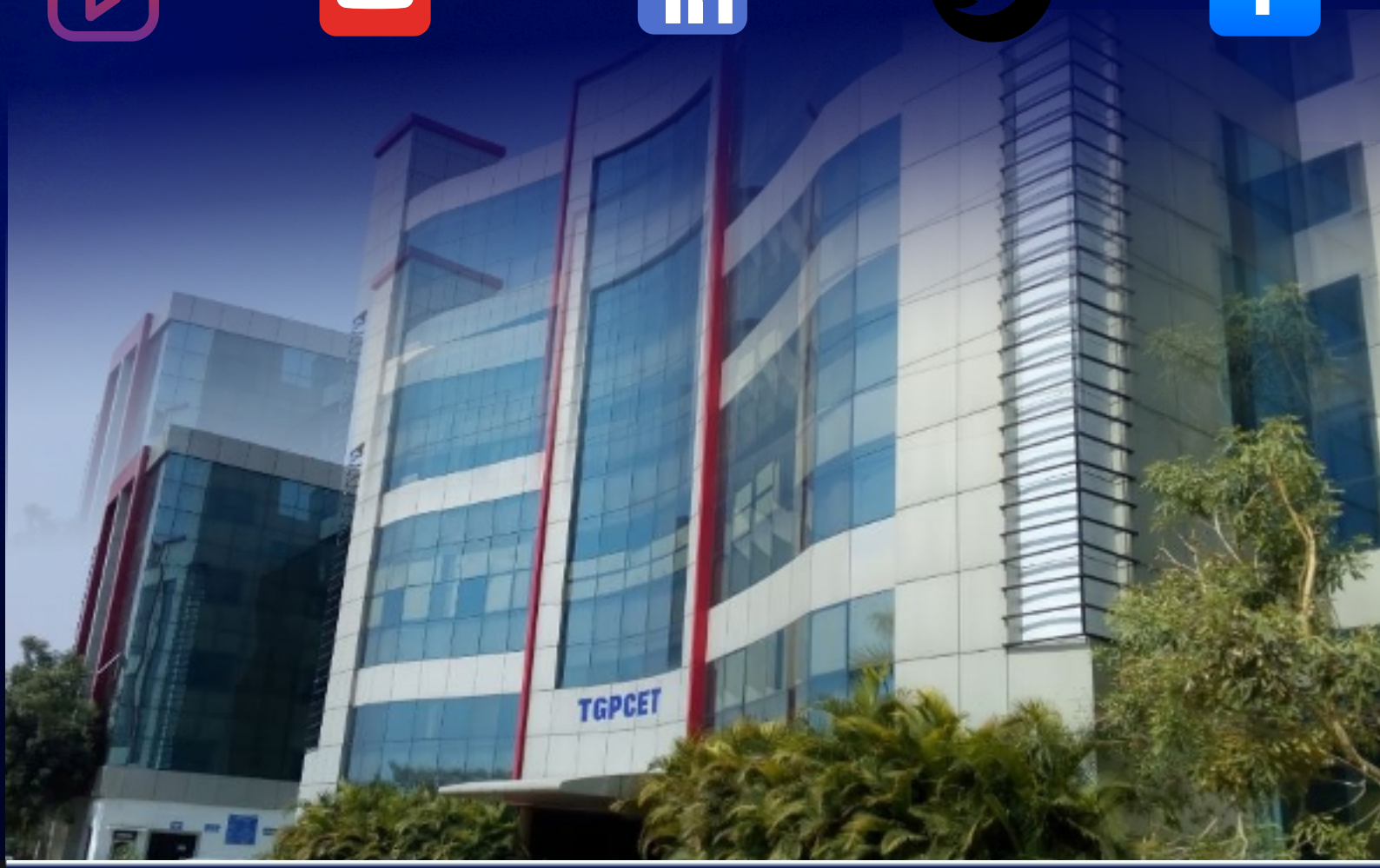

B.Tech | B.Arch | M.Tech | MBA | MCA | BBA | BCA | Polytechnic | D.Arch
B.Pharm | D.Pharm | BAMS | B.Sc Nursing | Physiotherapy | Ph.D