“GIZMOGENIX”

Department of Electronics and Telecommunication Engineering

SAU. SUNDARABAI MANIK ADSUL POLYTECHNIC

A. Y. 2025-2026

About Trust

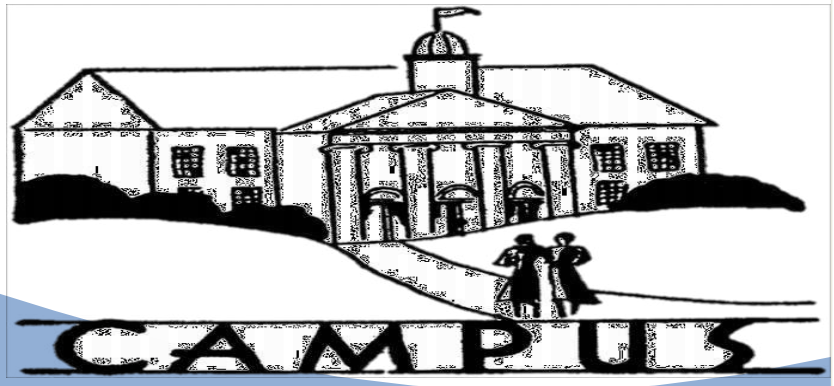
Sakeshwar Gramin Vikas Seva Sanstha was established on 24th September 2004 to promote the noble cause of education. The founder member & president of this sanstha is Hon. Prof. Anirudha Manik Adsul. Prof. Anirudha Adsul is well known personality all over Maharashtra in Education field. The work in the field of education which is started 25 year ago under the name of Adsul's Classes for 11 and 12th Science students has today been transformed into Adsul's Technical campus (Engineering and MBA) College, and B.Ed. college under the Sakeshwar Gramin Vikas Seva Sanstha. Today 2000+ students from rural areas are studying in in the institute and thousands of pass out students are contributing to the progressive development of country.

About (SSMA POLYTECHNIC)

Sau Sundarbai Manik Adsul Polytechnic, Chas, Ahilynagar established in 2010 and approved by Directorate of Technical Education Mumbai (DTE), Maharashtra Government & affiliated to Maharashtra State Board of Technical Education (MSBTE). The institute is approved by All India Council for Technical Education (AICTE).

At present, the institute offers Three Year Diploma Courses in the following faculties.

1. Electronics & Telecomm. Engineering
2. Mechanical Engineering
3. Computer Engineering
4. Electrical Engineering
5. Civil Engineering



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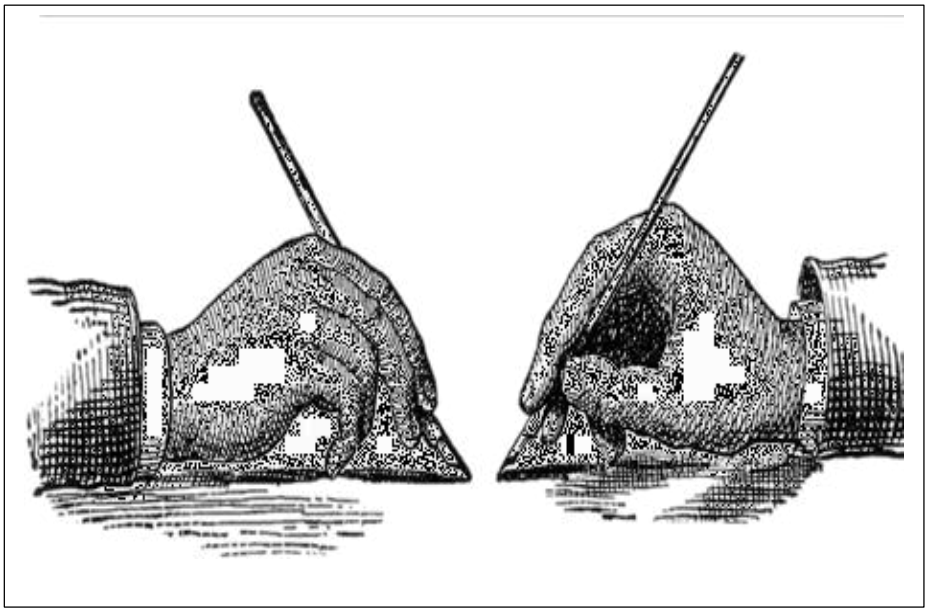
Teacher Incharge	:	Prof.Aher S.K.
Teacher Editor	:	Prof. Darandale J.P.



Students

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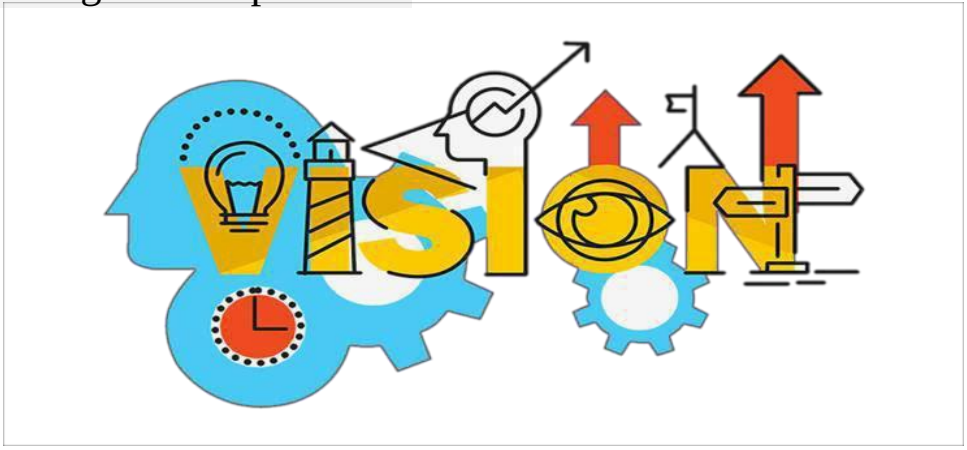
Creative Head	:	Kshirsagar Aditya
Creative Head	:	Arde Chetan
Coordinator Writing Student	:	Lokhande Subodh
Volunteer	:	Raskar Prathamesh

Vision

To be a premier department in the field of Electronics and Telecommunication engineering with emphasis on hands-on activities.



Mission

M1: Producing professional engineers to handle the state-of-the-art technologies in the field.

M2: Imparting research and innovative aptitude with high moral for overall development of students.

M3: Establish leadership skills, team spirit and high ethical values among the students.

M4: Encourage students to become entrepreneur.

Staff

Prof. Palande S.C
Professor & Head

Prof. Darandale J.P.
Professor

Prof. Palve D.S.
Professor

Prof. Aher S.K.
Professor

Prof Patole A.M.
Professor

Prof.Dhirde P.N.
Professor

Prof.Lokhande G.D
Professor

5G and Beyond" Is A Dynamic and Multidisciplinary Field

Research on 5G and beyond is a dynamic and multidisciplinary field that encompasses various aspects of wireless communication, network architecture, device design, and applications. Here are

Some potential research areas within the broader domain of 5G and beyond: ¬ Network Performance

Optimization: Investigating methods to enhance the performance, capacity, and efficiency of 5G networks, including techniques such as spectrum sharing, resource allocation, interference management, and network densification. ¬ Millimeter Wave Communications: Exploring the potential of millimeter wave frequencies for high-speed, short-range communication in 5G and beyond. This includes investigating propagation characteristics, beam forming techniques, and channel modeling to improve coverage and capacity in mm Wave bands. ¬ Massive MIMO: Researching advanced multiple-input, multiple-output (MIMO) techniques for 5G and beyond, including large-scale antenna arrays beam forming, and spatial multiplexing. Focus areas include optimizing

MIMO algorithms, reducing hardware complexity, and improving energy efficiency. ¬ Ultra- Reliable Low-Latency Communications (URLLC) .

Students Activity

Cultural Activity performed by students

Poster Presentation

Ganesh Festival Celebration 2024

Intercollege Completion

Engineer's Day

Quiz Competition

Rangoli Making Competition

Paper Presentation

National Science Day

Industrial Visit

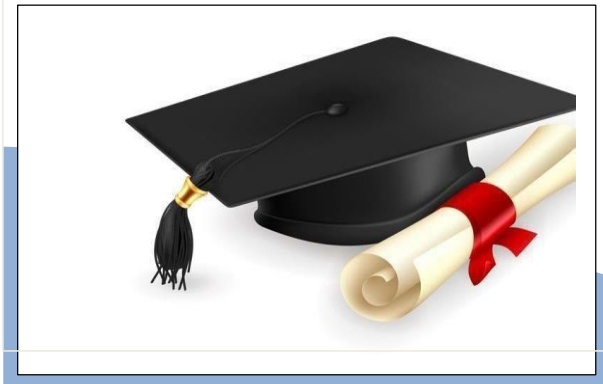
Parents Meet

Academic Toppers

MR. SARTHAK
ANANDKAR
TY E&TC

MR.SURAJ DARKUNDE
TY E&TC

MR.ABBASNAGARWALA
TY E&TC



Paper publish by Students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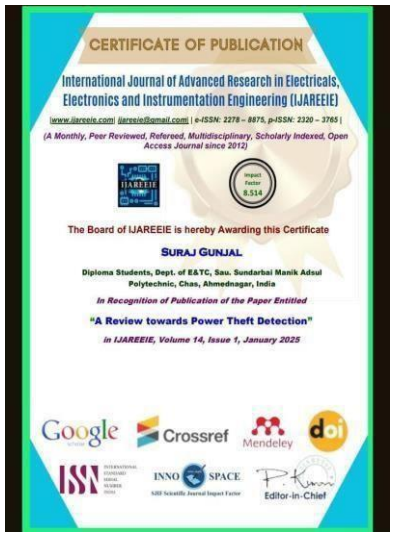
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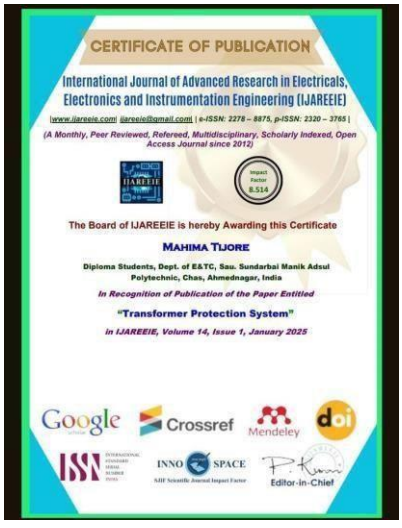
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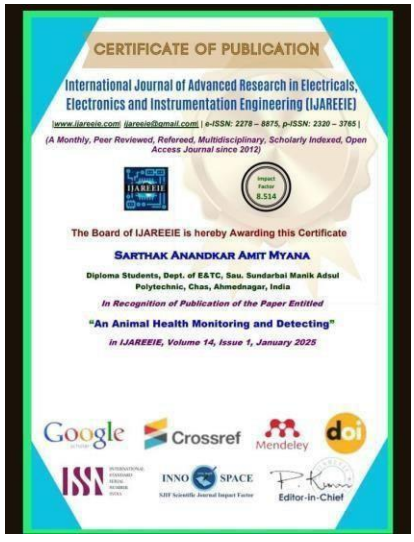
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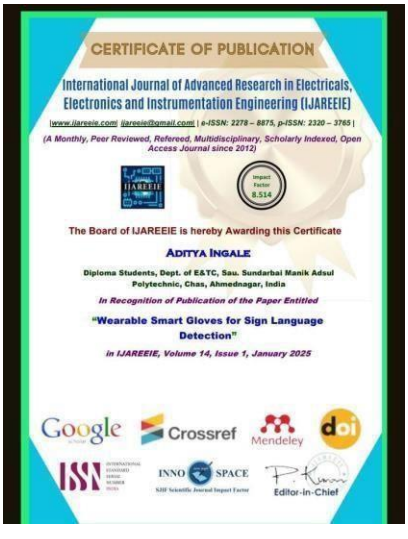
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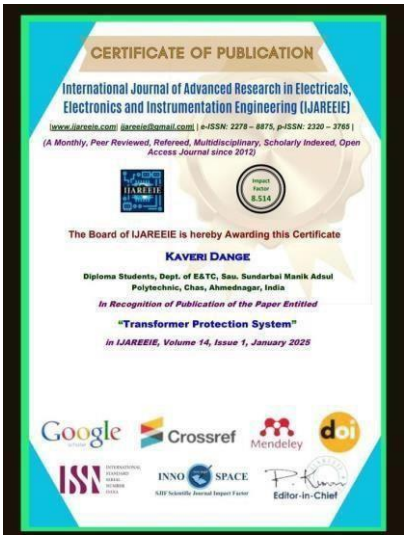
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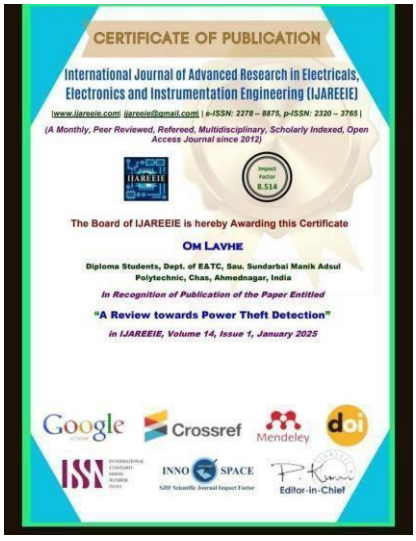
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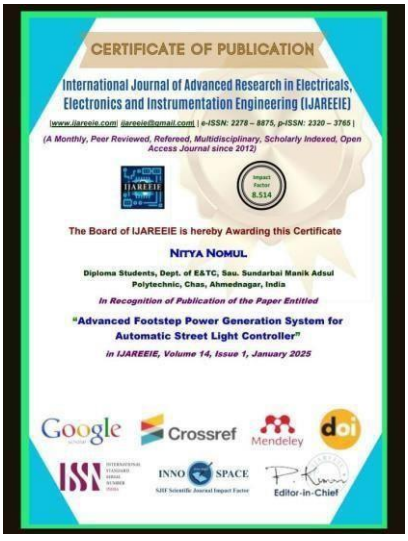
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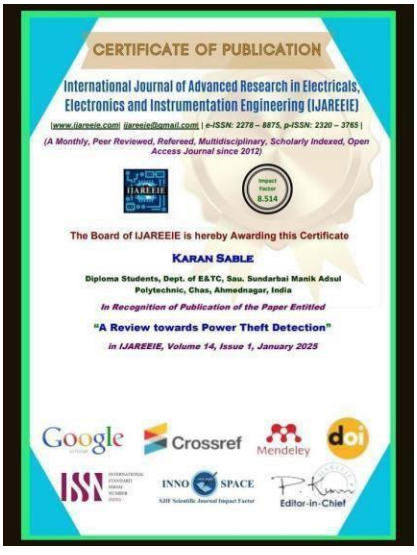
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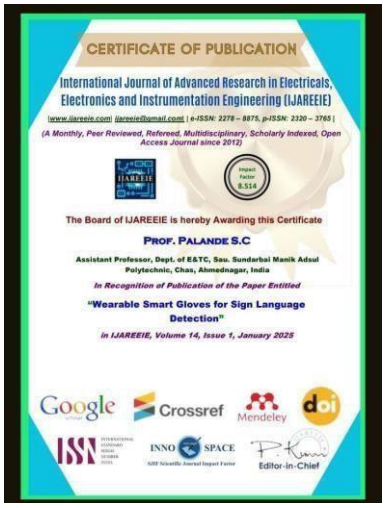

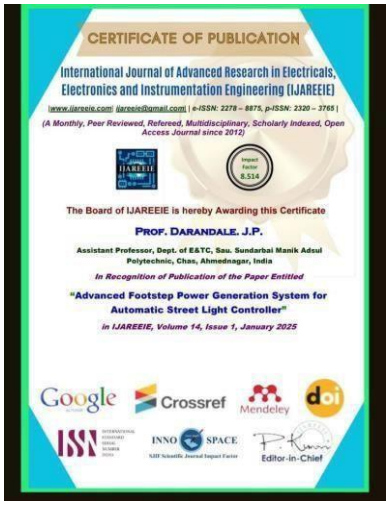

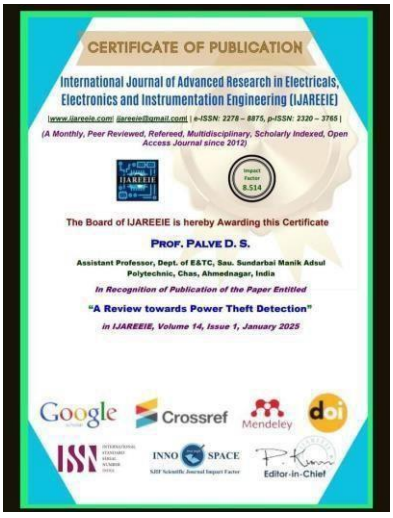

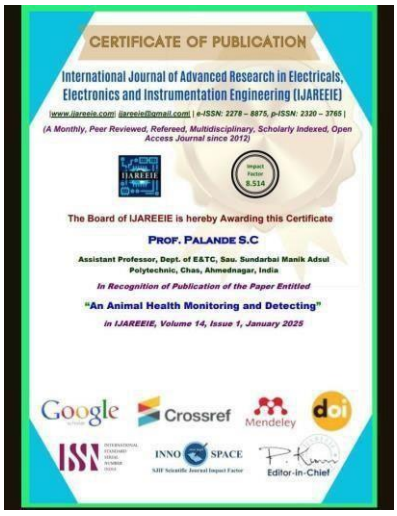

Faculty Achievements

Shree Samarth Academy's

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MHASANE PHATA,TAL-PARNER,DIST-AHMEDNAGAR

STATE LEVEL TECHNICAL EVENT

TECHNO-VISION 2K26

CERTIFICATE

THIS IS TO CERTIFY THAT MR/MRS/MES/MISS Kharmale Snehal Sharad CLASS EJ-4K

HAS PRESENTED / PARTICIPATED/ SECURED Second POSITION IN

THE EVENT Seminar Presentation AT "TECHNO-VISION 2026" ON 25TH FEBRUARY 2026

MR.P.M.BENDRE COORDINATOR | MR.S.P.WATHORE EVENT-COORDINATOR | PROF.D.D.DESALE PRINCIPAL

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MR.P.M.BENDRE COORDINATOR | MR.S.P.WATHORE EVENT-COORDINATOR | PROF.D.D.DESALE PRINCIPAL

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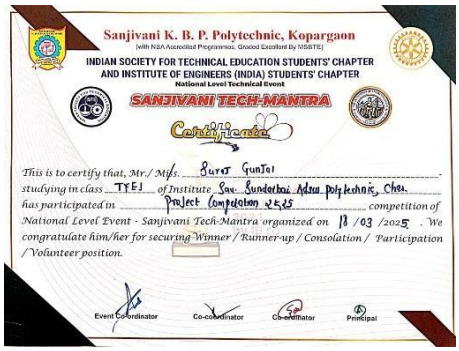
National and state level acheviment


Sanjivani Pratisthan Mumbai Sanchalit
S.P.I.T. POLYTECHNIC, KURUND
Shirur-Nighoj Road, Tal. Parner, Dist. Ahilyanagar Pin 414306
"INNOVISION 2K25"
(State Level Technical Quiz, Poster Presentation & Project Competition)
This is to certify that Mr./Ms. SAMARTH S. KALBHOR
of A.T.C. CHAS has Secured 1st / 2nd / 3rd / participated
Prize in "INNOVISSION 2K25"- State Level Technical Quiz / Posters Presentation / Project
Competition organized by "S.P.I.T Polytechnic, Kurund" held in the academic year 2024-25.
Prof. Mr. N. A. Shelke Academic Co-ordinator
Prof. Mr. S. D. Kapse Principal


SAKESHWAR GRAMIN VIKAS SEVA SANSTHA'S
SAU. SUNDARBAI MANIK ADSUL POLYTECHNIC
Presents,
TECHNOTSAV - 2K25
12th STATE LEVEL TECHNICAL EVENT
Certificate
This is to certify that Mr./Mis. Amit Balaji Myana
From SSMA Chas, A. Nagar has presented / participated / secured 2nd Rank Position
in Quiz Competition He/She is appreciated for his/her active participation.
Prof. Palwe P.D Co-ordinator
Prof. Hole P. P. Event Co-ordinator
Prof. Gadakh R. S. Principal
ProAzure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AND INSTITUTE OF ENGINEERS (INDIA) STUDENTS' CHAPTER
SANJIVANI TECH-MANTRA
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This is to certify that, Mr./ Mis. Surat Gunjal
studying in class TYEJ of Institute Sau. Sundarbai Adsul Polytechnic, Chas.
has participated in Project Competition 2K25 competition of
National Level Event - Sanjivani Tech-Mantra organized on 18/03/2025. We
congratulate him/her for securing Winner / Runner-up / Consolation / Participation
/ Volunteer position.
Event Co-ordinator Co-ordinator Co-ordinator Principal


SRIJAN
CERTIFICATE
OF PARTICIPATION
DIPEX
IDEA PRESENTATION ROUND, AHILYANAGAR & NASHIK DISTRICT
This is to certify that Mr./Ms. Gunjal Suraj Bhaskar
from Sau. Sundrabai Manik Adsul Polytechnic participated in the Idea
Presentation Round of DIPEX-2025, Ahilyanagar & Nashik District held in association with Internal
Quality Assurance Cell (IQAC), Dr. Vithalrao Vikhe Patil College of Engineering Ahilyanagar, The
Institutions of Engineers (INDIA) Ahilyanagar Local Centre, Association of Ahmednagar Manufacturing
Industries on 16th March, 2025.
आपका वर्धमान कर्तृत्व भारतमाता के चरणो मे समर्पित हो।


Sanjivani K. B. P. Polytechnic, Kopargaon
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AND INSTITUTE OF ENGINEERS (INDIA) STUDENTS' CHAPTER
SANJIVANI TECH-MANTRA
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This is to certify that, Mr./ Miss. Yash Surwase
studying in class TY of Institute Adsul Polytechnic
has participated in Battle Verse competition of
National Level Event - Sanjivani Tech-Mantra organized on 18/03/2025. We
congratulate him/her for securing Winner / Runner-up / Consolation / Participation
/ Volunteer position.
Event Co-ordinator Co-ordinator Co-ordinator Principal


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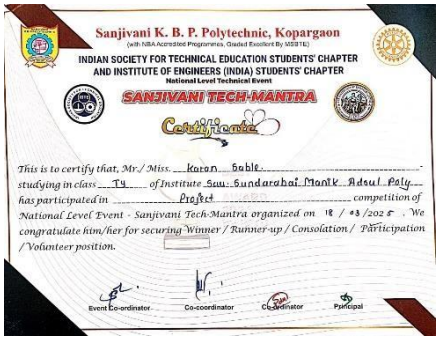
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This is to certify that Mrs. DIPALI SURYAKANT PALVE has participated in a National Level One-Week Faculty Development Program (online mode) on "EMERGING TRENDS IN ADVANCE MANUFACTURING TECHNOLOGY" organized by the Mechanical Engineering Department from 20th to 24th February 2024. Thank you for your active participation.
Dr. Srikant Prasad, Coordinator, SOET
Mr. Jainesh Sarvaiya, Coordinator, SOET
Dr. Vishal N. Sulakhe, Co-convenor, HOD, Mechanical Engg. Dept., SOET
Prof. Dr. Prakash G. Burade, Convenor, SOET


Sandip University, Nashik
School of Engineering & Technology
Department of Mechanical Engineering
Certificate of Participation
This is to certify that PALANDE SONALI CHHABU from SSM ADSUL POLYTECHNIC CHAS, A.NAGAR has participated in a One Week National Level Online Faculty Development Programme (FDP) on "ADDITIVE MANUFACTURING TECHNOLOGY" organized by Mechanical Engineering Department from 04/03/2024 to 09/03/2024.
Dr. Rahul Kumar, Coordinator, SOET
Mr. Akshay Tajane, Coordinator, SOET
Dr. Vishal N. Sulakhe, Co-Convenor, HOD, Mech. Engg. SOET
Prof. Dr. Prakash G. Burade, Convenor, Associate Dean, SOET

Faculty Achievements

Sr. No	Name of Faculty	Achievements
1	PROF.PALANDE S.C.	1. Recent trends in mobile computing with real time approach 2. Faculty development program. 3. Paper published to IJAREEIE
2	PROF. DARANDALE J.P.	1. Emerging trends in a advance manufacturing technology. 2. Faculty development program. 3. Training in a electrical vehicle technology 4. Faculty development programme on effective teaching 5. Paper published to IJAREEIE
3	PROF. AHER S.K.	1. Emerging trends in a advance manufacturing technology
4	PROF. PALVE D.S.	1. Emerging trends in a advance manufacturing technology 2. Paper published to IJAREEIE 3. Quality Enhancement through Outcome-Based Curriculum Implementation 4. Emerging Trends in Electrical Engineering
5	PROF. PATOLE A.M.	1. Quality Enhancement through Outcome-Based Curriculum Implementation 2. Emerging Trends in Electrical Engineering 3. AI Tools Mastery Workshop
6	PROF.LOKHANDE G.D.	1. Quality Enhancement through Outcome-Based Curriculum Implementation 2. Emerging Trends in Electrical Engineering 3. AI Tools Mastery Workshop


IRJMETS
International Research Journal Of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
e-ISSN: 2582-5208
Ref: IRJMETS/Certificate/Volume 8/Issue 1/71201342045
DOI : https://www.doi.org/10.56726/IRJMETS64455
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This is to certify that author "Kartik Lohakar" with paper ID "IRJMETS71201342045" has published a paper entitled "LANDMINE DETECTION ROBOTIC VEHICLE " in International Research Journal Of Modernization In Engineering Technology And Science (IRJMETS), Volume 8, Issue 1,January 2026
Editor in Chief
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Project Title

Sr.No.	Name Of Students	Project Name
1	Shaikh Ayan S.	Autonomous Fire-Fighting Robot
2	Jagtap Umesh B.	
3	Zine Komal R.	
4	Dudhade Anushka S.	
5	Raskar Prathamesh S.	Footstep Power Generation via Piezoelectric Transducers
6	Pathan Suhan Y.	
7	Potghan Karan R.	
8	Wagh Vaibhav N.	
9	Kotkar Sai S.	Dual-Mode Autonomous Navigation Robot
10	Kale Om R.	
11	Shelke Sarthak B.	
12	Navale Kunal H.	
13	Kshisagar Aditya G.	Remote-Operated Landmine Detection Robotic Vehicle
14	Arde Chetan P.	
15	Lokhande Subodh S.	
16	Lahakr Kartik B.	
17	Modhave Sanket G.	Smart Medicine Reminder and Dispensing System
18	Modhave Karan P.	
19	Bhor Abhishek S.	
20	Suryavanshi Rohan S.	

ABSTRACT
1. Autonomous Fire-Fighting Robot

This project focuses on the design and implementation of an **Autonomous Fire-Fighting Robot** capable of detecting, navigating toward, and extinguishing localized fires without human intervention. The primary objective is to minimize the risk to human life by deploying a robotic unit into hazardous environments where high temperatures, smoke, and structural instability make manual firefighting dangerous.

Core System Components

The robot's architecture is divided into three critical subsystems:

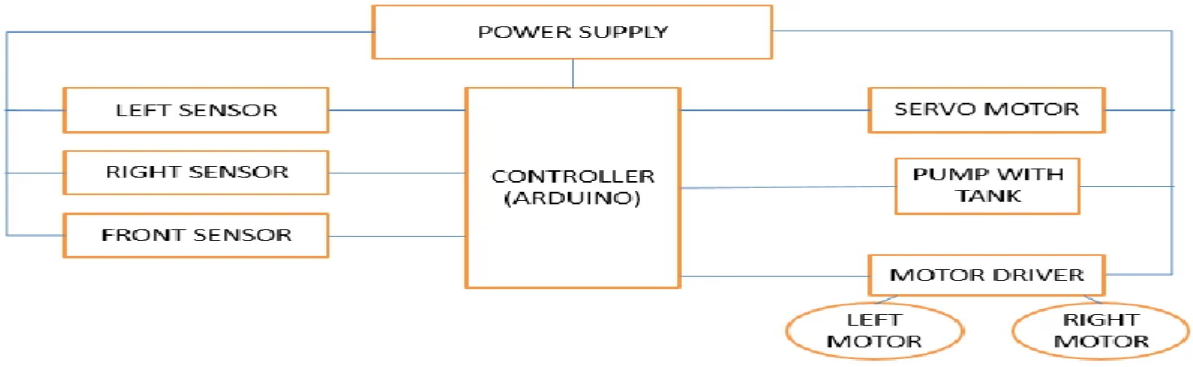
- **Detection & Sensing:** Utilizing a combination of **ultraviolet (UV) or infrared (IR) flame sensors** and gas sensors (such as the MQ-2) to identify the presence and precise location of a fire.
- **Navigation & Logic:** An onboard microcontroller (e.g., Arduino or Raspberry Pi) processes sensor data to guide the robot through the environment while employing **ultrasonic sensors** for real-time obstacle avoidance.
- **Extinguishing Mechanism:** Once the robot reaches the target, a high-torque water pump connected to a directed nozzle—or a specialized CO2 canister—is activated to suppress the flames.

Methodology and Results

The robot employs a **closed-loop control system**. It continuously scans its surroundings for heat signatures; upon detection, it calculates the shortest path to the source while bypassing debris. Experimental results demonstrate that the prototype can effectively detect a flame within a range of **2–3 meters** and extinguish it within seconds, maintaining a safe distance to protect its own circuitry.

Significance

By integrating automated response systems with mobile robotics, this project provides a scalable solution for industrial warehouses, laboratories, and residential complexes. Future iterations could incorporate **IoT (Internet of Things)** modules to alert emergency services and thermal imaging cameras for more sophisticated navigation in smoke-filled rooms.



2. Footstep Power Generation via Piezoelectric Transducers

With the global shift toward sustainable energy, this project explores the design and implementation of a **Footstep Power Generation System**. The system is engineered to capture kinetic energy from human footsteps and convert it into usable electrical energy. This "crowd-sourced" power generation is particularly effective in high-traffic urban areas, such as railway stations, shopping malls, and pedestrian walkways.

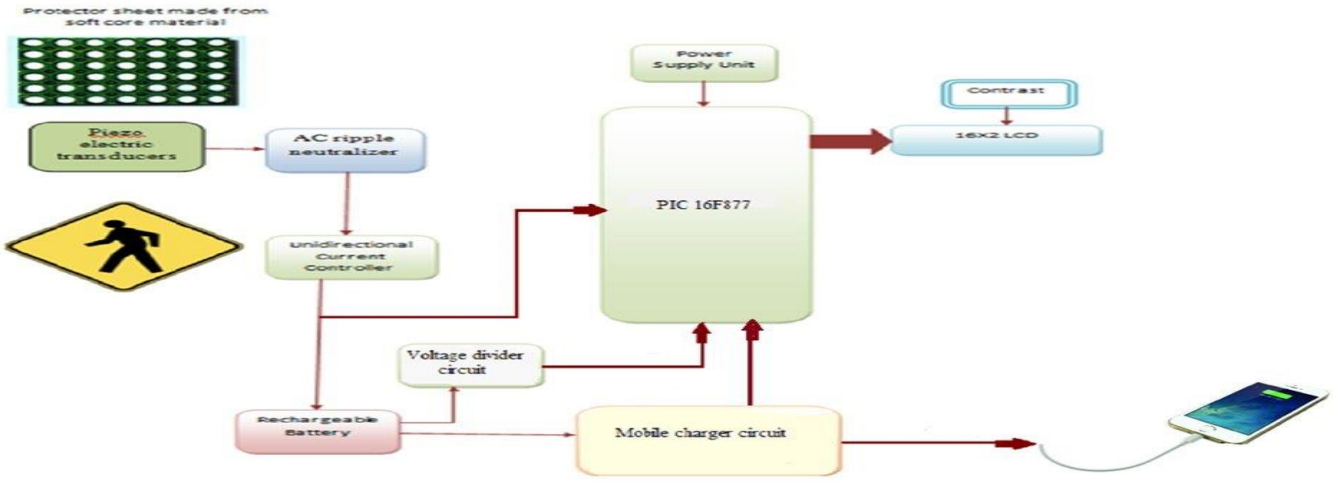
Technical Framework

The project utilizes the **Piezoelectric Effect**, where mechanical stress applied to specialized ceramic materials generates an electric charge. The system architecture includes:

- **Energy Harvesting:** A matrix of **piezoelectric sensors** embedded beneath a flexible floor tile or "power mat" to capture the pressure of a footfall.
- **Power Conversion:** Since the output from sensors is AC and often intermittent, a **bridge rectifier** and filtering capacitors are used to convert the signal into stable DC.
- **Storage & Management:** A charging circuit manages the flow of electricity into a **Lead-Acid or Li-ion battery**, ensuring the energy is stored efficiently for later use.

Future Potential

This project highlights a scalable, eco-friendly solution to energy demands. By integrating this technology with **IoT-based monitoring**, urban planners can simultaneously track foot traffic data while generating clean energy, paving the way for smarter, self-sustaining "Green Cities."



3. Dual-Mode Autonomous Navigation Robot

This project presents the design and development of an **Autonomous Line-Following Robot with Integrated Obstacle Avoidance**. Traditional line followers are limited by their inability to handle unexpected path blockages; this project overcomes that limitation by fusing infrared (IR) sensing for path tracking with ultrasonic sensing for spatial awareness. The result is a robust navigation system capable of maintaining a predefined course while safely maneuvering around stationary or dynamic obstacles.

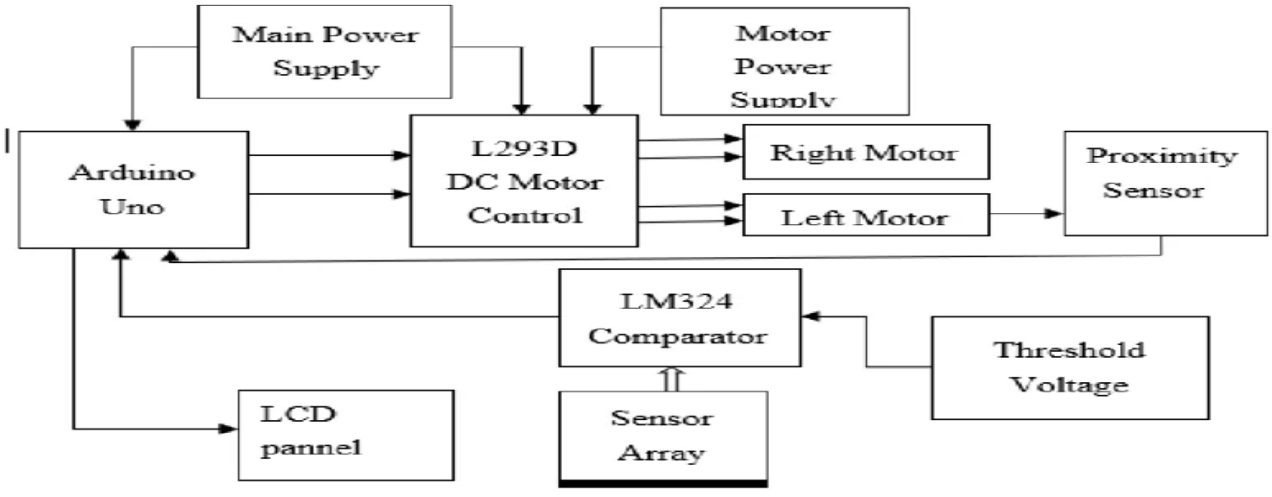
System Architecture and Logic

The robot's intelligence is managed by a central microcontroller (such as an Arduino Uno) programmed to prioritize safety over pathing. The system operates through two primary sensor arrays:

- **Path Tracking:** A dual or triple **IR Reflectance Sensor** array detects the contrast between the floor and the track (usually a black line on a white surface). It employs a differential drive system to make micro-adjustments to the motor speeds.
- **Collision Prevention:** An **HC-SR04 Ultrasonic Sensor** continuously monitors the "clear zone" ahead. If an object is detected within a threshold (e.g., 20 cm), the robot initiates a pre-programmed "bypass routine"—turning away from the line, circumnavigating the obstacle, and scanning to re-acquire the track.

Applications and Future Scope

This dual-capability robot serves as a foundational prototype for **Automated Guided Vehicles (AGVs)** used in modern smart factories and hospitals. Future enhancements could include **PID (Proportional-Integral-Derivative) control** for smoother cornering and Bluetooth modules for remote monitoring and data logging.



4. Smart Medicine Reminder and Dispensing System

Non-adherence to medication schedules is a significant challenge in healthcare, often leading to complications or prolonged recovery, particularly among the elderly. This project presents the design and development of an **Arduino-based Smart Medicine Reminder System**, an automated solution designed to alert patients and ensure timely medication intake.

System Design and Functionality

The system is built around an **Arduino Microcontroller** (such as the Uno or Mega) and integrates several key modules to ensure reliability:

- **Real-Time Tracking:** A **DS3231 Real-Time Clock (RTC) module** provides high-precision timekeeping, allowing the user to pre-set specific times for different medications.
- **User Interface:** An **LCD Display** (16x2 or 20x4) shows the current time and indicates which specific pill needs to be taken.
- **Alert Mechanisms:** To cater to different sensory needs, the system employs both **auditory (Piezo buzzer)** and **visual (LED indicators)** alerts.
- **Physical Dispensing:** Using **servo motors** or stepper motors, the system can be configured to rotate a container or open a specific compartment corresponding to the prescribed dose.

Significance and Future Scope

This prototype offers a low-cost, customizable alternative to expensive commercial pill dispensers. Future iterations could integrate an **ESP8266 Wi-Fi module** to send SMS or app notifications to caregivers if a dose is missed, and a **Load Cell** (weight sensor) to verify if the medicine was physically removed from the tray.

5. Remote-Operated Landmine Detection Robotic Vehicle

Landmines remain a persistent global threat, causing thousands of casualties annually and rendering vast areas of land unusable. This project presents the design and development of a **Landmine Detection Robotic Vehicle**, a cost-effective and safe alternative to manual demining. The primary objective is to create a mobile platform capable of scanning hazardous terrain and identifying buried metallic threats while keeping human operators at a safe distance.

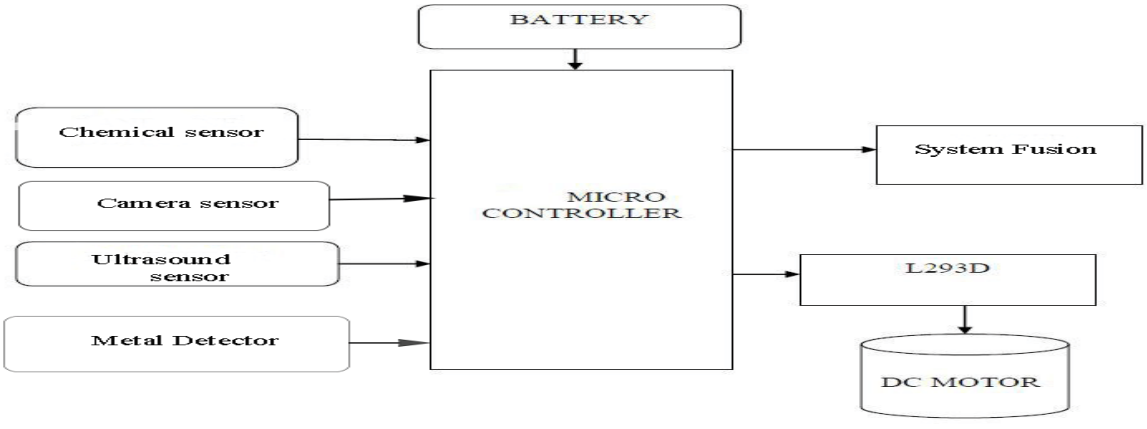
System Architecture & Sensing

The robotic vehicle is built on a rugged, high-torque chassis designed for off-road traversal. Its intelligence and operation are divided into three core modules:

- **Detection System:** The heart of the robot is a **Pulse Induction (PI) Metal Detector** or a high-sensitivity **Inductive Proximity Sensor** mounted on a front-facing scanning arm. This sensor identifies the metallic components common in anti-personnel and anti-tank mines.
- **Wireless Navigation:** To ensure operator safety, the vehicle is controlled remotely using **Radio Frequency (RF)** or **Bluetooth/Wi-Fi modules** (such as the HC-05 or NRF24L01), allowing for real-time steering and speed control from a distance of up to **100 meters**.
- **Safety & Alert Mechanisms:** Upon detecting a metallic anomaly, the onboard **Arduino or Raspberry Pi** triggers an immediate response: an onboard buzzer sounds, a high-intensity LED flashes, and the robot's movement is automatically paused to prevent accidental detonation.

Significance and Future Scope

This prototype serves as a proof-of-concept for low-cost autonomous demining. By replacing human "prodders" with robotic units, the risk of fatality during clearing operations is significantly reduced. Future versions could integrate **GPS Tagging** to create digital maps of mined areas and **Ground Penetrating Radar (GPR)**



THANKS

CONCLUSION

The development of the Landmine Detection Robotic Vehicle represents a significant step forward in humanitarian engineering and hazardous-area exploration. By replacing manual sweeping methods with an automated, remote-controlled system, this project effectively demonstrates how technology can be used to preserve human life and minimize the risks associated with demining operations.

The integration of metal detection sensors, wireless communication, and autonomous navigation ensures that minefields can be mapped with high precision and at a lower cost than traditional armored vehicles. While the current prototype successfully identifies metallic landmines and provides real-time alerts, it serves as a foundational platform for more sophisticated defense and safety applications.

In summary, this robotic system proves that automation is not just about efficiency—it is about safety. As robotics technology continues to evolve, systems like this will become indispensable in clearing war-torn regions and making them safe for civilian habitation once again.

THANKS.