

VOLUME 02

ISSUE NO. 12

THE SPARK

Igniting Innovations

DEPARTMENT OF
ELECTRICAL AND ELECTRONICS
ENGINEERING

DEC
2025



UNIVERSITY COLLEGE OF ENGINEERING KAKINADA (A)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Inside



01 EVENTS

04 PHOTOGRAPHY

02 PLACEMENTS

05 ARTS &
CULTURALS

03 ARTICLES



EVENTS

- Dr. K. Venkata Reddy, Professor and Head of the Department EEE, JNTU Kakinada, has participated in **Innovative strategies Empowering Sustainable Livelihoods: AI-Driven Smart Approaches for Poly Generation, Innovative Farming, and Biopharmaceutical Research**, an ANRF PAIR PROJECT held on 12 December 2025 in collaboration with Vellore Institute of Technology [VIT].
- The Department of Electrical & Electronics Engineering, JNTUK, in collaboration with the 2017–2021 EEE Alumni Batch, organized an **online Career Guidance Program** on 07 December 2025 for II, III, and IV B.Tech students. The session focused on different career options such as GATE/IES, higher studies, MBA, MS in abroad, software and IT careers, and Civil Services. Alumni shared their experiences and guidance, helping students understand career paths and plan their future. The program was attended by the students actively.
- III and IV B.Tech EEE students attended an online panel discussion titled “**GATE Aspirants: Challenges, Opportunities & Success Stories**”, **organized by the IEEE India Council Women in Engineering (WIE)** and Student Activities Coordination Team on 16 December 2025 at 07:30 PM (IST). The session featured distinguished GATE qualifiers who shared their preparation journeys, challenges encountered, and strategies for success. The discussion provided the students with valuable guidance on effective preparation methods and highlighted the academic and career opportunities available through GATE, thereby supporting their future academic and professional planning.
- The faculty members **N. Sagar Teja Yadav**, Assistant Professor (C), and **L. V. Narayana**, Assistant Professor (C), Department of Electrical and Electronics Engineering actively participated in the Workshop on “**Cyber Security of Power Grids**” held from 23rd to 26th December 2025 at the **Indian Institute of Science (IISc), Bangalore**. The program focused on emerging challenges in securing modern power systems, smart grids, and critical electrical infrastructure against cyber threats. The workshop provided valuable insights into grid resilience, real-time monitoring, vulnerability assessment, and advanced protection strategies essential for future power networks.
- Mr. Gushidi Manikantha, III B.Tech EEE, has participated in One-Day workshop on “**Transforming Farming Landscapes with Connected AI Systems , IoT Intelligence, Digital Twins with Sustainable Practices**” held on 04 December 2025, sponsored by ANRF-PAIR Project, by School of Computer science Engineering and Information systems, Vellore Institute of Technology [VIT], Vellore.
- JNTUK team attended Vignan Mahotsav cricket tournament from Dec 19 2025 - Dec 24 2025 ,players from our EEE department are IV B.Tech T. Sai Govinda Krishna (captain) 22021A0246 K. Ashok sai 23025A0259 III B.Tech Ch Venkatesh 23021A0205 II B.Tech K. Latheesh Kumar 24021A0225



PLACEMENTS


ACCENTURE
With CTC of 5.5 LPA



SINAGAM SAI KRISHNA


DCM SHRIRAM
Growing with trust
With CTC of 5.43 LPA



CHOLLANGI SRI SATWIK


With CTC of 5.5 LPA



GOLLADI POORNIMA



KAPUDASI HEMA KRUTHI

Health Diagnosing Mirrors

A Smart Step Towards Preventive Healthcare

Introduction

Healthcare remains predominantly reactive rather than preventive. Individuals visit medical facilities only after symptoms become apparent, missing critical early warning signs. The World Health Organization emphasizes that early detection of non-communicable diseases can reduce mortality by 30-40%, yet most people lack access to continuous health monitoring tools. Conditions such as skin cancer, eye abnormalities, and stress-related disorders display subtle visual indicators that go unnoticed in daily life. Existing diagnostic equipment measures isolated parameters and remains confined to hospitals or clinics, creating an accessibility barrier for preventive healthcare.

Problem Statement

Current healthcare infrastructure faces a fundamental limitation: the gap between early detection and daily accessibility. People postpone medical checkups due to time constraints, consultation costs, or unawareness of emerging health risks. Elderly individuals struggle with hospital visits. Working professionals experience undiagnosed stress and fatigue. Students suffer from undetected sleep disorders. Existing wearable devices measure only specific vitals; imaging systems require expensive equipment and trained technicians; mobile app-based diagnostics lack convenience. This creates a critical need for an intelligent, non-invasive diagnostic system that integrates seamlessly into daily routines and provides comprehensive health insights without requiring deliberate user effort.

Proposed Solution: The Health Diagnosing Mirror

The Health Diagnosing Mirror, as shown in Fig 01, addresses this challenge by transforming a bathroom mirror into a sophisticated health monitoring platform. By integrating advanced sensors, high-resolution cameras, and artificial intelligence algorithms into an object used multiple times daily, the system enables continuous, effortless health monitoring. The mirror analyzes facial features, skin conditions, eye coloration, and vital signs to detect early health indicators including stress levels, skin abnormalities, eye-related disorders, and temperature fluctuations.



Source: Open AI

Fig 1. Health Diagnosing Mirror

System Architecture

The system integrates five complementary sensing modalities. High-resolution camera modules (5-8 megapixel) capture detailed facial and skin images under controlled LED lighting. Infrared thermal sensors detect temperature variations and blood flow patterns. The processing core consists of a microcontroller and edge AI processor executing facial

recognition, skin texture analysis, and vital sign detection locally on the device. The user interface displays comprehensive health dashboards showing skin analysis results, vital signs, stress indicators, and personalized wellness recommendations

AI-Powered Health Analysis

Skin analysis algorithms identify moles, acne, and potential early indicators of skin cancer through pattern recognition. Eye condition detection recognizes jaundice coloration, stress-related patterns, and fatigue indicators. Facial recognition models, as shown in fig 02, assess stress levels through microexpression analysis. Vital sign estimation algorithms process facial blood flow variations to extract heart rate, oxygen saturation, and respiration patterns without physical contact.

Design Innovation and Cost Optimization

The project demonstrates systematic design thinking from problem empathy through prototype refinement. Cost optimization strategies achieved 62% reduction in production expenses through bulk purchasing, local manufacturing partnerships, custom PCB design, modular architecture, and edge AI processing eliminating cloud subscriptions. Mass production cost targets ₹6,200 per unit from initial prototype cost of ₹16,500.



Source: Open AI

Advantages and Future Scope

The system provides non-invasive, continuous monitoring supporting early detection across all age groups. Limitations include lighting-dependent accuracy and the understanding that the system supplements rather than replaces professional diagnosis. Future iterations will incorporate full-body posture analysis, electronic health record integration, advanced predictive AI for chronic disease forecasting, and voice-guided health coaching.

Conclusion:

The Health Diagnosing Mirror exemplifies how sensor fusion and artificial intelligence bring hospital-grade diagnostics into homes, making preventive healthcare accessible and automatic. From ideation through prototyping to design optimization, the project transforms an everyday object into a sophisticated wellness companion. This innovation has the potential to revolutionize personal health monitoring, democratize early disease detection, and contribute significantly to healthier lifestyles across all age groups in India.

S. Ruchitha

III B.TECH

23021A0246

OXYGEN SUFFOCATION AVOIDANCE AND RESCUE SYSTEM

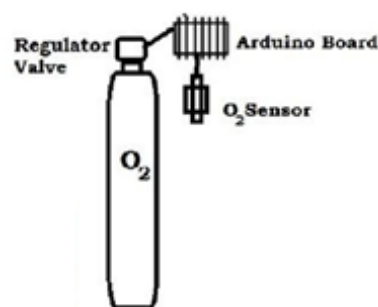
As the smart system has been developed in the automobile industries, new features are implemented for the comfort of customer. If a car is locked, creating a closed cabin, the unmindful toddlers and pets in the car, cannot open the door or windows. Across the globe, several infant children's deaths have been reported after left in a parked car because of the suffocation inside the car cabin.

In today's world, passengers in cars sometimes find themselves in bad situations where they are uncomfortable or unhappy for a variety of reasons. One of these reasons is that people suffocate within the closed car cabin owing to a lack of O₂. Lot of mishaps happened due to this problem. The victims of this major problem are mainly toddlers, pets, and physically disabled persons because they are not aware of the unlocking system of a car. This is most likely due to a lack of ventilation caused by closed windows in a locked car. These situations can be severe, and the passenger may die as a result. The proposed model checks for CO₂ levels inside the enclosed space and using an exhaust fan by opening the sliding window it escapes the excess CO₂ and allows O₂ to enter into cabin. As a result, the individual can be rescued. This proposed method can be used in a variety of other isolated and poorly ventilated environments, such as chemical plants and industries. For the passengers to survive, the interior of the car (or any automobile) must always be favorable and perfect. In today's world, passengers in cars sometimes find themselves in bad situations where they are uncomfortable or unhappy for a variety of reasons. One of these reasons is that people suffocate within the closed car cabin owing to a lack of O₂. Lot of mishaps happened due to this problem. The victims of this major problem are mainly toddlers, pets, and physically disabled persons because they are not aware of the unlocking system of a car. This is most likely due to a lack of ventilation caused by closed windows in a locked car. These situations can be severe, and the passenger may die as a result. The proposed model checks for CO₂ levels inside the enclosed space and using an exhaust fan by opening the sliding window it escapes the excess CO₂ and allows O₂ to enter into cabin. As a result, the individual can be rescued. This proposed method can be used in a variety of other isolated and poorly ventilated environments, such as chemical plants and industries.

In addition to monitoring CO₂ concentration, the system can be integrated with temperature and humidity sensors to detect rapid heat build-up inside the vehicle, which is another major cause of fatalities. A microcontroller continuously analyzes these environmental parameters and compares them with predefined safety thresholds. When abnormal conditions are detected, the system automatically triggers multiple safety responses such as activating the exhaust mechanism, slightly lowering the windows, and turning on ventilation fans to restore breathable air conditions. Simultaneously, an alert message can be sent to the vehicle owner through a

mobile application using GSM or IoT connectivity, ensuring immediate human intervention. An audible alarm can also be activated to notify nearby people for quicker rescue.

This methodology consists of a simple device which makes use of the CO₂ sensor which makes easy to detect, when a person or child accidentally locked inside the vehicle is suffocating. The sensor gives the signal to Arduino UNO chip. Arduino consists of ATmega328P microcontroller. Arduino sends signal to the microcontroller. Once the microcontroller receives the signal from Arduino, it slides the window. The exhaust fan allows fresh air into the car cabin. The child who is locked inside can get the supply of O₂, the child can be saved. The charging of this rescue device can be done easily from solar panel. Solar Panel uses sunlight as a source of energy to generate direct current electricity. This direct current is supplied to the power supply pin of the Arduino UNO. This external battery can save the fuel of car.



The proposed work can also be used in the places where there is a chance for O₂ suffocation like mines and sanitation works. An oxygen cylinder with O₂ sensor is placed near the work place. Whenever the sensor senses less O₂ level it sends the signal to arduino board. The microcontroller opens the regulator valve of the cylinder and supplies O₂, hence saves the lives of workers.



V.Kavya Sri
III B.TECH
23021A0250

Satellite Internet in India-The Future of Internet Above Us

Introduction

India is one of the fastest-growing digital nations in the world, with internet connectivity playing a crucial role in its progress. This momentum is reflected in the staggering 1,002.85 million internet subscribers reported during April-June 2025, highlighting the scale and impact of India's digital revolution. However, internet penetration remains limited in certain regions of the country, underscoring the need for satellite internet to complement existing networks.

What is Satellite Internet

Satellite internet provides connectivity using satellites in Geostationary (GSO) and Non-Geostationary Orbits (NGSO). It supports the Digital India vision by delivering internet access directly from space to any location. This makes it especially valuable for remote, hilly, border, and island regions where terrestrial networks are difficult or costly to deploy.



Source: <https://getgravity.nz/>

India's Regulatory Landscape for Satellite Internet TRAI

TRAI recommends policies for spectrum allocation for satellite communication services. It promotes efficient spectrum use through flexible, time-bound licensing with possible extensions. This approach supports fair competition and sustainable growth of satellite internet services.

IN-SPACe (Indian National Space Promotion & Authorization Centre)

IN-SPACe is the nodal agency enabling private participation in India's space sector. It authorizes and supervises Non-Government Entities and facilitates access to ISRO's infrastructure and satellite resources. Acting as a bridge between government and industry, it supports the expansion of space-based broadband connectivity.

NSIL (New Space India Limited)

NSIL is the commercial arm of ISRO and is responsible for delivering space-based services to users. It operates multiple communication satellites and supports broadband, broadcasting, and connectivity services across India, including remote and strategic regions.

ISRO (Indian Space Research Organisation)

ISRO develops and maintains India's satellite infrastructure, including communication satellites that form the backbone of space-based connectivity. It collaborates with IN-SPACe and NSIL to support both government and commercial satellite internet initiatives.

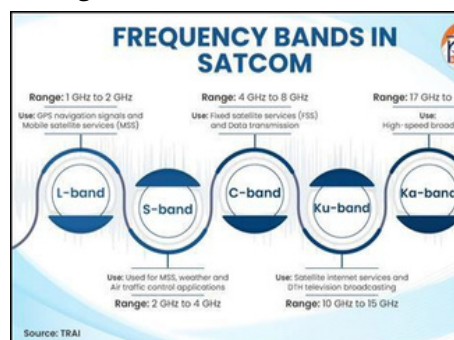
Role of NSIL in Satellite Communications

NSIL plays a key role in meeting India's satellite communication needs through demand-driven missions and operational services. GSAT-N1 (GSAT-24) supports

Direct-To-Home (DTH) services and is already operational. GSAT-N2 (GSAT-20) is designed for broadband connectivity and is

Understanding the Satellite Communication Spectrum

In satellite communications, frequency bands serve as the essential channels through which voice, data, and broadband signals are transmitted between Earth and space. The popular frequency bands used for providing satellite communication services are:



<https://static.pib.gov.in/WriteReadData/userfiles/image/image00800XG.jpg>

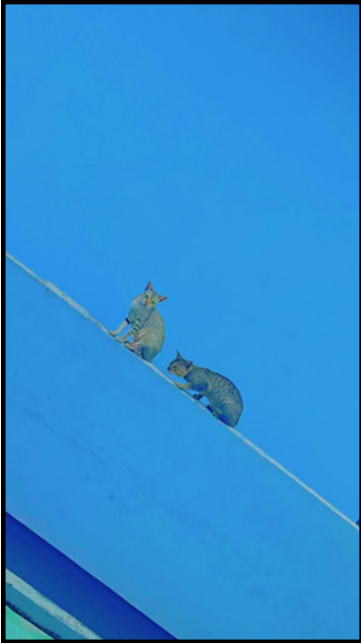
Shift to LEO/MEO-based Satellite Internet Services

Driven by the need for lower latency, higher bandwidth, and reliable coverage in remote areas, India is shifting from GEO satellites to LEO and MEO systems. This transition will enable faster and more dependable internet connectivity across the country.

Marking a major step in strengthening the nation's digital connectivity landscape, Starlink Satellite Communications Pvt. Ltd. (SSCPL) in June 2025 received a license to launch satellite internet services in India. Prior to it, Jio Satellite Communication Limited and OneWeb India Communications Private Limited have been granted license for providing such services. As of April 2025, more than 10 satellite operators have shown interest and applied for authorization to provide satellite capacity in India.

DARSI. NIVAS
25021D5203
I M. TECH PED

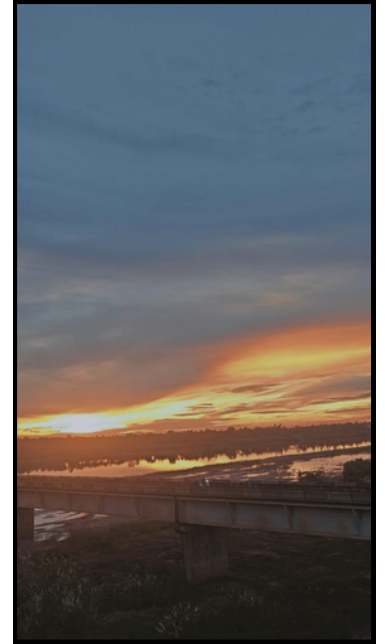
PHOTOGRAPHY



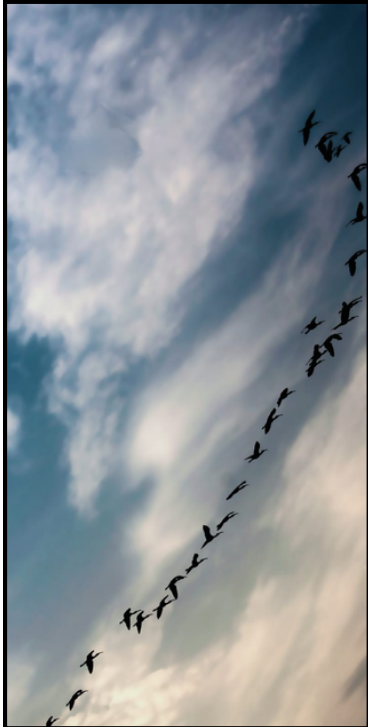
**PERIKELA PRIYANKA
I B.TECH**



**JADA MIST
II B.TECH**



**V. BHASKARA RAO
I B.TECH**



**KARRI PREM KUMAR
II B.TECH**



**S.R.NAGESH NAIK
II B.TECH**

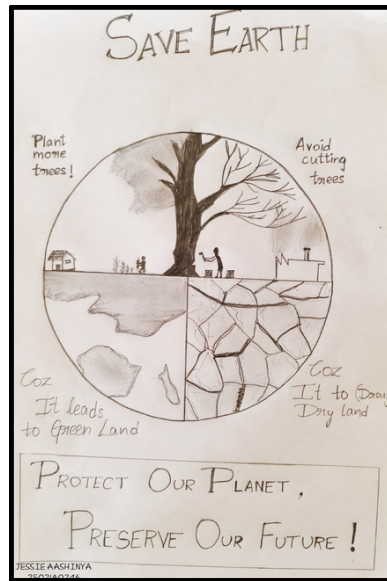


**NAMALA PRANEETH
II B.TECH**

ARTS AND CULTURALS



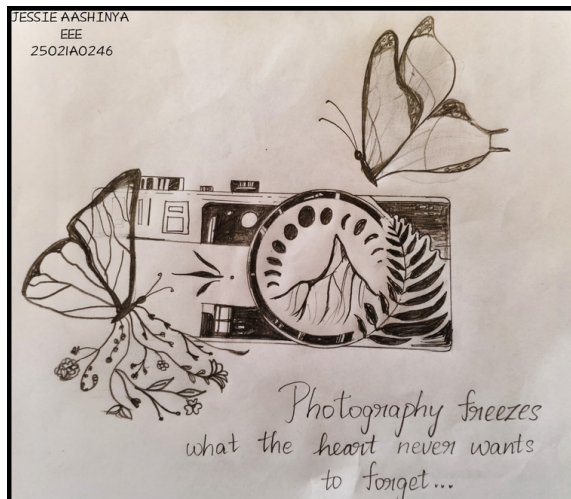
BASA KARTHIKEYA SAI
I B.TECH



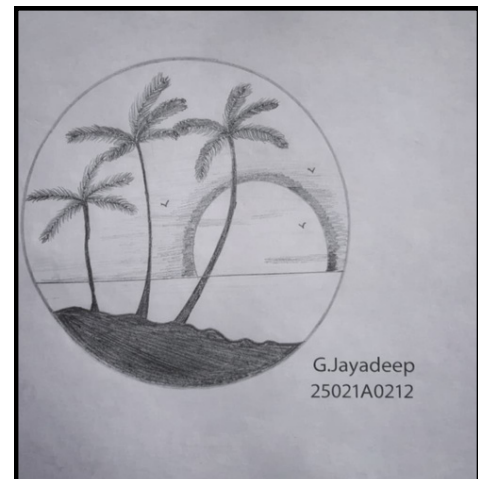
JESSIE AASHINYA
I B.TECH



K. HEMALATHA
I B.TECH



JESSIE AASHINYA
I B.TECH



G.JAYDEEP
I B.TECH



PERIKELA PRIYANKA
I B.TECH



K.HANNAH
I B.TECH

Our Team,

Editor in Chief

Dr. K.Venkata Reddy
Professor & Head

Issue Editor

Dr. M. Nageswara Rao
Professor & Controller of
Examinations

Associate Editors

Smt. K.Vijaya Bhanu
Assistant Professor(C)

Smt. J.Jyothsna
Assistant Professor (C)

Dr.C.Naga Kota Reddy
Assistant Professor (C)

Student Members

I M.Tech

K. Lakshmi Varshitha - HVE
Y. Aravind - AEPS
D. Nivas - PED

IV B.Tech

Ms. B. Thulasi
Mr. R.D. Pavan Kumar

III B.Tech

Ms. P. Harika
Mr. Pardha Praneeth. P
Mr. M. Yashwanth Surya
Mr. G.Gnanendra

II B.Tech

Mr. J.Mist
Mr. N.Praneeth

I B.Tech

Mr. E. Gnana Aniruddha
Ms. B. Priya Varshini

Contact Details:

Editor in Chief

Department of Electrical & Electronics Engineering.

University College of Engineering Kakinada.

Kakinada-533003, Andhra Pradesh.

Mail.Id: thespark@jntucek.ac.in