ERODE SENGUNTHAR ENGINEERING COLLEGE

(AN AUTONOMOUS INSTITUTION)

Approved by AICTE, New Delhi, Permanently Affiliated to Anna University- Chennai, Accredited by National Board of Accreditation (NBA), New Delhi & National Assessment and Accreditation Council (NAAC), Bangalore with 'A' Grade PERUNDURAI-638 057, TAMILNADU, INDIA.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Smart Breakage Detection with Auto-Power Cut System for Local Transmission Lines

Electroff System

TEAM MEMBERS

Bharanidharan R

Deepitha M

Esakiganeshan R

Jayashree M

MENTOR

Mr.S.Gladson AP/ECE

PROBLEM STATEMENT

- Power distribution networks, especially in urban and semi-urban areas, face frequent hazards such as wire breakages, fallen poles, and abnormal current conditions. These faults pose serious risks including electrocution, fire hazards, prolonged power outages, and delays in maintenance response. Traditional monitoring methods rely heavily on manual inspection or delayed reporting, leading to increased downtime, safety hazards, and reduced reliability of the electricity supply.

- There is a critical need for an automated, real-time monitoring and auto power cut off power line safety system that can detect faults immediately, isolate the affected line safely, and notify maintenance teams promptly. Such a system must also ensure continuous monitoring even during power outages and provide actionable information to electricity board staff to improve response time and reduce hazards.

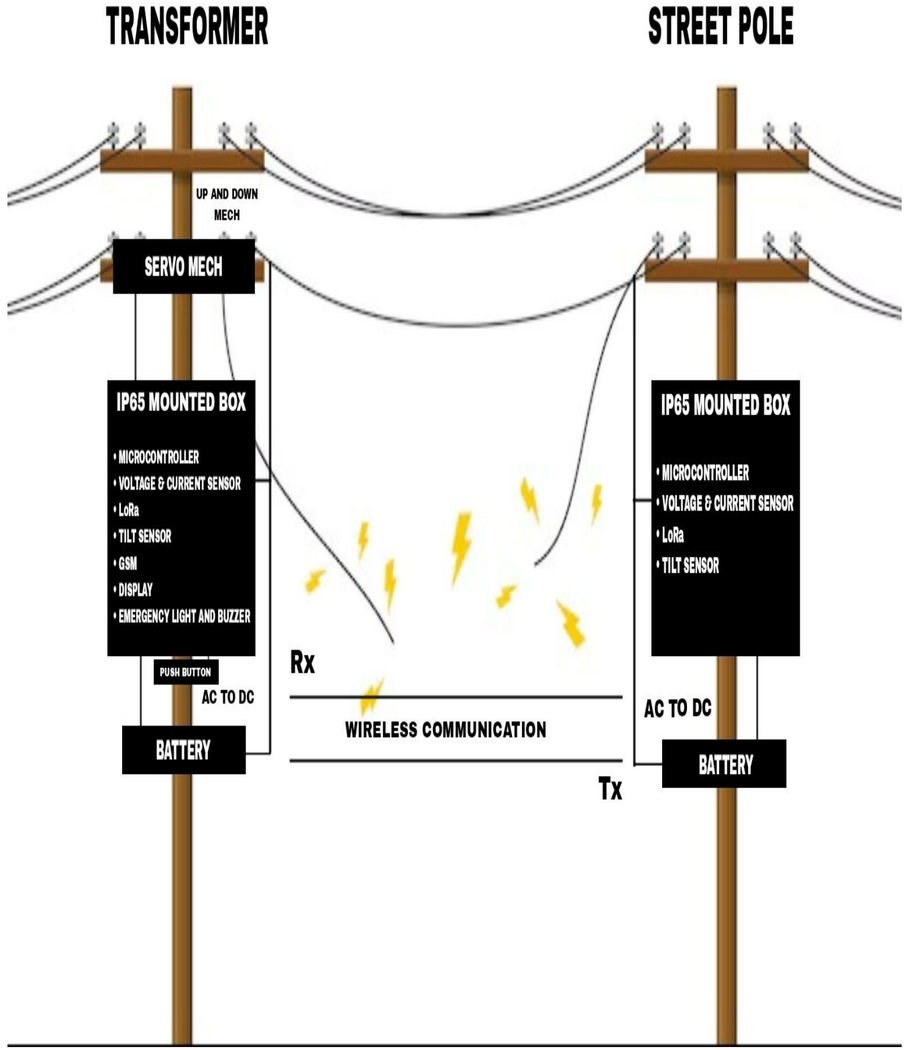
SOLUTION

Proposed Solution :

- It finds a break in the wire between the poles and sometimes the pole will fall due to disaster. Once detected, it automatically shutdown the power in that section and immediately sends an SMS to the EB using Edge level processing for quick action.

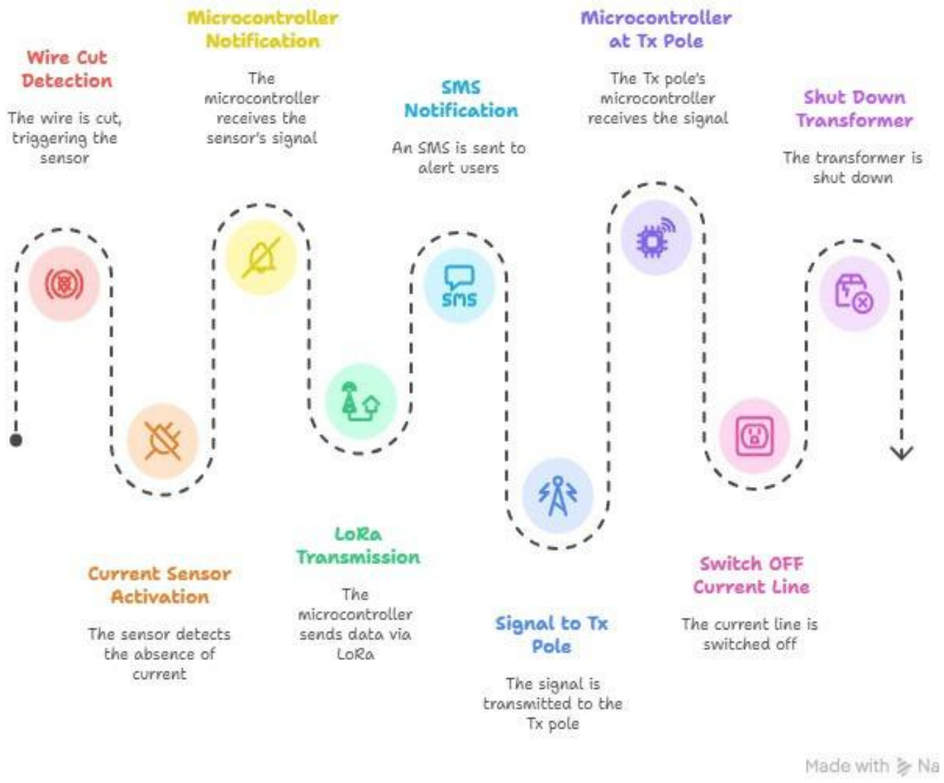
Working :

- Assume the transformer as the Receiver Pole (Rx) and the street pole as the Transmitter pole (Tx).
- If the wire is cut, the Current sensor at Tx detects no current and sends this to the microcontroller.
- The microcontroller sends signals through LoRa to the Rx pole(Transformer) , which then gives outputs.
- Outputs are: SMS alert, display on monitor, and MCCB to switch off the faulty line/Servo mech to cut the power line.
- Additionally, A tilt sensor detects pole fall, the microcontroller cuts current, and power backup is given by a rechargeable battery from the Output transformer line via AC to DC.

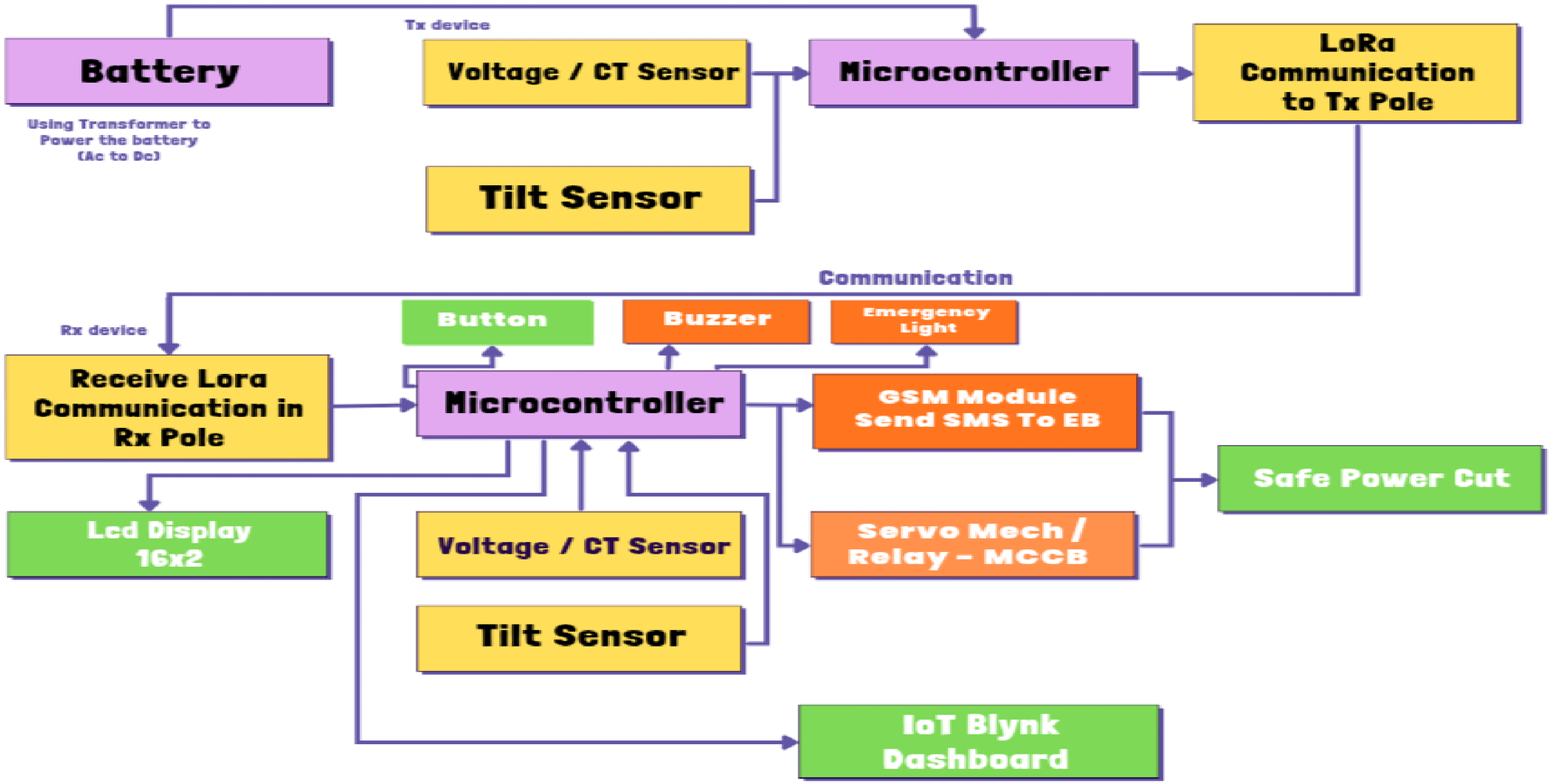


IMPLEMENTATION

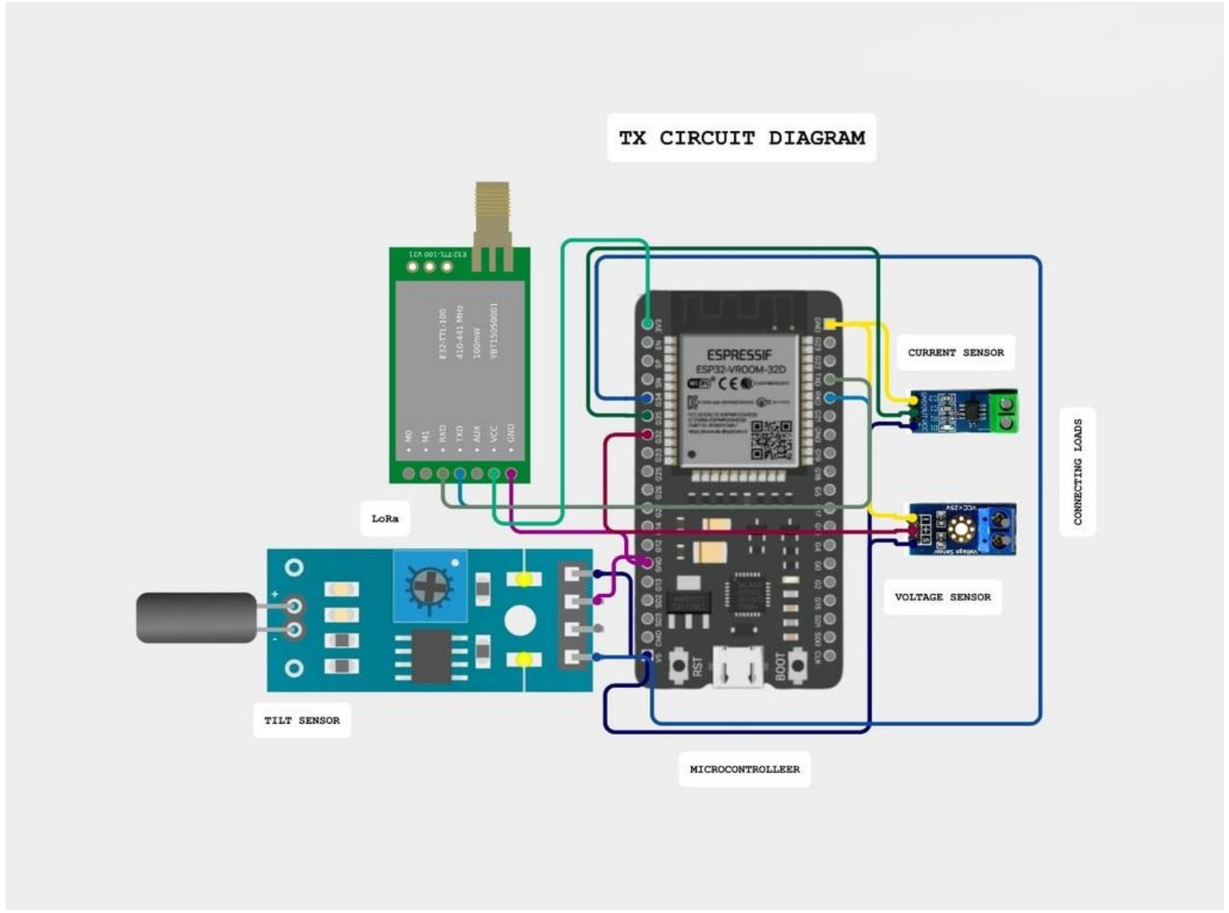
- At the TX pole, voltage, current, and tilt sensors are connected to the power line and pole.
- The sensor outputs are connected to the TX side microcontroller for continuous monitoring.
- The microcontroller processes the sensor data and sends it to the LoRa module.
- LoRa communication transmits the signal from the TX pole to the RX unit.
- The RX-side microcontroller receives and analyzes the transmitted signal.
- If a wire break, pole fall, or abnormal current condition is detected, the Servo mechanism or MCCB trips automatically to cut the power supply.
- A buzzer and emergency warning light are activated to indicate the fault condition locally.
- System status and fault information are displayed on the LCD screen.
- Continuous monitoring is carried out at the EB office using the IoT based Blynk dashboard.
- The GSM module sends SMS alerts to EB officials for immediate notification.
- A manual reset button is provided to restore the system after fault clearance.
- The microcontrollers are powered using rechargeable batteries.
- The batteries are charged through a regulated power supply connected to the local transformer.

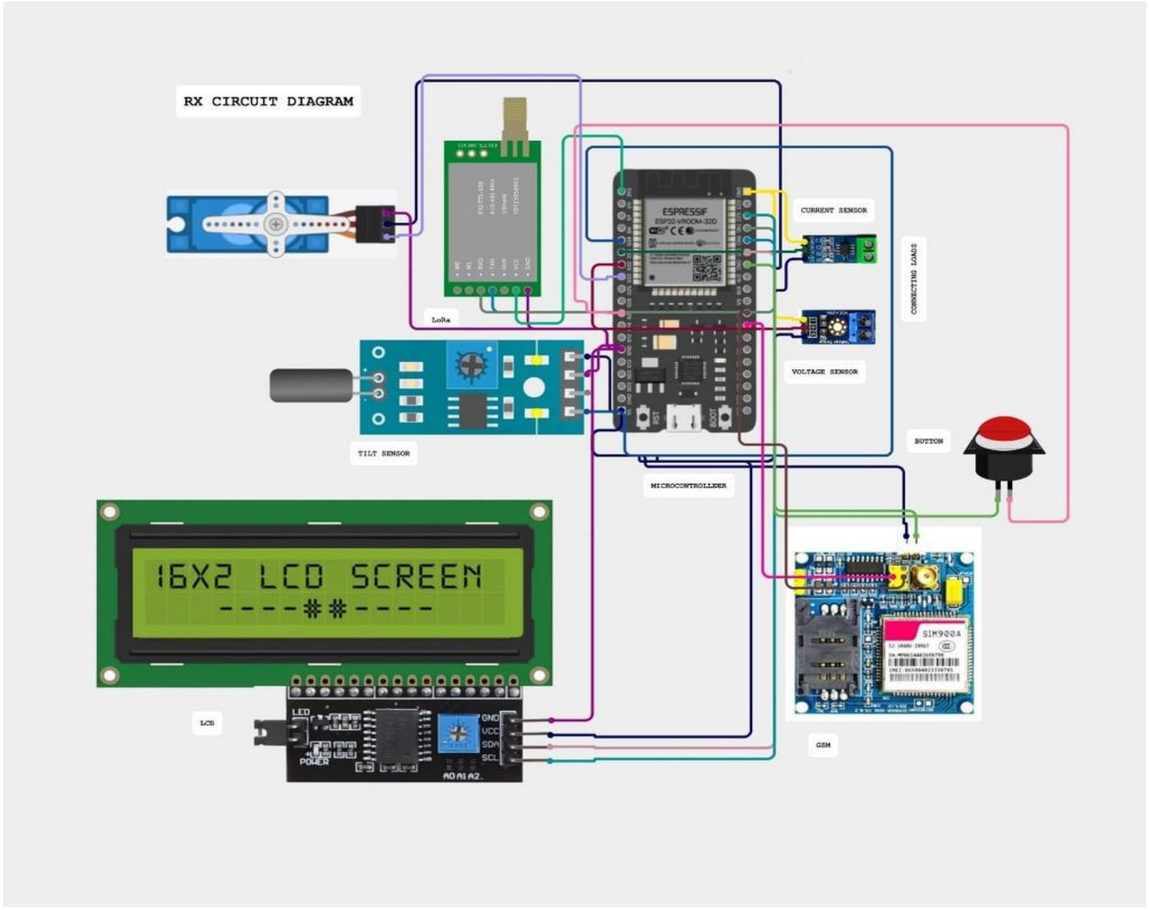


BLOCK DIAGRAM



SCHEMATIC DIAGRAM





FEATURES

- IoT based real time monitoring system.
- Retrofit design compatible with existing pole infrastructure.
- Automatic fault detection and power isolation.
- Instant EB alert through SMS and IoT dashboard.
- Scalable for urban, semi urban, and rural networks.

VALUE PROPOSITION

- Enhances public safety by preventing accidents caused by live wires.
- Reduces downtime and improves maintenance response time.
- Improves reliability of power distribution.
- Enables proactive fault management through real-time monitoring.

TECHNOLOGY USED

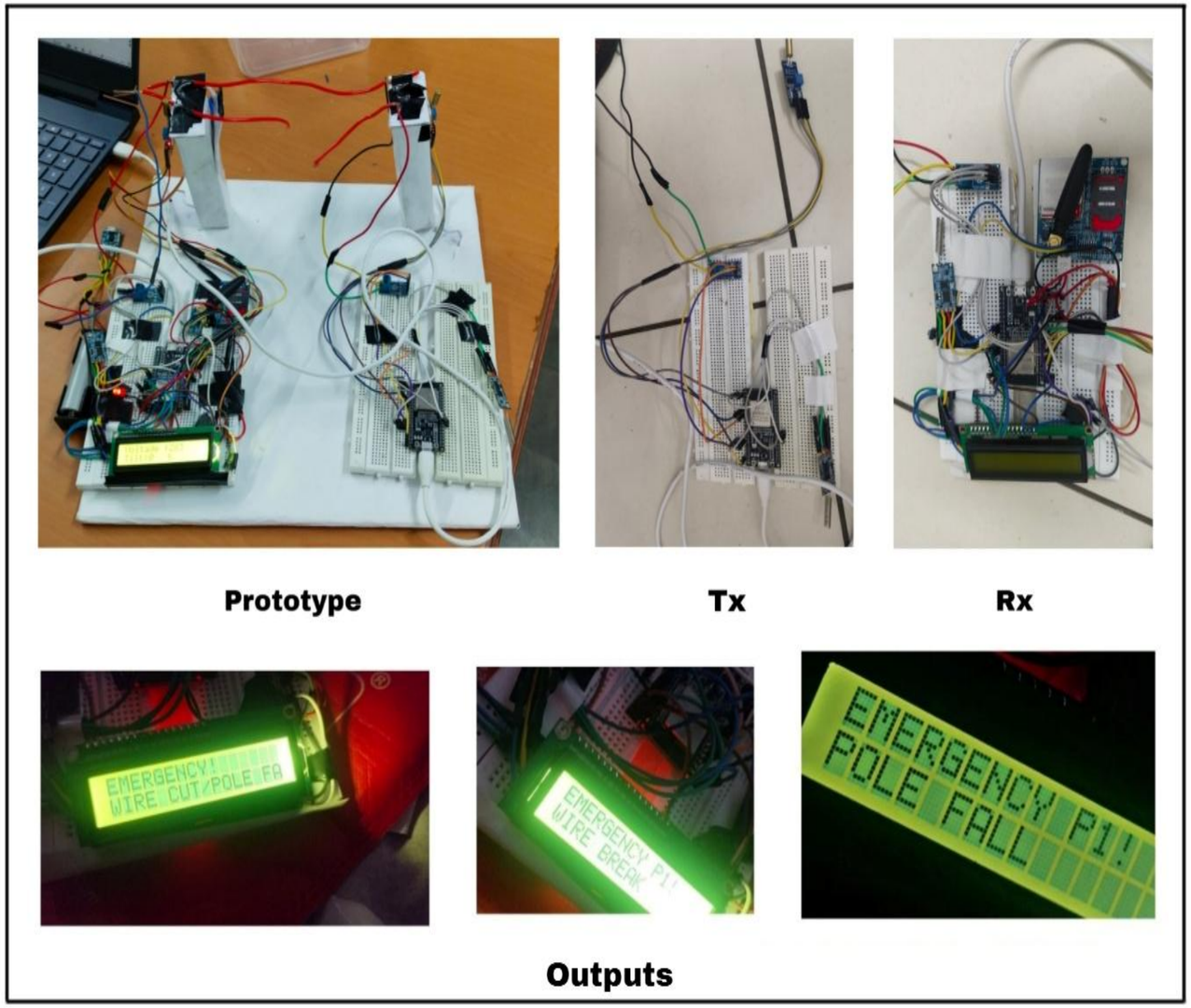
Hardware:

- CT sensors
- Voltage sensors
- Tilt sensor
- Microcontroller (ESP32)
- LoRa modules (Tx & Rx)
- Relay driver circuit
- MCCB
- Servomotor mechanism
- GSM
- Buzzer
- Display (16×2)
- Reset button (push)
- Rechargeable Battery

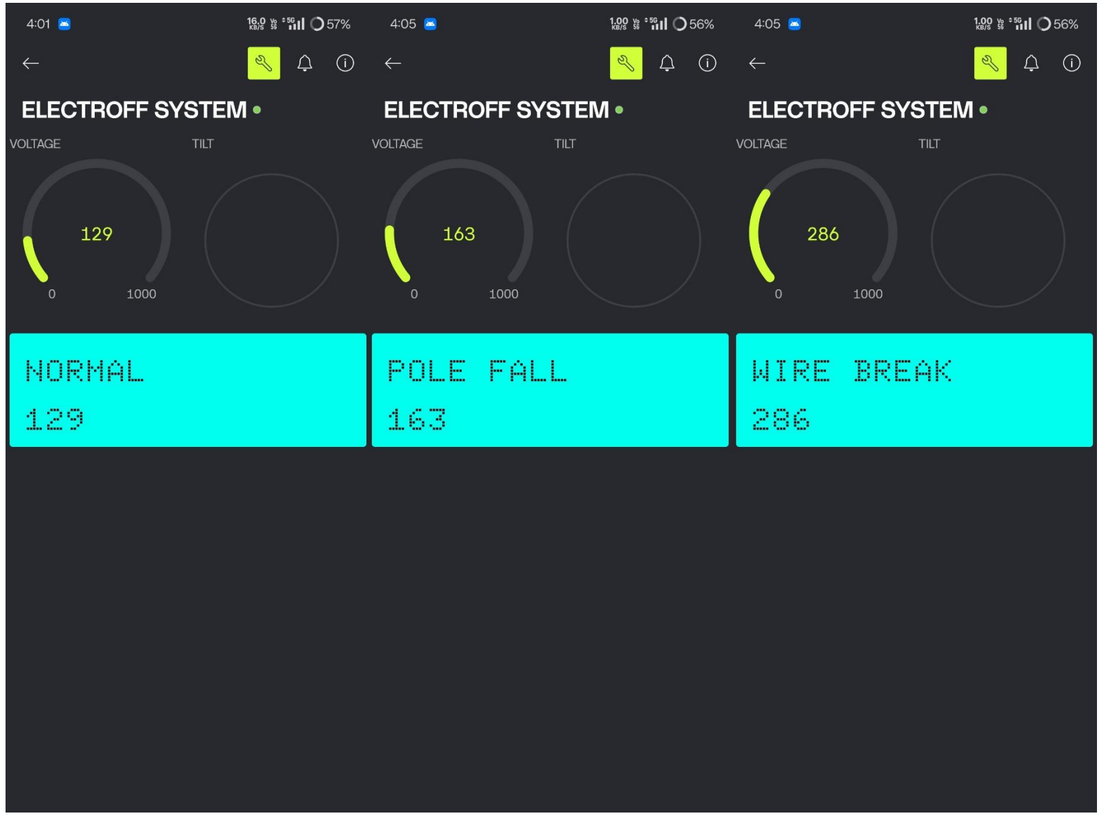
Software:

- Embedded C/C++
- SMS/IoT dashboard (Blynk) integration for EB alerts
- Edge processing for faster alert response

PROTOTYPE

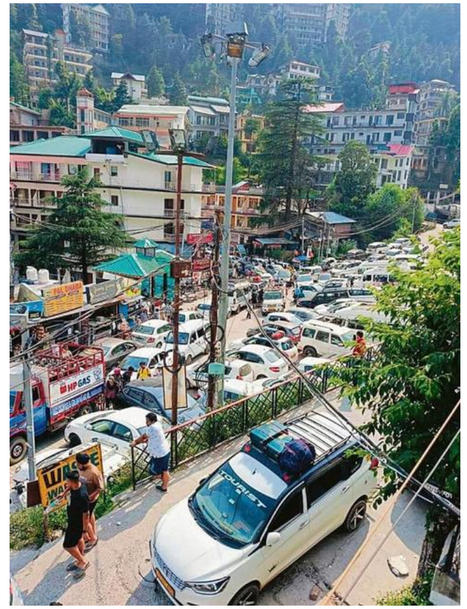


IOT BLYNK DASHBOARD:

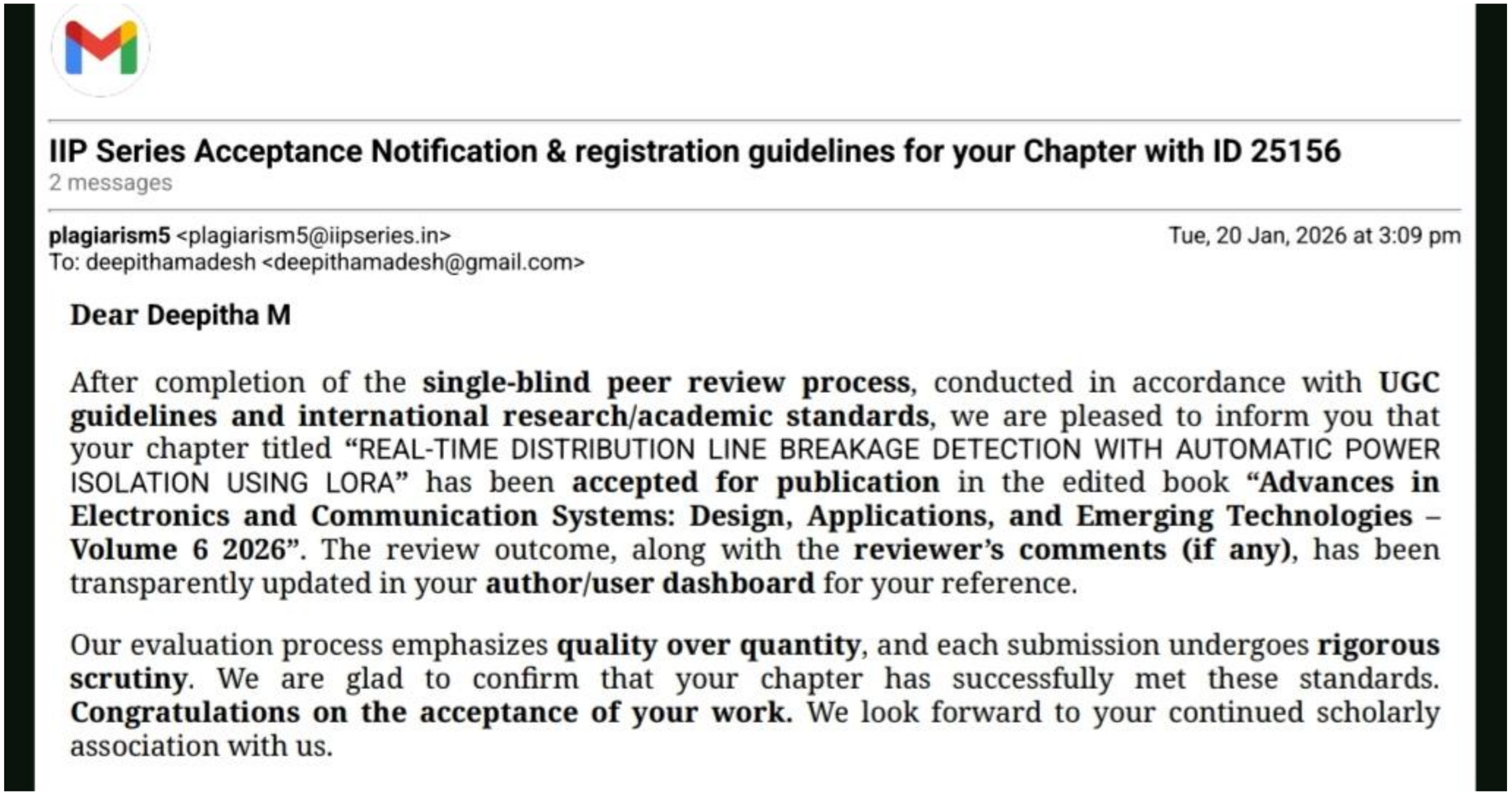


APPLICATIONS

- Urban Areas: Enables smart grid automation with real-time fault detection and fast power restoration.
- Semi-Urban Areas: Provides a low-cost remote monitoring solution, reducing manual inspection time.
- Rural Areas: Offers long-range LoRa communication for quick fault alerts in areas with limited connectivity.



This work has been peer reviewed and accepted for publication in the IIP Series edited book ‘Advances in Electronics and Communication Systems – Volume 6 (2026)’



IIP Series Acceptance Notification & registration guidelines for your Chapter with ID 25156

2 messages

plagiarism5 <plagiarism5@iipseries.in> Tue, 20 Jan, 2026 at 3:09 pm
To: deepithamadesh <deepithamadesh@gmail.com>

Dear Deepitha M

After completion of the **single-blind peer review process**, conducted in accordance with **UGC guidelines and international research/academic standards**, we are pleased to inform you that your chapter titled “REAL-TIME DISTRIBUTION LINE BREAKAGE DETECTION WITH AUTOMATIC POWER ISOLATION USING LORA” has been **accepted for publication** in the edited book **“Advances in Electronics and Communication Systems: Design, Applications, and Emerging Technologies – Volume 6 2026”**. The review outcome, along with the **reviewer’s comments (if any)**, has been transparently updated in your **author/user dashboard** for your reference.

Our evaluation process emphasizes **quality over quantity**, and each submission undergoes **rigorous scrutiny**. We are glad to confirm that your chapter has successfully met these standards. **Congratulations on the acceptance of your work.** We look forward to your continued scholarly association with us.

THANK YOU