

LoRaAssist: A Real-Time Fault Monitoring and Alert System for Electrical Linemen

G Saritha¹, M Ashwitha Ram², G Manasa³, CH Anusha⁴

¹Sr. Asst. Professor in Dept. of Electrical & Electronics Engineering

^{2,3,4}UG Student, Dept. of Electrical & Electronics Engineering

Christu Jyothi Institute of Technology & Science, Jangaon, Telangana, India

Abstract: *Electrical linemen are often exposed to hazardous conditions due to the lack of real-time fault detection and alert mechanisms. Traditional communication methods are either limited by range or involve significant delays. This paper presents LoRaAssist, a real-time fault monitoring and alert system specifically designed for electrical linemen. The system uses Arduino Uno microcontrollers and LoRa modules to establish a long-range, low-power wireless communication link between field equipment and monitoring units. Short-circuit faults are detected using a relay-based sensing mechanism, and immediate alerts are transmitted via LoRa to a remote display unit equipped with an LCD and keypad interface. This setup ensures that linemen are notified instantly of faults occurring in the electrical network, enhancing both safety and response time. Experimental results demonstrate reliable communication over significant distances with minimal power consumption, proving the effectiveness of LoRa technology for critical field operations. LoRaAssist provides a scalable and cost-effective solution for improving electrical maintenance practices in both urban and rural areas.*

Keywords: LoRa, Fault Monitoring, IoT, Electrical Safety, Arduino, Short Circuit Detection

