A Real Time Forest Fire Detection and Alerting System using LoRa Module

Ohol R. D[1], Saniya H. Kazi[2], Kanchan R. Kathe[3], Kavita B. Gaikwad[4]

Professor, Dept. of Electronics and Telecommunication[1]
Students, Dept. of Electronics and Telecommunication[2,3,4]
Amrutvahini Polytechnic, Sangamner, Ahilyanagar, India

Abstract: *The need for efficient fire detection systems is highlighted by the substantial threats that forest fires pose to both human lives and the ecosystem. Limited coverage, high false alarm rates, and delays in signal transmission are just a few of the problems traditional methods for detecting forest fires sometimes encounter. This research study suggests a unique strategy that uses longrange (LoRa) communication technology for forest fire detection to address these problems. LoRa allows for long-range, low-power wireless communication, making it appropriate for installation in sparsely populated, off-the-grid forest areas. This study investigates the development, application, and assessment of a LoRa-based forest fire detection system. The suggested system includes a network of sensor nodes outfitted with LoRa transceivers and fire detection sensors. The sensor nodes send real-time data to a centralized control center while continuously monitoring environmental variables like temperature, humidity, and smoke. Complex algorithms are used by the control center to analyses the data it receives and identify probable fire issues. When a fire is discovered, the system immediately creates notifications and sends them to the appropriate authorities and local communities. Numerous field tests were carried out in various forest settings to gauge the success of the suggested strategy. The outcomes show the system's capacity for precise fire detection, minimal false alarm rates, and quick response times. A viable option for early forest fire detection and prevention, the LoRa-based system also shown its benefits in terms of broad coverage, long-range communication, and energy economy. This study advances forest fire management systems by laying the groundwork for the creation of reliable, scalable, and affordable fire detection technologies that can lessen the devastation caused by forest fires. This research paper's main goal is to offer a thorough analysis of the development, use, and evaluation of a LoRa-based forest fire detection system.*

Keywords: Forest Fire, Detection, LoRa Module, Sensors

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DOI: 10.48175/568

ISSN
2581-9429
IJARSCT

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