RAJALAKSHMI ENGINEERING COLLEGE
An AUTONOMOUS Institution
Affiliated to ANNA UNIVERSITY, Chennai

25 years OF ACADEMIC EXCELLENCE

Department of Computer Science and Engineering

IOT BASED FOREST FIRE ALARM SYSTEM FOR EARLY DETECTION AND RESPONSE

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Introduction

Forest fires pose significant threats to ecosystems and human settlements. Traditional detection methods often delay response. This project introduces an IoT-based Forest Fire Detection and Alarm System. Utilizing low-cost sensors, it monitors temperature, humidity, and smoke levels in real-time. Machine learning algorithms enable early fire outbreak detection, while GPS provides precise location tracking. This solution offers continuous monitoring, early detection, and rapid alerts, revolutionizing forest fire management with a proactive approach to safeguarding valuable resources.

Problem Statement and Motivation

Forest fires cause extensive destruction, highlighting flaws in current detection methods like delayed visual detection and limited coverage. This IoT-Based Forest Fire Detection and Alarm System aims to address these issues with real-time data collection and machine learning for early fire condition detection. By providing continuous monitoring and rapid response through instant alerts, it enhances resource allocation in fire management. This system offers a scalable, cost-effective solution, protecting natural habitats and human communities, and revolutionizing forest fire detection and response.

Existing System

Existing forest fire detection systems like watchtowers, satellite monitoring, camera networks, aerial patrols, and weather stations face significant limitations. Watchtowers and patrols have limited coverage and human constraints. Satellite and camera systems struggle with resolution and weather issues, while weather stations lack forest specificity and predictive integration. These systems often lack real-time data and comprehensive coverage, leading to high costs and delayed responses. An innovative, integrated solution is needed for real-time monitoring, predictive analysis, and rapid alerts, offering cost-effective and scalable fire risk management.

Objectives

1. Early Detection and Real-time Monitoring
2. Data Collection, Analysis, and Predictive Modeling
3. Rapid Alert System and Precise Location Tracking
4. User-friendly Interface
5. Cost-effectiveness and Environmental Consideration

Abstract

This paper introduces an innovative IoT-based Forest Fire Alarm System for early detection and response. Utilizing low-cost sensors (temperature, humidity, smoke), the system collects real-time data via microcontrollers and transmits it to a central unit using low-power protocols. A cloud-based platform analyzes this data with machine learning algorithms, predicting fire outbreaks. Real-time monitoring is provided through a web dashboard and mobile app, with GPS for location tracking. An automated alert system notifies authorities immediately, enhancing scalability, performance, and rapid response in forest fire management.

Thank You