Chapter 20
Real-World Implementation of Cloud Computing New Technologies

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ABSTRACT

Smart cities are novel and difficult to study. Fires can kill people and destroy resources in cities near forests, farms, and open spaces. Sensor networks and UAVs are used to construct an early fire detection system to reduce fires. The suggested method uses sensors and IoT apps to monitor the surroundings. The suggested fire detection system includes UAVs, wireless sensors, and cloud computing. Image processing improves fire detection in the proposed system. Genuine detection is also improved by rules. Many current fire detection technologies are compared to the suggested system's simulation findings. The approach improves forest fire detection from 89 to 97%.

DOI: 10.4018/979-8-3693-0900-1.ch020

Table 1. Forest fire detection basics

Requirements	Specification	Reason
Prompt detection	Early detection	The prompt identification of fires and communication with the management system are both important.
Maximum Protection	Spectrum of Detection	utilising fewer sensors to monitor a larger region while also reducing overall energy consumption
Cost-effective	Notification	Warning warning distributed all over the world via email and text message Portable
Portable	Energy Usefulness	Reduced energy consumption will result in an increased lifespan for the system.

INTRODUCTION

Science is studying smart cities. This article prevents forest fires in cities. This project constructed an IoT, UAV, and image processing forest fire monitoring system. IoT devices monitor environmental indicators and analyse data to detect issues. The occurrence is confirmed via image processing. ICT, IoT, WSN, and computer automation increase urban living conditions in smart cities (Liang, L. L., et al. 2023). IT can manage transit, monitoring, and resource scheduling for cities. Smart cities may boost living standards and resource efficiency. Many governments run smart city pilot schemes to improve the environment and quality of life with smart technologies. ICT, IoT, and WSN generate intelligent apps.

To improve life, smart cities manage infrastructure and resources. In "smart cities," real-time data determines learning parameters. Smart cities use sensor internetworks and IoT for smart buildings, pollution assessment, traffic, water, public monitoring, and grid tracking.

A forests can host amphibians, birds, reptiles, etc. Forests cover 35% of the land. Forests grow from plantations and organic processes. Natural activities like fires deforest. People sometimes raise temperatures. Forest monitoring is costly and time-consuming. Forest fires threaten smart cities, the environment, economy, infrastructure, animals, and humanity worldwide. Indian forest fires are rising. In 2015, 15,937 forest fires occurred (Ozkan, O., et al. 2023) and 24,817 in 2016. The fire accelerates in a year.

Himachal Pradesh and Uttarakhand burned 17,502 acres in 2016. Human and animal extinction, ecological instability, and soil fertility loss result. Wildfires destroy ground microorganisms and nutrients and endanger neighbours. Forest fires are caused by combustible materials, environmental factors, and ignition. To protect wildlife, natural resources, and the environment, researchers have devised many forest fire prevention strategies. Wildfires are different from urban and agricultural fires and can originate for many reasons. Humans cause most wildfires. Global warming may cause forest fires. Forest conservation requires widespread public knowledge and firefighting. In Table 1, forest fire detection systems meet various standards.

The sensor-based fire detection system in Figure 1 is simple. Forest fire is shown in shot. The framework checks the snapshot and alarms for smoke or fire. Sensors, transmission channels, image processing methods, and an alert signal mechanism make up this image-processing system. The processing unit receives images from sensor nodes over a network. Fire detection and warning are done by the processing unit using RGB and YCbCr colour models. Cai Ye et al. Power supply uniformity is also ensured.