

## Smart Wireless Forest Fire Alerting System

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The forest coverage of over 30% of the Earth's land surface assists to balance the water cycle as well as the natural conversion of O<sub>2</sub> and CO<sub>2</sub>, which aids in organism respiration. Therefore, various research studies have paid attention to the prevention of deforestation. Deforestation is mostly caused by forest fires, which can occur naturally or as a result of human negligence. Since a forest fire can be started by a single lightning strike, preventing them before they start is deemed impossible. However, early discovery and response can lower the frequency of occurrence. The study proposes a Wireless Sensor Network with a smart sensor concept, which uses radio frequency communication as the communication technique and allows sensor nodes to connect with each other to verify the status of their neighbours. The base station or master node of the sensor network, which is located outside the forest cover, has been used to send out alerts using GSM technology. The communication network was built up with the help of HC-12 and NRF 24L01+ radio frequency transceivers, and the DHT-11 temperature and humidity sensors were utilized for detection. The accuracy was tested through different testing strategies with a prototype of a distributed single-sink wireless sensor network, and the results were evaluated. A comprehensive system with more components can be developed to expand the sensor network to cover a large forest area.

**Keywords:** *forest fire detection and alerting, wireless sensor networks, smart sensors, inter sensor communication, HC-12 communication, NRF24L01+ communication*