**wireless communication-Based smoke detection system design for forest fire monitoring**

**ABSTACT**

Forest Fires are one of the most important and prevalent type of disasters and they can create a great deal of Environmental Impacts due to which their early detection is very vital. The main need for choosing this particular application for the detection of forest fires is to overcome the demerits present in the existing technologies of MODIS and Basic Wireless Sensor Network-based Forest Fire Detection Systems and an advanced system is developed for the detection of forest fires. The two main modules present in the project are the Monitoring Area Module and the Forest Area Module. All these together are split into five sub-modules for step-by-step development and implementation. Those include Sensors’ Module, Serial Communication Module using Zigbee, Optimized Solar Energy Harvester using Maximum Power Point Tracking (MPPT), PC-based application.

The application demonstrates the gateway is reliable, compatible, and extendible. Because of this gateway the forest monitoring system realized the real-time, and improved the ability of monitoring the forest parameters.

**INTRODUCTION**

Forests are part of the important and indispensable resources for human survival and social development that protect the balance of the earth ecology. However, because of some uncontrolled anthropogenic activities and abnormal natural conditions, Forest Fires occur frequently. These fires are among the most serious disasters to forest resources and the human environment. In recent years, the frequency of forest fires has increased considerably due to climate changes, human activities and other factors. The prevention and monitoring of Forest Fires has become a global concern in Forest Fire prevention organizations. Currently, Forest Fire prevention methods largely consist of Patrols, Observation from watch towers, Satellite Monitoring (Fu et al.) and lately Wireless Sensor Networks (Han et al.). Although observation from watch towers is easy and feasible, it has several defects. In the first place, this method requires many financial and material resources and a trained labor force. Second, many problems with fire protection personnel abound, such as carelessness, absence from the post, inability for real-time monitoring and the limited area coverage.

The scope of application of Satellite Detection Systems is also restricted by a number of factors, which reduces its effectiveness in Forest Fire Detection. Due to the demerits in Satellite-based Detection Systems, Wireless Sensor Network Technology was used to detect Forest Fires and send the information to the computers in the Monitoring Centers. The collected data will be analyzed and managed by the Computer. Compared with the normal meteorological information and basic forest resource data, the system can make a quick assessment of a potential fire danger. The analytical results will then be sent to the relevant department as the policy-making basis by which the department will make the decision of firefighting or fire prevention.

**The Structure of the Forest Monitoring System**

This forest monitoring and control system is designed to solve the problem when there are huge forest areas. If each divided forest areas communicates with the remote server independently, the construction is big and the cost is high. So we need gateway to gathering data and send to the remote server unified. As shown in the Fig. the forest monitoring and control system is made up of the acquisition and control system in the forest, the gateway and the upper computer, and the ZigBee coordinator is a part of the gateway.

**Merits of proposed systems:**

1. Low cost
2. Easy of use
3. No manual monitoring
4. Fast updation of data
5. Can be monitored from remote place

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