

# 무선 센서 네트워크 기반 산불 감시 시스템 설계와 구현

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## A Design and Implementation of Forest Fire Surveillance System based on Wireless Sensor Networks

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### 요 약

Wireless Sensor Networks (WSNs) will be revolutionary applications such as environmental monitoring, home/factory automation, and logistics. Many wild fires, damaging valuable environment, occur in forest and mountain during the dry winter season. Current surveillance camera on the tower, infrared sensor system and satellite system. cannot support real-time surveillance, monitoring, and handling automatic alarm system. In this paper, we developed wireless sensor network based forest fire surveillance system design and implemented. The forest fire surveillance system (FFSS) consists of Wireless Sensor Networks, middleware and web application. WSNs measure temperature, humidity and detect smoke. The middleware program and web application analyze the collected data and information. If fire in forest occur, FFSS can detect smoke and give an early fire alarm in real-time.

Keyword: Wireless Sensor Networks, Surveillance System, Middleware, Minimum Cost path Forwarding

### 1. Introduction

Wireless sensor networks (WSNs) guarantee many new applications: environmental monitoring, home/factory automation, and logistics. This technology drives the emerging sensor networks applications, which is developed with the integration of digital circuitry. This integrated digital circuitry will be a small, cheap, autonomous sensor nodes. WSNs consist of small, low-power, and low-cost devices that integrated with limited computation, sensing, and radio communication capabilities. This technology has the potential to solve and give early alarm on many emergency situations[12].

Ubiquitous Sensor Network (USN) will be popular over the next ten years. The USN based sensing technologies for various applications have been growing, and new kinds of sensors have been developed with micro electro mechanical systems (MEMS) technology. A number of studies have been conducted on structural health monitoring for buildings and civil engineering structures in

recent years[3]. Some of these studies have focused on wireless sensing technology. The USNs evaluate and analyze the environmental information, such as temperature, humidity, sound, vibration, smoke as well as pictures of building and forest. The USNs based forest fire surveillance system (FFSS) will give the early alarm of fire in a forest using the analyzed environment information.

### 2. Motivation

Forest fires in Korea occur frequently in spring and fall seasons because they are drier than summer and winter seasons. The forest fire warning period of South Korea starts from 15th February to 15th May in spring season and 1st November to 15 December in fall season. Figure 1 shows the location of the fire during the fire seasons in Republic of Korea[8]. Table 1 also shows the number of fire occurs, area, and amount of damage by the forest fire during the period of 2000-2003.