

AN IOT APPROACH TO WILDFIRE DETECTION AND REMEDY WITH SENSOR NETWORK DEPLOYMENT

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ABSTRACT

Wildfires are expensive disasters in terms of both property loss and life safety. Wildfire often occurs in environmentally sensitive regions such as forest, park, and grassland area or along the urban-wildland interface. Environmental monitoring in such terrain must be environmentally appropriate, which requires easy installation, low maintenance, and relatively inexpensive instrumentation.

Our proposed project is a fully real-time implementable system that is capable of providing real-time remote wildfire monitoring and IoT based upload of fire accident to an online server. The work aimed at the design and implementation of a low cost but efficient and flexible wildfire monitoring and alert system using IoT technology. The implementation is based on SIM 800 based wireless cellular advanced IoT system for fire accident intimation. It is also interfaced with Atmega 328 P-PU for logical analysis. This makes the system much efficient to correctly analyze the fire and start the fire extinguisher pump to do the task. The deployed system uses few LM 35 Temperature sensors to detect the fire due to temperature rise. A mesh of sensors can be used for better accuracy. The project is a real-time deployable system which can easily detect, intimate and resolve fire.

Keywords: SIM 800, Atmega 328 P-PU, LM 35 etc

1. Introduction

Given that solely 10% of forest fires have a natural cause (lightning), it will be assumed that 90% of such fires square measure caused by inappropriate human behavior (discarding glowing cigaret butts, barbecue fires that aren't utterly destroyed etc.). fire risk sometimes happens throughout and when winters with very little snow, when long periods of dry weather and through summer heat waves, and particularly if such conditions coincide with sturdy winds (e.g. foehn). of these factors will severely dehydrate trees,

shrubs and also the forest floor. Forest fires in the European nation most frequently have an effect on tiny areas. Besides the valleys that square measure frequently exposed to the current of air, the primarily vulnerable regions square measure Valais, Graubünden and Swiss canton. Folks square measure rarely vulnerable by forest fires as a result of Swiss legislation prohibits the development of housing in forests. The fire risk indicates the likelihood of a fire occurring. It will be exacerbated e.g. by folks participating in leisure activities, in order that action must be taken notwithstanding the danger of a fire is low. Nine of the thirty-nine trekkers died in a very large fire in southern Tamil Nadu on Sunday have died of burns. Thirty folks, principally students, are saved and brought to the hospital. Indian Air Force helicopters square measure sorting out additional stranded trekkers. the hearth poor come in the Kurangini hills in Theni district, once a bunch of twenty-five ladies and 3 kids was arriving from a trek unionized by the city Trekking Club to mark Women's Day. On their manner back on Sunday, the cluster died on a hill, encircled by the fireplace. Several jumped on the boulders below to flee the blaze. A video taken from the hills before sunset on Sunday shows worrying visuals of some ladies lying down, unable to maneuver, indicating burn injuries.



Fig.1 – Forest Fire: A Tragic Incidence

2. PREVIOUS WORK

According to Buratiet al. (2009), a wireless device network (WSN) is outlined as “a network of devices, denoted as nodes, which may sense the atmosphere and communicate the data gathered from the monitored field (e.g., a district or volume) through wireless links. The info is forwarded, presumably via multiple hops, to a sink (sometimes denoted as controller or monitor) which will use it regionally or is connected to different networks (e.g., the Internet) through a entree. The nodes is stationary or moving. They will bear in mind of their location or not. They will be homogenized or not”[1]. Fire detection and interference is another real downside face variety of states. Totally different ways for observation the emergence of fires are initiated. The first ways were supported manned observation towers however this method was inefficient and not entirely effective. Afterwards, camera police work systems and satellite imaging technologies were tried however this conjointly verified ineffective at having the ability to with efficiency monitor the initial begin of the forest fire.

As an example camera networks is put in in numerous positions within the forests however these offer solely line of sight photos and these is also stricken by weather and/or physical obstacles. Satellite pictures have verified a lot of economical than camera police work, wherever pictures gathered by 2 satellites, the advanced terribly high resolution radiometer (AVHRR), launched in 1998 and also the moderate resolution imaging

spectro-radiometer (MODIS), launched in 1999 are used [2]. Sadly, these satellites will offer pictures of the regions of the world each 2 days which is on time for fireplace scanning, besides the standard of Satellite pictures is stricken by the weather. The revolution of WSN technology in recent years has created its potential to use this technology with a possibility for early fire detection. These sensors got to be self-union associated follow an economical formula, interfaced with different technologies or Networks. Variety of studies have thought-about mistreatment WSN in wood fireplace systems. Doolin et al [3] experimented with ten sensors supplied with GPS device, to sense temperature, wetness pressure and send these information back to the sink. The matter with this technique is that the gap between sensors is just too so much (approximately 1km).

2.1 Existing System

Several systems has been tried and implemented for fire detection and extinguish but in smaller level like cinema halls, institutions and malls but implementation for a bigger network like forest of several kilometer radius is not yet implemented. Smoke sensor based system only activates when smoke is too dense which is not possible in open areas like forest. Till we know about fire many kilometers of areas gets burnt and animals/humans killed.

2.2 Drawbacks

- Slower Response
- Smaller Coverage Range
- Possible in smaller areas only
- Higher implementation overhead (Cost) because we need chain of wireless sensor network.

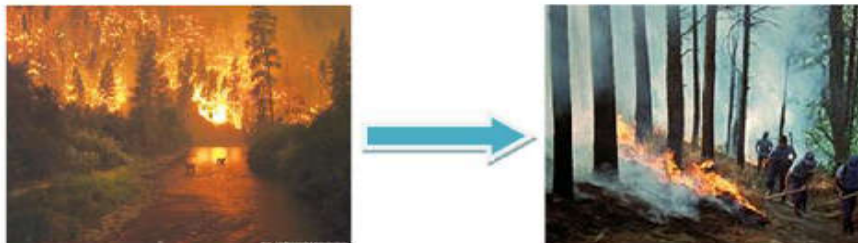
3. PROPOSED SYSTEM

3.1 IoT Based Wildfire Extinguisher System

In our proposed system Fire sensor (LM-35) is used which sends the signals to the microcontroller unit for proper processing and determination of the temperature rate. This is monitored in terms of buzzer sound and activates triggering an alarm and motor to pump the water. Till the fire person arrive at least fire should not cross the area where these sensors are deployed due to water continuously spread. Using IoT system it automatically updates the web server about the fire accident.

3.2 Sensor Based Identification

Our system is also equipped with laser type heart beat sensor for increased efficiency and accurate results. Whenever the system detects finger it starts to pass the laser through our veins and one photo resistor is present to detect the amount of light passing through veins. System is highly efficient and usable directly interfacing with microcontrollers.



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