LITERATURE SURVEY

Emerging methods of early detection of forest fires

INTRODUCTION

Forest ﬁre is one such disaster which when occurs at large scale

not only destroys the ﬂora, fauna, vegetation of the forest but also puts the life of

human being and animals at a very high risk. In the recent past years, managing this

type of crisis, viz., a large scale ﬁre has become a very difﬁcult and challenging

task. Things that are common in most of the forest ﬁre that occur at large scale are

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Fire detection at an early stage is important for the safety of the people. Lack of information due to manual

detection is the main cause of failure of fire detection. Fire can be detected by using smoke at an early stage as it is

the fire indicator. Generally automatic forest fire detection using image processing techniques represents one of the

significant aspects of forest fire avoidance earlier. Detection using image and video is effective than using sensors.

Literature Survey:

* **Cheng** (2011) proposed a fire detection system based on Neural Network; here neural network is used in detection information for temperature, Coconcentration, and smoke density to determine probability of three representative fire conditions. RBF neuron structure is used, the information regarding temperature, CO concentration, and smoke density are collected and data fusion is used to generate fire signal decision. The detectors have continuous analog outputs, when detection limit is exceeded the hardware circuit sends a local fire indication to fusion center, this force thesystem detectors to generate final decision. Single-sensor detector is used to generate the final decision[1]
* **Surapong Surit, Watchara Chatwiriya** proposed a method to detect fire by smoke detection in video. This approach is based on digital image processing approach with static and dynamic characteristic analysis.The proposed method is composed of following steps, the first is to detect the area of change in the current input frame in comparison with the background image, the second step is to locate regions of interest (ROIs) by connected component algorithm, the area of ROI is calculated by convex hull algorithm and segments the area of change from image, the third step is to calculate static and dynamic characteristics, using this result we decide whether the object detected is the smoke or not. The result shows that this method accurately detects fire smoke[2].
* **Owayjan, M., Freiha, G., Achkar, R., Abdo, E., and Mallah, S., “Firoxio** proposed that the Video cameras sensitive in visible spectrum based on smoke recognition during the day and fire flame recognition during the night, Infrared thermal imaging cameras based on detection of heat flux from the fire, IR spectrometer which identifies the spectral characteristics of smoke gases, and “Light detection and ranging” system which measures laser light backscattered by smoke particles. Infrared and laser-based systems have higher accuracy than the other systems [3].
* The most critical issue in a forest fire detection system is immediate response in order to minimize the scale of the disaster. This requires constant surveillance of the forest area. Current medium and large-scale fire surveillance systems do not accomplish timely detection due to low resolution and long period of scan. Therefore, there is a need for a scalable solution that can provide real-time fire detection with high accuracy. We believe that wireless sensor networks can potentially provide such solution. Recent advances in sensor networks support our belief that they make a promising framework for building near real time forest fire detection systems. Currently, sensing modules can sense a variety of phenomena including temperature, relative humidity, and smoke which are all helpful for fire detection systems [4]
* WSN comprising three various types of sensors which can distinguish temperature, fire and smoke levels of methane, carbon mon-oxide and carbon dioxide was additionally proposed for wild fire recognition .The information gained by sensors is transmitted utilizing radio recurrence module. The radio recurrence module used has limited bandwidth and also picks up noise easily[5]

* Meteorological data and images are parameters that change over space and time with relatively high frequency. The change of meteorological data could be recognized in hour scale, and the change of image data, taking into account only information connected to forest fires, in minute scale. Also for the forest fire prediction system, meteorological data history (archive values) is quite important. In order to monitor meteorological parameters and collect images in real time, the sensory network has to be established [6]

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