EMERGING METHODS FOR EARLY DETECTION OF FOREST FIRES

IDEATION PHASE

LITERATURE SURVEY

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TITLE	AUTHORS	JOURNAL AND YEAR	PROBLEM PROPOSED	CONCLUSION
Emerging methods for early detection of forest fires using unmanned aerial vehicles and LoRaWAN sensor networks	Georgi Hristov, Diyana Kinaneva, Plamen Zahariev, Jordan Raychev	2018 28th EAEEIE Annual Conference (EAEEIE)	In this paper they have discussed and presented two different emerging solutions for early detection of forest fires. The first solution involves the use of unmanned aerial vehicles (UAVs) with specialized cameras. The second is development of systems for early forest fire detection using LoRaWAN sensor networks.	Several different scenarios for the possible use of the drones for forest fire detection were presented and analysed, including a solution with the use of a combination between a fixed-wind and a rotary-wing UAVs. These are to be used in place of fire fighters.
An image processing technique for automatically detecting forest fire	Jerome Vicente, Philippe Guillemant	International Journal of Thermal Sciences Volume 41, Issue 12, December 2002	In this paper they presented an automatic system for early smoke source detection through the real time processing of landscape images.	They have identified that the more efficient data for smoke identification is the velocity distribution of smoke plumes, whose energy is higher than the energy of many other landscape phenomena and use this for fire detection

Forest Fire Detection System based on Wireless Sensor Network	Junguo ZHANG, Wenbin LI, Zhongxing YIN, Shengbo LIU, Xiaolin GUO	2009 4th IEEE Conference on Industrial Electronics and Applications, **Date of Conference:** 25-27 May 2009	The deficiencies of conventional forest fire detection on real time and monitoring accuracy was explored and wireless sensor network technique for forest fire detection was introduced, together with satellite monitoring, aerial patrolling and manual watching, an omni-bearing and stereoscopic air and ground forest-fire detection pattern was explored so that the decision for fire-extinguishing or fire prevention can be made rightly and real-timely by related government departments. A cluster-based wireless sensor network paradigm for forest fire real-time detection was put forward in this paper.	Compared with the traditional method of fire prevention, wireless sensor network technology has greater advantage, and there are broad prospects for application in the forest fires monitoring. The research on the application of wireless sensor networks in forest fires detection abroad is still in the laboratory stage, and China's research in this area is even less limited to the preliminary exploration of wireless sensor network node structure, topology, network security aspects , and the transmission characteristics of radio waves in forest study rarely.
An intelligent system for false alarm reduction in infrared forest-fire detection	B.C. Arrue; A. Ollero; J.R. Matinez de Dios	IEEE Intelligent Systems and their Applications (Volume: 15, Issue: 3, May-June 2000)	This paper proposes a system that combines computer vision tools, neural networks, and expert fuzzy rules to detect forest fires in open areas.	The study presented indicates a dramatic decrease in the false alarm rate maintaining the detection capabilities.
Using Popular Object Detection Methods for Real Time Forest Fire Detection	Shixiao Wu, Libing Zhang	11th International Symposium on Computational Intelligence and Design (ISCID) **Date of Conference:** 08-09 December 2018	In this paper, they focus on three problems that surrounded forest fire detection, real-time, early fire detection, and false detection.	They use classical objective detection methods like Faster R-CNN, YOLO and SSD to detect forest fire.

Image Processing Based Forest Fire Detection	Vipin V	ISSN 2250-2459, Volume 2, Issue 2, February 2012	In this research work a rule based colour model for forest fire pixel classification is proposed. The proposed colour model makes use of RGB colour space and YCbCr colour space.	The performance of the proposed algorithm is tested on two sets of images; one containing fire and the other with no- fire images. The proposed model achieves 99% flame detection rate and 14% false alarm rate.
Real-time forest fire detection with wireless sensor networks	Liyang Yu; Neng Wang; Xiaoqiao Meng	2005 International Conference on Wireless Communications, Networking and Mobile Computing **Date of conference:** 26-26 September 2005	In this paper, they proposed a wireless sensor network paradigm for real-time forest fire detection. The wireless sensor network can detect and forecast forest fire more promptly than the traditional satellite-based detection approach.	They used neural networks to prolong the lifetime of the sensor network. The simulation results show that our in-network processing approach is efficient to reduce communications between sensor nodes.
An intelligent real-time fire-detection method based on video processing	Thou-Ho Chen; Cheng-Liang Kao; Sju-Mo Chang	IEEE 37th Annual 2003 International Carnahan Conference on Security Technology. **Date of Conference**: 14-16 October 2003	In this paper, to achieve fully automatic surveillance of fires, an intelligent real-time fire detection method based on a 2-stage decision strategy of video processing is proposed. Two-stage decision strategy is utilized to verify a real fire and then to check if the fire will spread out.	The experimental results shows that the proposed method can achieve intelligent fire detection. For the general purpose of tire detection, this research will provide a cost-effective technique and it may be more attractive than others.
Forest fire detection system based on a ZigBee wireless sensor network	Junguo ZHANG, Wenbin LI, Ning HAN, Jiangming KAN	Springer 01 July 2008	This paper proposes a wireless sensor network paradigm based on a ZigBee technique. The proposed technique is in real time, given the exigencies of forest fires. The architecture of a wireless sensor network for	They have designed a ZigBee wireless sensor technology to monitor temperature and humidity in the forest in a more timely and precise way, and pointed out unique advantages of safety in data transmission, flexibility in building

			forest fire detection is described.	the network, and low cost of this system.
Advanced System for the Prevention and Early Detection of Forest Fires (ASPires)	Peter Peinl, Rossitza Goleva, Jugoslav Ackoski	35th Annual ACM Symposium on Applied Computing March 2020	This paper outlines design and prototypical implementation of ASPires, an open Advanced System for the Prevention and early detection of forest fires. It demonstrates the potential to reduce reaction times and thereby damage and costs by the use of novel sensor and mobile communication technologies.	ASPires is a prototypical system for the prevention and early de tection of forest fires. New technologies (sensor, camera, drone, wireless communication) allow to reduce detection times. Data were stored in a Cloud and were made available to civil protection authorities.