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Topic : **EMERGING METHODS ON EARLY DETECTION OF FOREST FIRES**

LITERATURE SURVEY:

S.NO	TITLE	AUTHOR	ABSTRACT
1.	Early detection of forest fire using unmanned aerial vehicles and lorawan sensors	Georgi Hristov, Jordan Raychev,	Forest fires are occurring throughout the year with an increasing intensity in the summer and autumn periods. These events are mainly caused by the actions of humans, but different nature and environmental phenomena, like lightning strikes or spontaneous combustion of dried leafs or sawdust, can also be credited for their occurrence. Regardless of the reasons for the ignition of the

			forest fires, they usually cause devastating damage to both nature and humans. Forest fires are also considered as a main contributor to the air pollution, due to the fact that during every fire huge amounts of gases and particle mater are released in the atmosphere. To fight forest fires, different solutions were employed throughout the years. They ware primary aimed at the early detection of the fires. The simplest of these solutions is the establishment of a network of observation posts - both cheap and easy to accomplish, but also time-consuming for the involved people. The constant evolution of the information and communication technologies has led to the introduction of a new generation of solutions for early detection and even prevention of forest fires. ICT-based networks of cameras and sensors and even satellite-based solutions were developed and

			used in the last decades. These solutions have greatly decreased the direct involvement of humans in the forest fire detection process, but have also proven to be expensive and hard to maintain. In this paper we will discuss and present two different emerging solutions for early detection of forest fires. The first of these solutions involves the use of unmanned aerial vehicles (UAVs) with specialized cameras. Several different scenarios for the possible use of the drones for forest fire detection will be presented and analysed, including a solution with the use of a combination between a fixed-wind and a rotary-wing UAVs.
2	Early detection of forest fire using mixed learning techniques and UAV.	Varanasi LVSKB Kasyap, [1] D. Sumathi, [1] Kumarraju Alluri	Over the last few decades, forest fires are increased due to deforestation and global warming. Many trees and animals in the forest are affected by

			forest fires. Technology can be efficiently utilized to solve this problem. Forest fire detection is inevitable for forest fire management. The purpose of this work is to propose deep learning techniques to predict forest fires, which would be cost-effective. The mixed learning technique is composed of YOLOv4 tiny and LiDAR techniques. Unmanned aerial vehicles (UAVs) are promising options to patrol the forest by making them fly over the region. The proposed model deployed on an onboard UAV has achieved 1.24 seconds of classification time with an accuracy of 91% and an F1 score of 0.91. The onboard CPU is able to make a 3D

			model of the forest fire region and can transmit the data in real time to the ground station. The proposed model is trained on both dense and rainforests in detecting and predicting the chances of fire. The proposed model outperforms the traditional methods such as Bayesian classifiers, random forest, and support vector machines.
3	**An intelligent system for false alarm reduction in infrared forest-fire detection**	B.C. Arrue; A. Ollero; J.R. Matinez de Dios	Forest fires cause many environmental disasters, creating economical and ecological damage as well as endangering people's lives. Heightened interest in automatic surveillance and early forest-fire detection has taken precedence over traditional human surveillance because the latter's

			subjectivity affects detection reliability, which is the main issue for forest-fire detection systems. In current systems, the process is tedious, and human operators must manually validate many false alarms. Our approach, the False Alarm Reduction system, proposes an alternative real-time infrared-visual system that overcomes this problem. The FAR system consists of applying new infrared-image processing techniques and artificial neural networks (ANNs), using additional information from meteorological sensors and from a geographical information database, taking advantage of the information

			redundancy from visual and infrared cameras through a matching process, and designing a fuzzy expert rule base to develop a decision function. Furthermore, the system provides the human operator with new software tools to verify alarms.
4	**A hybrid artificial intelligence approach using GIS-based neural-fuzzy inference system and particle swarm optimization for forest fire susceptibility modeling at a tropical area**	DieuTien Bui[a]Quang-ThanhBui[b]Quoc-PhiNguyen[c]BiswajeetPradhan[d]HalehNampak[d]Phan TrongTrinh[e]	This paper proposes and validates a novel hybrid artificial intelligent approach, named as Particle Swarm Optimized Neural Fuzzy (PSO-NF), for spatial modeling of tropical forest fire susceptibility. In the proposed approach, a Neural Fuzzy inference system (NF) was used to establish the forest fire model whereas Particle Swarm Optimization

			(PSO) was adopted to investigate the best values for the model parameters. Tropical forest at the province of Lam Dong (Central Highland of Vietnam) was used as a case study. For this purpose, historic forest fires and ten ignition factors (slope, aspect, elevation, land use, Normalized Difference Vegetation Index, distance to road, distance to residence area, temperature, wind speed, and rainfall) were collected from various sources to construct a GIS database, and then, the database was used to develop and validate the proposed model. The performance of the forest model was assessed using the Receiver Operating Characteristic curve, area

			under the curve (AUC), and several statistical measures. The results showed that the proposed model performs well, both on the training dataset (AUC = 0.932) and the validation dataset (AUC = 0.916). The usability of the proposed model was further assessed through comparisons with those derived from two benchmark state-of-the art machine learning methods, Random Forests (RF) and Support Vector Machine (SVM). Because the performance of the proposed model is better than the two benchmark models, we concluded that the PSO-NF model is a valid alternative tool that should be considered for

			tropical forest fire susceptibility modeling. The result in this study is useful for forest planning and management in forest fire prone areas.