Project id : PNT2022TMID38776

Team leader : G. Vishwanadhani

Team members : S. Chitra
R. Preetha
M. Sowmiya

Project title : Emerging Methods for Early Detection of Forest Fires

LITERATURE SURVEY

Paper 1:

Title : Emerging methods for early detection of forest fires using unmanned aerial vehicles and lorawan sensor networks.

Author : Hristov, Georgi and Raychev, Jordan and Kinaneva, Diyana and Zahariev, Plamen

Journal : EAEEIE Annual Conference

Year : September 2018

Methodology : LoRaWAN, sensor network

Scope : In this paper they have briefly presented two new methods for early forest fire detection, including part of their characteristics and main components. They have also analysed some of the benefits, which these methods can provide to the involved Bachelor, Master and PhD students. Both solutions are still under development, but they show great potential and work on their development and improvement will continue in the following years.

Paper 2:

Title : Early Forest Fire Detection Using Drones and Artificial Intelligence

Author : Diyana Kinaneva, Georgi Hristov, Jordan Raychev and Plamen Zahariev

Journal : Comput intell Neurosci

Year : 2019

Methodology : UAVs, artificial intelligence.

Scope : The system for early forest fire detection is still in its development stage. They thought that the system could enhance the available platforms for fire detection and they hope that such improvement could significantly reduce the damages caused by untimely or late fire detection.

Paper 3:

Title : A Review on Early Forest Fire Detection Systems Using Optical Remote Sensing

Author : Panagiotis Barmpoutis, Periklis Papaioannou, Kosmas Dimitropoulos and Nikos Grammalidis .

Journal : MDPI

Year : November 2020

Methodology : Multispectral imaging systems, terrestrial, aerial, artificial intelligence.

Scope : In this paper presents an overview of the optical remote sensing technologies used in early fire warning systems and provides an extensive survey on both flame and smoke detection algorithms employed by each technology. Three types of systems are identified, namely terrestrial, airborne, and spaceborne-based systems, while various models aiming to detect fire occurrences with high accuracy in challenging environments are studied.

Paper 4:

Title : Early Detection of Forest Fire Using Mixed Learning Techniques and UAV

Author : Varanasi LVSKB Kasyap, D. Sumathi, Kumarraju Alluri, Pradeep Reddy CH, Navod Thilakarathne, and R. Mahammad Shafi

Journal : Computational Ibtelligence and Neuroscience

year : 2022

Methodology : Autonomous Drone Routing, Fire Detection and Fire Region Prediction, 3D Modeling of Forest Fire,

Scope : The author aims in developing the 3D model for the captured scene. YOLOv4 tiny network is deployed to detect the fire. The accuracy of the detection rate achieved through this model is 91%. The proposed model outperforms the other existing techniques in terms of detecting in the early stage.The 3D modeling techniques presented in this paper can also be extended to various natural disaster prediction models.

Paper 5:

Title : Forest Fire Modeling and Early Detection using Wireless Sensor Networks

Author : Mohamed Hefeeda and Majid Bagher

Journal : Exeley

Year : 2020

Methodology : Wireless Sensor Networks, Forest Fire Modeling, Forest Fire Detection Systems, Coverage Protocols, k-Coverage Protocols, Fire Weather Index

Scope : The proposed fire alert system overcomes the need of a human intervention to continuously monitor the forest area. Monitoring and detecting is done by the sensors installed and message alerts are used to alert the required authorities. GPS module can be added to the nodes to get the exact location of fire or smoke

Paper 6:

Title	: Multi-hazard disaster studies:Monitoring,detection,recovery,and management based on emerging technologies and optimal techniques
Author	: Amina Khan, Sumeet Gupta, Sachin Kumar Gupta.
Journal	: Elsevier
Methodology	: satellite remote sensing, WSN, Mobile Ad hoc Network (MANET), IoT, Artificial Intelligence (AI), Fuzzy Logic, Unmanned Aerial Vehicle (UAV), Big Data Analytics (BDA)
Scope	: This paper give a systematic approach to various technologies for disaster monitoring , detection, prediction, and management. Identification and critical review of the recent techniques and technologies like WSN, IoT, NN, AI, UAV, RS, satellite imagery, etc. that are involved in providing a better solution for disaster monitoring, detection, and management have been made. The paper also describes the importance of various networks in monitoring disasters, specially landslide, forest.

Paper 7:

Title	: Early Forest Fire Detection System using Wireless Sensor Network and Deep Learning.
Author	: Wiame Benzekri1, Ali El Moussati, Omar Moussaoui. Mohammed Berrajaa4 LANOL
Year	: 2020
Journal	: International Journal of Advanced Computer Science and Applications.
Methodology	: Deep learning, RNN.
Scope	: This method is based on three steps: Estimate the general risk level of the forest, assess and predict in several places the existence or not of fires, and possibly surveyed the place declared to be burning with

the help of a UAV. The originality of this work lies in the use of a wireless sensor network distributed over the entire forest and the deep learning methods to predict in real time a possible start of the fire.