Literature Survey

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S.No	TITLE	PROPOSED WORK	TOOLS USED/ ALGORITHM	TECHNOLOGY	ADVANTAGES/ DISADVANTAGES
1.	A Survey on Forest Fire Detection	Fire detection at an early stage is important for the safety of the people. 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. In image processing the inputs for the fire detection may be an image or a video but the input as a video is quite complex process but provides good result. The techniques such as Wavelet decomposition, spatial and temporal analysis, Gaussian Mixture Model, Multi-Feature fusion detect fire in an accurate manner.	Wavelet Transform Wavelet and Color model Neural Network Covariance Descriptors	**DEEP LEARNING**	**ADVANTAGES** Neural Network produces accurate result as it uses temperature, smoke density and CO concentration. **DISADVANTAGES** The method works only well when the fire is clearly visible. If the fire is small and if it is far away from the camera or covered by dense smoke the method fails.

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2.	Autonomous Forest Fire Detection	The autonomous forest fire detection principle is based on temporal contrast differences with the natural background and spatial characteristics of the smoke plume. The images are obtained from multiple staring black and white video cameras installed on a small platform in a tower. To reduce the bandwidth of the needed communication link with the operational centre, all processing is performed locally at the tower. The detection algorithm sends alarm messages with the co-ordinates of the location of the fire automatically and on request images or system status are sent.	3CCD colour cameras B&W spatio temporal algorithm Binning Image Acquisition	**ARTIFICIAL INTELLIGENCE**	**ADVANTAGES** The autonomous forest fire detection system is capable of detecting quickly a relative small smoke plume with a low false alarm rate. Patrolling and manned watch towers have additional variable cost during to the period these detection methods are used. **DISADVANTAGES** One of the implications of this filter is that it has a delay time. The fire detection system will be mounted on towers which will have a lack of high bandwidth communication infrastructure.

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3.	Early Forest Fire Detection Using Drones and Artificial Intelligence	Forest fires have been and still are serious problem for many countries in the world. These solutions mainly aim to mitigate the damage caused by the fires, using methods for their early detection.Here we propose a platform that uses Unmanned Aerial Vehicles(UAVs), which constantly patrol over potentially threatened by fire areas. The UAVs also utilize the benefits from Artificial Intelligence (AI) and with on-board processing capabilities. This allows them to use computer vision methods for recognition and detection of smoke or fire,using the images or the video input from the drone cameras ie., fixed and rotary-wing drones.	Unmanned Aerial Vehicles(UAVs) Artificial intelligence Computer vision Drone	**ARTIFICIAL INTELLIGENCE** **MACHINE LEARNING** **DEEP LEARNING**	**ADVANTAGES** UAV-based approach can address all the limitations of the current approaches. viable detector of wildfire smoke in videos taken by UAVs both in terms of accuracy and speed **DISADVANTAGES** In case of thin smoke which is similar to the texture and color of clouds it ibecomes difficult to detect the forest fire.

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4.	A Deep Learning Powered Forest Fire Detection System	It is a well known fact that the sooner a wildfire is detected, the quicker it can be put out, which highlights the importance of early detection. By scanning the landscape using regular cameras and Deep Artificial Neural Networks, Bee2Fire searches for smoke columns above the horizon with a image classification approach. After these networks were trained, the system was deployed in the field, obtaining a sensitivity score between 74% and 93%, a specificity of more than 99% and a precision of around 82%.	Deep Learning Artificial Neural Networks PyTorch FastAI IBM Watson	**ARTIFICIAL INTELLIGENCE** **DEEP LEARNING**	**ADVANTAGES** The developed classifier used for open source methods (PyTorch / FastAI) and combined it with a publicly available classifier from IBM gave the results very positive **DISADVANTAGES** Although the first value may be considered on the low side, it is important to have in mind that even if one does not take into account the system's specification requirements, the problems that may come from this low value are offset by the nature of wildfires and the operation mode of the system.

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5.	Deep Convolutional Neural Networks for Forest Fire Detection	Both a full image and fine grained patch fire classifier in a joined deep convolutional neural networks (CNN). The fire detection is operated in a cascaded fashion, ie the full image is first tested by the global image-level classifier, if fire is detected, the fine grained patch classifier is followed to detect the precise location of fire patches.To facilitate the evaluation of various fire detectors in the community, we build a fire detection benchmark. According to our best knowledge, this is the first one with patch-level annotations.	Convolutional Neural Networks Unmanned Aerial Vehicles(UAVs) Computer Vision SVM classifier Binary Classification Model	**DEEP LEARNING** **CONVOLUTIONAL NEURAL NETWORK**	**ADVANTAGES** There is no redundant feature computation since both global and local classifiers share the same network for computing features. the computation of the deep feature patch classifier is even lower due to the low dimension of the high level features in CNN. **DISADVANTAGES** There is a lack of standard data in the computer vision community. Increasing the size of benchmark and making finer grained annotations was not possible.

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6.	A Lightweight Network for Forest Fire Detection and Recognition	Forest fire is becoming one of the most significant natural disasters at the expense of ecology and economy. Here we develop an effective SqueezeNet based asymmetric encoder-decoder U-shape architecture, Attention U-Net and SqueezeNet (ATT Squeeze U-Net),functions as an extractor of forest fire.We replace classical convolution layer by a depthwise one and engage a Channel Shuffle operation as a feature communicator in the Fire module of classical SqueezeNet. Then, this modified SqueezeNet is employed as a substitution of the encoder of Attention U-Net and a corresponding DeFire module designed is combined into the decoder. Finally, to classify true fire, we take use of a fragment of the encoder in ATT Squeeze U-Net. The experimental results of modified SqueezeNet integrated Attention U-Net show a competitive accuracy.	Attention U-Net SqueezeNet Fire module Light-weight network.	**CONVOLUTIONAL NEURAL NETWORK** **DEEP LEARNING**	**ADVANTAGES** This model takes attention mechanism to highlight useful features and suppress irrelevant contents by embedding Attention Gate (AG) units in the skip connection of U-shape structure. **DISADVANTAGES** Adds more weight parameters to the model, which can increase training time especially if the input data for the model are long sequences.

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