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Smoke and Fire Detection using Deep Learning: A Review

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Abstract: *The fire and smoke monitoring systems are useful in numerous industries like military, Social Security and economical. The recent methods for fire and smoke detection are used only motion and colour characteristics thus many wrong alarms are happening and this is often decrease the performance of the systems. During this study, we will observe the way we are able to divide the smoke columns with object detection and a deep learning-based approach and convolutional neural network (CNN) model for extracting smoke features and smoke detection. The colour, motion and disorder are useful characteristics in fire and smoke detection algorithm. Smoke of fireplace will blur the entire or a part of the photographs. Thus by processing of the frames, different objects will detect. Because of evaluate the features of objects, the goal objects (fire and smoke) will be defined easily. The results of the study have broad application prospects within the important military, social insurance, forest-fire alarm, commercial applications, and so on. preprocessing, feature extraction, and fire detection. Among, feature extraction is that the core part in algorithms. Traditional algorithm depends on the manual selection of fireplace whereas algorithms of deep learning, Convolutional Neural Networks (CNNs) like GAN, SS-GAN, DCGAN, DCNN, AlexNet, VGG, Bi-LSTM, Inception, ResNet, RetinaNet Faster R-CNN can automatically learn and extract complex image features effectively. These processes has many advantages like early fire detection, high accuracy, flexible system installation, and the capability to effectively detect fires in large spaces and complicated building structures.*

Keywords: Smoke detection, Fire detection, Wildfires, Deep learning, Convolutional neural network (CNN)

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