

EMERGING METHODS FOR EARLY DETECTION OF FOREST FIRE

ABSTRACT:

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Forest fires are a major environmental issue, creating economic and ecological damage while endangering human lives. It is difficult to predict and detect Forest Fire in a sparsely populated forest area and it is more difficult if the prediction is done using ground-based methods. As part of the early warning system, forest fire detection has a critical role in detecting fire in a forest area to prevent damage to forest ecosystems. In this case, the speed of the detection process is the most critical factor to support a fast response by the authorities. Thus, this article proposes a new framework for fire detection based on combining colour-motion-shape features with machine learning technology. The characteristics of the fire are not only red but also from their irregular shape and movement that tends to be constant at specific locations. These characteristics are represented by color probabilities in the segmentations stage, color histograms in the classification stage, and image moments in the verification stage. A frame-based evaluation and an intersection over union (IoU) ratio was applied to evaluate the proposed framework. Frame-based evaluation measures the performance in detecting fires. In contrast, the IoU ratio measures the performance in localizing the fires. Thus, the proposed method is suitable and reliable for integrating into the early warning system.