

ABSTRACT

Early detection of forest fires is vital to prevent extensive damage to forests. Smoke detection, facilitated by satellite sensors capturing thermal images, is a primary focus for early fire detection. Image processing techniques enhance image quality by eliminating noise, improving fire prediction accuracy. Preprocessed images undergo segmentation to isolate forest sub-areas for accurate detection of affected regions. Our proposed system employs a deep learning approach, utilizing Convolutional Neural Networks (CNNs) for forest fire detection. CNNs, with their convolutional layers, excel at capturing spatial patterns within images, enhancing detection accuracy. By training the CNN model on labeled datasets and evaluating its performance based on metrics such as precision and recall, we aim to predict forest fires effectively. Graphical representations of the model's performance provide insights into its accuracy and effectiveness in detecting forest fires across various scenarios. It is scalable and cost-effective, it collaborates with global networks for data sharing, featuring a user-friendly interface for efficient use by responders. This comprehensive approach aims to mitigate the impact of forest fires on ecosystems and human communities. This integrated system aims to bolster early warning systems, enabling prompt intervention to mitigate the devastating impact of forest fires on ecosystems and human communities.