Abstract

This research focuses on developing a fire detection algorithm using the 3D CNN method. The current fire suppression system relies on smoke detection, but it is not effective for outdoor use. Therefore, this study aims to address this limitation by leveraging deep learning techniques. The dataset used uses 124 videos categorized into three classes: negative videos without fire or smoke, smoke videos, and fire videos. The 3D CNN architecture is employed to detect fires in the videos. The 3D CNN method is specifically designed to analyze spatio-temporal features in video data, making it suitable for fire detection. The research conducts three experiments with different numbers of epochs: 15, 25, and 50. The accuracy of the trained models is evaluated for each experiment. The results show that by increasing the value of the epoch accuracy is increasing. The training model achieves 92% accuracy after 15 epochs, 93% accuracy after 25 epochs, and 100% accuracy after 50 epochs. By utilizing the 3D CNN approach, this research demonstrates the effectiveness of deep learning in fire detection. The findings suggest that increasing the number of epochs can enhance the model's accuracy, indicating the importance of longer training periods. The developed system has the potential to significantly improve fire detection capabilities, especially in outdoor environments where traditional smoke detection systems may fall short.