

Abstract

In this paper, we developed a fire detection system based on video using multi-feature fusion and support vector machine (SVM). Our multi-feature fusion-based system used an improved frame difference method and combination of Lab, YCbCr, and RGB color models to eliminate nonmoving and nonfire pixels in video. The fire characteristics features are determined by calculating the boundary disorder of the fire with convex hull, calculating the fire pixels in each frame to obtain fire area variability, and calculate centroid stability. The final process of fire detection is conducted by using an SVM classifier. For our experiment, we used 142 videos for training set and 19 videos for testing set. Each video has a variety of scenarios such as various video resolutions and FPS, the number of moving objects other than fire, environmental lighting conditions, angles, and video capture times. Our experiment result showed the average accuracy of the proposed system reached 86.61%.