

ABSTRACT

FIRE DETECTION USING IMAGE PROCESSING AND MACHINE LEARNING

The process of oxidation of any material in the exothermic process of combustion, releasing heat and light as byproducts, is called Fire. Fires are one of the main causes of death in the world. Although there are various fire detection systems most of them did not prove their effectiveness in detecting fires due to inefficiency or restrictions. For example, systems based on smoke sensors in detecting fires cannot be used in open areas because they are restricted to the existence of a ceiling or a wall. Besides that, having many flammable objects in open large areas, such as trees and fuel of car may interact with oxygen in the air which makes fire growth and expansion very fast. According to the prior stated facts, we present the project we worked on with the aim of implementing a more efficient and trustworthy fire detecting system.

The light parameter and the color of the flame helps in detecting fire. Fire detection using color information has many applications in computer vision and other domains. Our color model-based method used for fire detection has many advantages over conventional methods of smoke detection etc., such as simplicity, feasibility, and understandability. In order to enhance the performance parameters of fire flame detection based on a live video stream, we propose an effective color model-based method for fire detection. Each and every pixel is checked for the presence or absence of fire using color features, and periodic behavior in fire regions is also analyzed. Dynamic boundary check is also done to detect the edges of the fire Region of Interest (ROI). Candidate fire regions are detected using chromatic and dynamic measurements. This project is implemented using the Opencv module.

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