COMPUTER VISION BASED FIRE ALARMING SYSTEM

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Degree of Master of Science

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Thesis submitted in partial fulfillment of the requirements for the degree Master of Science

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DECLARATION

"I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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To

My Parents

ACKNOWLEDGEMENT

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ABSTRACT

Fire detection system is the most important component in the surveillance systems. It monitors the indoor environment and issues alarm as part of the early warning mechanism. The ultimate goal of Fire alarming system is to provide an alarm at early stage before the fire become uncontrolled.

Conventional fire detection systems are generally limited to indoor environment and have following drawbacks. They suffer from the transparent delay from the fire to the sensor. Further sensors are looking at a point and the fire may not affect that point. The reliability of the fire detection systems mainly depend on the positional distribution of the sensors. A video based fire detection system is able to detect fire by processing image sequence acquired from a video would overcome the above shortcomings. It also can be used in accordance with surveillance cameras for better performance. This type of detection system can provide high detection rate and low false alarm rate since they detect the combustion itself instead of its byproducts.

In this project, proposed a video based fire-alarming system to detect fire in a record room by processing the video data captured by an ordinary camera monitoring the scene. The proposed video based fire detection system uses adaptive background subtraction to detect foreground moving object and then verified by the rule based fire color model to determine whether the detected foreground object is a fire or not., YCbCr color space is used to model the fire pixel classification . In addition to the motion and colour the detected fire candidate regions are analyzed in temporal domain to detect the fire flicker. Some Morphological operations are used to enhance the features of detected fire candidate region. All of the above clues are combining to form the fire detection system. The performance of the proposed algorithm is tested on two sets of videos comprising the fire/fire colored object and, non-fire. The experimental results show that the proposed system is very successful in detecting fire and /or flames. This system detects fire within 3 to 30 sec. Use of a high-speed camera and compatible software would increase the detection time.

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