A Multi-Tiered Portable Wireless System for Monitoring Fire Environment

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ABSTRACT: Fire accident is getting worse for all these days which can be detected and predicted using openCV based on Image processing. Twlio methodology is used for communication with user.

Using image processing in fire detection isthe ability to serve large and open space . Camera will capture the image and it will send that image to controller for further evaluation. After fire is detected this system indicate the user for alert message.

KEYWORDS: Fire Detection; Flame sensor, USB web Camera; Image Processing, MotionDetection. Software-python ,Django framework.

1. INTRODUCTION

Image processing and computer vision has lot of applications in the field of security, biometric, safety systems, medical imaging to remote sensing, industrial inspection to document processing, and nanotechnology to multimedia databases, etc.,

In this method going to introduce how to avoid and control the fire accidents in major industries and factories and so on, Initially for this project using major Hardware components like camera for capturing an video and then use twiliofor communicate with user with call and alert message. The fire detection is more complicated. This problem can be overcome using computer vision based techniques which can detect accurately but not predict. The proposed fire detection algorithm consists of two main parts: fire color modeling and motion detection. The project is aimed at using surveillance cameras in order to detect and monitor the occurrence of fire. Since the cameras are already installed in places, this system is aimed at diminishing the disadvantages of false alarm, making the system cost effective and fast method of detecting fire.The system uses Open Source Computer Vision, also known as OpenCV, isan open source freeware which is aimed at computer vision.

II. SYSTEM REQUIREMENT

In this method mainly detects the fire through image processing, and then if there is any fire detected then it transfers the information to the user through Ethernet and also the video frames are also transferred by displaying the address in the LCD display.
First the project is divided into two parts,
- Detecting the fire through image processing
- Transferring the information through Twilio.

2.1 Image Processing
In this application image processing is used for analyzing and comparing the image of fire. The image of various parts of same fire images is stored under a common fire detail. When the comparison of shown image is not in available, then it recaptures the fire image.
In the image preprocessing the goal is to enhance the visual appearance of images and improve the manipulation of data sets. The input image can be converted into gray conversion and compare with the training dataset

and then tined the fire images and then but the system. It includes processes such as getting image as input, gray conversion, training the dataset and detecting the value of fire using the trained dataset.

The main Hardware/Software used are
- Ubuntu
- Opencv
- Python
- Django Framework

A) Ubuntu: Beagle board supports, Ubuntu, Angstrom, Win C and Android operating system. Ubuntu is one of the user friendly OS and it comes in two packages. The Ubuntu installed on Beagle board is light weight version which takes less memory.

B) Open CV: The proposed algorithm used computer visions to detect fire, to implement it the image processing libraries are required. MATLAB is one of the tool use to perform image processing operations, since Beagle board is an Open source hardware, hence Open CV Library software package is used which is as free and supports Beagle board.

C)   *Python:*   It is a general purpose, high level programming language. Few features of Python programming languages are Readability, Available libraries, Py Tables, balance between high and low level programming languages and Speed.

D) **Django framework:** Django is a Python-based free and open-source web framework, which follows the model-template-view architectural pattern. It is maintained by the Django Software Foundation, an independent organization established as a 501 non-profit. Django's primary goal is to ease the creation of complex, database-driven websites.

III. EXISTING SYSTEM

Nowadays, almost all the fire detection system uses sensors. The accuracy, reliability and positional distributions of the sensor determine the betterment of the system. For high precision fire detection systems, large numbers of sensors are needed in the case of outdoor applications. Sensors also need a frequent battery charge which is impossible in a large open space. Sensors detect fire if and only if it is close to fire. This will lead to damaging of sensor. Incase any sensor get damaged to give an false detection. The sensors are high rate of cost if any damage it required an high cost to rebuild.

FIG.1: Sensor

3.1 Disadvantages

- ➤ Time complexity
- ➤ Need more manual work
- ➤ There is no security
- ➤ Hardware or other sensors are needed to provide digitized system

IV. PROPOSED SYSTEM

Today, everything in the world is smart and digitalized. Many advances have been made in the fire control sector too. However, use an OpenCV module for an fast and efficient to prevent and detect an fire in image processing. And Twlio used for an contact the user. Twilio allows software developers programmatically to make and receive phone calls, send and receive text messages, and perform other communication functions using its web service APIs.
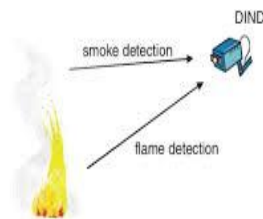

FIG.2. Camera detect the fire

4.1 Motion Detection

Motion detection method for fire is used to detect occurrence of any movement in a video. It is done by analyzing the difference in images of video frames. The most common approach used for motion detection is background subtraction which can identify any movement in the video frame.

4.2 Color Detection System

Normally the input is in RGB form, and then RGB form is converted to HSV form. Then the range representing HSV form of fire is applied to detect only fire characteristics. Fire in HSV form is then displayed. HSV color space is chosen purposely because it has ability to differ illumination information from chrominance more effectively than the other color spaces. Threshold values for the fire are loaded in to the system, as par the threshold values color detection system display result only if the fire is detected.
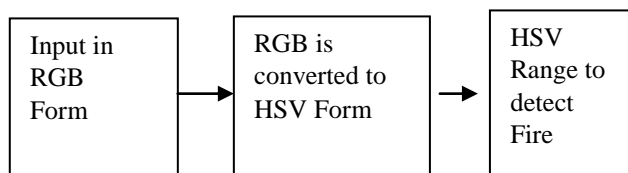

FIG.3. Color Detection method

4.3 Advantage

- ➤ User friendly system
- ➤ Automatically identify the fire and alert the user
- ➤ Improved security system based image recognition
- ➤ Reduce the complexity in terms of time and computational steps.

V. LIST OF MODULES

- Image Recognition
- Image segmentation

5.1 Image Recognition

There are several elements involved in recognizing the currency. They are as follows, Water mark. Fluorescence, Security, Micro lettering, Latent image and Optically variable ink, etc.

5.2 Image segmentation

It is the process of partitioning a digital image into multiple segments. Then it can be compared with the database for the currency identification.

VI. RESULT

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VII. CONCLUSION

In this method proposed a fire detection algorithm which is free from sensors as the ordinary fire detection systems contain. The objective of this project was to create a system which would be able to detect fire as early as possible from a live video feed. System is expected to detect fire while it is still small and has not grown to mammoth proportions. Also, the hardware is minimal and has been already existent in places, thus saving capital. It also saves cost by getting rid of expensive temperature and heat sensors etc. Based on the results produced, the system has proven to be effective at detecting fire.

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