FIRE ALERTING SYSTEM UNDER CCTV SURVEILLANCE

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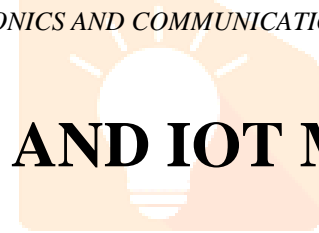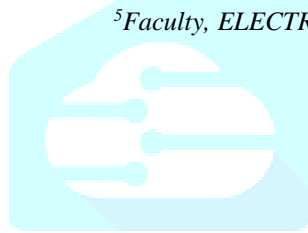[3]Student(4VM18EC067), ELECTRONICS AND COMMUNICATION ENGINEERING, VVIET, MYSORE, INDIA
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AND IOT MODULE

Abstract: Fire accidents are very common incident which takes 1000's life every year. Fire can be extinguished if we detect it in early stage without major damage and also evacuation of people can be done faster. This is especially important in schools and hospitals since kids and patients are hard to evacuate faster. Fire detection and alert system is done using live CCTV or any camera video. We use machine learning and image processing techniques to detect fire. The fire detection time of our project is approximately 30-50ms which is faster than all existing system like fire sensor. Hence we can identify fire quickly and evacuate or extinguish fire early. Growing technology came the tools like camera surveillance CCTV or is usually called. CCTV is used to monitor or oversee the rooms there is less supervision, so if there are such incidents spark can be rapidly anticipation before the spark of the fire spread and cause a fire. However, even though it has CCTV surveillance with no fixed rarely happen that the name fire. It will be based in the background by the lack supervision off. Even though we've been keeping an eye on a room with CCTV but if the officer's supervisors off guard and not immediate do anticipation when the anti-recorded by CCTV and thus are not denied the fire kept coming.

Keywords: Arduino UNO, Underground cable, fault, microcontroller, IOT, Cloud, LCD, reliability

I. INTRODUCTION

As we know in a company or industrial plants are very prone to fires, whose name occurs whether caused by man or machine error in production and even not rarely also caused short-circuit or shorted power. Typically, these fires occur in an area that is less oversight such as warehouse storage. Originally probably only happen a small spark of fire on the room, but due to the lack of supervision and the slowness anticipation that is done then the sparks that burn the entire contents of the room so that the fire is widespread.

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additional hardware, gives many opportunities to use software and networking, which helps this project to use in the future with other projects as well. The importance of the proposed thesis is to make a reliable, safe, and smart system to reduce limitations and faults like false alarms, which cause panic among the people and even the loss of money with the use of new technology. And make the places safe from the hazardous fire.

II LITERATURE SURVEY

The idea of Fire detection was first introduced by G. Sathyakala; V. Kirthika; B. Aishwarya ---Fire is something that burns giving out bright light, heat, and smoke. Fire can be dangerous and disastrous at times causing loss of people and property. In case of such fires, there is a need to detect it at the right time and act immediately. So, we are using computer vision technology to detect fire and send an alert to a remote fire station. This alert is not only sent as an emergency message but also a video is sent along with it, considering the room is under constant surveillance.

Design of an IOT approach for Security Surveillance system for Industrial process monitoring using Raspberry Pi D. Deepa; P Monica; V.S. Monisha; R. Mahalakshmi- The industrial environment presents unique fire protection and security challenges. The machinery used gases and the concentration of stored assets result in high risks. This system is capable of detecting fire and provides an alert to the workers. Raspberry Pi 3 has been used which is integrated with a couple of sensors and a camera. The system uses gas sensor to detect gas leakage, PIR sensor detects intrusion and the flame sensor detects fire. The sensors constantly sense and keep on transmitting values to the online web server over a Wi-Fi connection. If fire due to an intruder is detected, the camera captures the image and the system

System to detect fire under surveillanced area Jayashree; S. Pavithra; G. Vaishali; J. Vidhya--Fire usually causes serious hazards. Therefore, to prevent catastrophes that occur in industries, buildings, and forest areas, image based fire detection has become an important issue. Especially, if the combustion at initial stage could be detected immediately, the vandalism would be reduced to a greater extent. In this proposed system, first image prepossessing is done and segmented, which includes edge detection and threshold methods. Histogram of Oriented Gradient (HOG) algorithm and Gray Level Co-occurrence Matrix (GLCM) algorithm are used for extracting the features. Support Vector Machines (SVMs), an algorithm that is used for classification. After image processing section, detected fire level is given as input to the micro-controller unit and LCD displays the fire level like normal, mild or severe, and also a message will be sent to the concerned person. And if the fire level is mild or severe, then it is alerted by using a buzzer. Thus, the system reduces life loss and also provides detection of fire at the initial stage in several areas.

Development of fire alarm system using Raspberry pi and Arduino Uno--MD SAIFUDAULLAH BIN BIN BAHRUDIN AND ROSNI ABU KASSIM.The proposed Fire alarm system is a real-time monitoring system that detects the presence of smoke in the air due to fire and captures images via a camera installed inside a room when a fire occurs. The embedded systems used to develop this fire alarm system are Raspberry Pi and Arduino Uno. The key feature of the system is the ability to remotely send an alert when a fire is detected. When the presence of smoke is detected, the system will display an image of the room state in a web page. The system will need the user confirmation to report the event to the Firefighter using Short Message Service (SMS). The advantage of using this system is it will reduce the possibility of false alert reported to the Firefighter. The camera will only capture an image, so this system will consume a little storage and power.

Tian qiu ,youg yan,gang lu , paper titled as ― New Edge Detection Algorithm For Image Processing. Digital image processing is playing an increasingly important part in imaging based flame monitoring systems. A crucial step in flame image processing is to detect the flame edge, a dividing boundary between the area where there is thermo-chemical reaction and those without. The determination of flame edges is a precursor to flame image processing and measurement of flame parameters. Several known edge detection methods have been tested to identify flame edges but the results achieved are disappointing. As a result of recent work in feature analysis of flame images, a novel flame edge detection method has been developed, which can detect the flame edges effectively and efficiently.

2.1 Outcome of Literature Survey

After referring various literature surveys we conclude that There is a need for developing a specific system based on the type Fire detection under CCTV surveillance, in order to increase the efficiency of the system. Most of the surveys have dealt with web cameras which requires more storage device for continuous recording, using CCTV which already have a storage device and continuously detects helps in easy Fire Detection.

III PROBLEM STATEMENT

The fires occur in an area that is less oversight such as warehouse storage. Originally probably only happen a small spark of fire on the room, but due to the lack of supervision and the slowness anticipation that is done then the sparks that burn the entire contents of the room so that the fire is widespread. Fire may damage entire property and also the lives.

IV OBJECTIVES

- Design and build the fire alert system by using the CCTV surveillance.
- Build a system which detects the fire and alert the user by sending a message to mobile.
- To build a system to detect fire using image processing.
- To build a cost effective system.
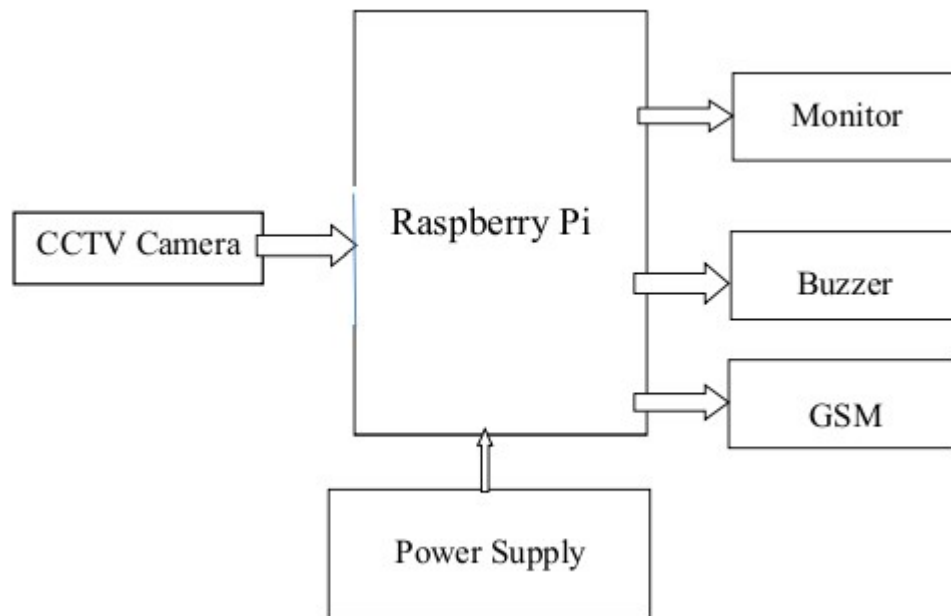- To build a system that is easy to manufacture.

V METHODOLOGY

Fig.5:Block Diagram

Here in fire detection, we are using the Haar Cascade classifier, which is very popular in object detection through the image or any other video feeds. The algorithm is also known as the Viola-Jones algorithm because Paul Viola and Michael Jones developed it. The algorithm to detect fire is based on the machine learning concept using the Haar-like features, which is combined with the cascade classifier. To create a cascade classifier, many images so-called positive and negative images were uploaded for training into the computer. Positive images refer to the pictures in which fire is included, and negative images are just the background images that mean those images, which doesn't contain a fire in the images. For this training, more than 150 images were uploaded in which 75% of the images were positive, and 30% were negatives. In order to train the cascade classifier, almost double the amount of negative images must be uploaded because the cascade classifier is based upon appearance-based methodology. After uploading of images, there are two stages in the algorithm for detecting fire one is the detection and another is training algorithm which is explained below with the steps included in it.

ADVANTAGES/DISADVANTAGES/APPLICATIONS

Advantages:
- System can detect the sparkles of the fire and alert the user's
- Low power consumption
- The system is low cost and affordable
- Can be used for alerting the user when fire catches
- No need of extra fire alert system to be install
- An extra system to the existing system.

Disadvantages:
- Fault alarm may cause during some unrecognizable picture detection.
- It is difficult to locate and repair the fault because fault is invisible.

Applications:
- Can be used in the farms and warehouse
- Can be used in the hospitals
- Can be used in goods manufacturing industries
- Can be used in the houses
- Can be used in the school

VI CONCLUSION

The project aimed to detect fire with a different approach rather than using an existing system. Currently, systems like a smoke detector and sprinkler water discharge systems are used, which are very useful and work at its best. But there are certain limitations to these systems. The thesis is conducted to optimized the current system. As technology is getting better and better as to keep it up with the technology and to minimize the limitations also, the new system has created.

By using image processing technology for detecting the fire, these limitations can be reduced because in this system camera acts like a human eye, as it detects a fire, the video is captured, and the image is processed using the software alert user. Thanks to Raspberry Pi, because of the size, cost-effectiveness, simplicity, and portability, it can be used everywhere. The prototype successfully detects fire. The thesis gives the review analysis, designing system, and algorithm, test, and result.

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