



Intelligent Fire Alert and Escaping System

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ABSTRACT: The primary purpose of Intelligent Fire Alert and Escaping System is to provide an early warning of fire so that people can escape from a place of danger to a safer place & immediate action can be taken to stop or get rid of the fire effect as soon as possible. This type of system uses sensors, microcontrollers, cameras, robot, GSM module etc. In this proposed research paper RF wireless remote controls a robot which has a fire alert system with a wireless camera inbuilt in the robot. An Intelligent Fire Alert and Escaping System identify the fire at early stage and monitors the situation with the help of camera which results in finding a safe route or place for escape. It is also capable of extinguishing fire at early stage and sends an alert to the fire station. The sensor used in this is a smoke detector and flame sensor.

Keywords: Fire alert, microcontroller, RF wireless, Smoke Detectors.

I. INTRODUCTION

Fire event is one of the great threat on the human life. Many peoples are injured in accidental fire event explosions. There are thousands of rupees buried each year for fire safety. Fire event is dangerous to human life and property which must be managed. The main issue is how to develop a safety system to search fire sources and guide people in leaving the dangerous place. In the past researches of the fire detection, many experts provide their opinion but a robotic system has an edge on them. A robot is used in many applications as a metal detector, spying, pick and place as it is also used in intelligent fire detect system. Buildings and homes are expected to be safer, convenient, and efficient for society in the 21st century and safety from fire is the most sensitive point for every person.

In this paper Intelligent fire alert and escape system is presented that can help in minimize losses by the fire event. Along with fire alarm this system sends an alert to fire station with location. To build a more responsive fire alarm system we use a smoke detector and flame sensor with a wireless camera inbuilt in a robot. The multiple functioning robot has more advantages than a single task robot. A movable system provides many advantages during fire. This system helps to escape from a fire spot by providing navigation with the help of camera inbuilt in a robot system. It also able to send a alert of fire to the nearest fire station with the help of a GSM and GPS module provided in the system. If fire is of small level the system is capable of extinguish it.

II. LITERATURE REVIEW

In this section latest fire detection and alert technologies with intelligent prevention system are discussed. The progress on fire detection technologies has been significant over the last decade due to advancement in sensors and microelectronics. In a review of progress in various emerging sensor technologies for fire detection and monitoring is elaborated. Generally fire detection technologies are divided into two groups, one is vision based technique that analyses video frames and process images to detect fire and other is sensor based fire detection.

With the increase of number of surveillance cameras, vision based fire detection with the same equipment sets become an attractive opportunity. Since it does not incorporate additional hardware budget. However, video frame detection based approach is not appropriate for early stage fire detection because during the early stage fire there might be only smokes or very minimal fire flames. Video frame detection based approach can miss detecting fire at that moment. While with gas sensor fire can be detected even before inflammation by identifying the type of leaking gas. To detect smoke with cameras several smoke detection researches have been published. Since smoke is grayish and semi-transparent, edges of high frequency image frames losses their sharpness and becomes an indicator for smoke. Also smoke is distinguished by checking the variations of background color tones, segmentation of smoke coloured pixels, blur background, illumination etc.

However it is not clear though how this technique can distinguish between foggy weather and smoke. To overcome this problem motion analysis is also included in vision based technique to detect smoke accurately. But sensors based fire detection techniques are easy to install, cheap in price and system becomes much more easily deployable.

In along with computer vision-based fire detection algorithm for fire colour modelling and motion detection, sensor networks are combined. These combined approaches seem very attractive however it could increase the expenses of the system and the system complexity will increase for installation and deployment. As compared to the above techniques and approaches intelligent fire alert and escaping strategy is simple, less expensive and effective to handle deceptive fire scenarios. It is also effective for early fire hazard occurrence detection.

III. SYSTEM COMPONENT DESCRIPTION

Smoke Sensor : MQ-2 gas sensor module is used to detect smoke. Basically gas sensor module has a small heater inside and a chemical sensitive sensor to detect a range of gases. For an instance, MQ-2 gas sensor module can distinguish Liquefied Petroleum Gas (LPG), Carmon Monoxide (CO), Hydrogen (H2), Methane (CH4), Smoke, Propane (C3H8) and Alcohol (-OH) gases. This sensor is popular because of its precision, fast response time, and sensitivity, high reliability, longevity and cost effectiveness. The sensor output is actually is an analog resistance, which is attached with a load resistor and connected with an Analog to Digital Converter (ADC). By reading the resistance level, leakage gas can be detected. Since MQ2 module has been used, load resistance was attached with the module circuit board by default. MQ2 sensor can detect gas as low as 200ppm to high limit 10000ppm. Therefore, it has the capability to sense gas very low density to high volume of range.

DC Water Pump : A water tank is a container for storing water. A pump is a device that moves fluids by mechanical action. Pumps can be classified into three major groups according to the method they use to move the fluid: direct lift, displacement, and gravity pumps. Among these we are using Direct Lift Pump

RF Transmitter and Receiver: We use a ASK Hybrid Transmitter and receiver module operates at 433MHz frequency. This module has a crystal stabilized oscillator for maintain accurate frequency control for best range. There we have to need only one antenna externally for this module. This Module is much cost efficient where long range RF communication is required. This module does not send data using UART communication of PC or

microcontroller directly because there is lots of noise at this frequency and its Analog technology. We can use this module with the help of encoder and decoder ICs which extract data from the noise. The range of transmitter is about 100 meters at maximum supply voltage and for 5 volt the range of transmitter is about 50-60 meter with using a simple wire of single code 17cm length antenna.

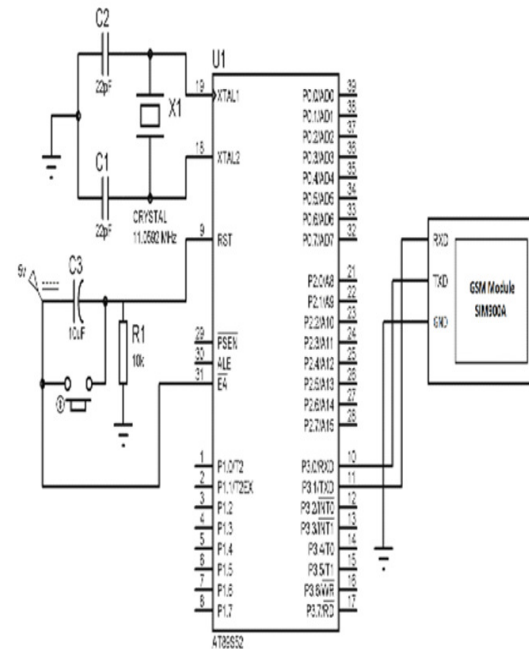
DC Motor: DC motors are used to move the wheels of robot. A driver IC L293d is used to drive the motors.

Wireless Camera: The wireless camera is used for making live demonstration of fired place. We are using a normal wireless camera. It is possible to see live video from a distant place and help the people in fire extinguishing. That's the reason we had used the mini wireless camera on robot for watched live the place of the fire in the screen at over distance and hence it's very useful in buildings, factories, hospitals etc.

GSM Modem: GSM modem is used to send alert the occurrence of fire accident via SMS. Using GSM modem a predetermined message can be send to required persons and also to fire station so that they get alerted and reach the place quickly where fire broken out.

IV. METHODOLOGY

To make an intelligent fire alert and escaping system a robot is needed that can detect and extinguish a fire using various components.



A smoke Sensor Detects the fire, usually at a starting range. We make a RF controlled robot for movement in the house from a distant place. Alert module is interfaced with SIM 900 for sending alert to the fire station and the respective person.

V. CONCLUSION

This paper gives a detailed mechanism about the robot that continuously monitors and sends an alert if a smoke is detected and with the help of DC water pump extinguishes it. If any fire accident occurs, there is a need of person to monitor continuously and alert respective department. In this process if any time delay takes place irreparable loss occurs. Hence a automatic system is useful for monitoring from a distant place and send alerts without delay.

VI. FUTURE SCOPE

In the present condition it can extinguish fire only in the way and not in all the rooms. It can be extended to a real fire extinguisher by replacing the water carrier by a carbon-dioxide carrier and by making it to extinguish fires of the entire room using microcontroller programming

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