

SMOKE AND FIRE DETECTION AND PREVENTION SYSTEM USING IOT TECHNOLOGY

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Abstract : About 7% of all house fires start in a bedroom. It leads to damage of all plush objects and also loss of life. To avoid that or to minimize the damage caused by fire outbreak an IOT technology is used to control such a kind of risk. NodeMCu based IoT fire detector is the solution for this kind of issue. In this model, we have fitted a fire indicator by making practical and effective use of NodeMCU ESP8266 which is connected with a smoke sensor and a Flame sensor. The smoke sensor detects if there's any smoke produced because of ingesting any type of gas and Flame sensor is for fire detection. Buzzer interfaced with it makes an alert sound and for the prevention, it is enabled with the automatic Water sprinkling system. A fire warning can also be activated by a little smoke from the flame of burning candle or fire lamps or a burning cigarette which may be used in any family. The buzzer gets stopped itself at whatever point the temperatures falls to comfortable indoor temperature and the amount of smoke decreases. NodeMCU fire and Smoke finder serves best because at whatever point it indicates fire or smoke, then it immediately alarms the admin or user about the fire through the Blynk App. At whatever point a fire happens, the user gets the alert notification through smart phone.

Keywords :- NodeMCU ESP8266 Board, PIC18f4550 Microcontroller, IOT- Internet of Things, MQ2 Sensor.

I. INTRODUCTION

Fire is a major issue as it is identified with individuals' security. It is basic to distinguish fire at the beginning period before it gets fierce and persistent. Ordinary fire identification techniques depend on sensors, as optical detecting, ionization current detecting, thermo couple and so on. They use smoke, photograph touchy attributes and temperature and so forth. Hence, these frameworks are slow and experience the various effects of a few issues like the caution can't be given except if the particles arrive at sensors to initiate them, they are not constantly solid and they may likewise give bogus alerts.

Every one of these techniques don't give extra data about fire like fire area, size, consuming degree, and so forth. Besides, these frameworks are additionally not relevant in enormous locales or in open air condition. Then again, the image based frameworks can identify the fire at beginning time before it gets tenacious. Any place the superfluous firebreaks out, CCTV camera can be accessible at the fire scene and subsequently the fire properties, for example, shading, tallness, etc can be resolved from pictures in the wake of investigating the sequence of video. In this manner video based fire discovery framework is valuable so as to effectively recognize the fire by preparing the advanced pictures. The benefit of utilizing video based fire identification is the capacity to cover enormous and open spaces.

To be appropriate in down to earth use, picture based fire location framework required to give client alarm as snappy as could be allowed, and furthermore the level of fire on screen. The framework accordingly should work continuously. Right now, procedure is created to meet the above prerequisites. To depict the fire highlights from fire pictures, the HSI shading model is picked. The shading partition strategy is utilized for shading division and fire veil is applied on unique pictures. At that point, the picture distinction technique is applied to evacuate misleading fire districts and further after dim scaling of pictures again the picture subtraction is performed.

Picture thresholding is applied to totally dispose of the fake commotion. At last, it evaluated the consuming level of fire to furnish the client with the caution connoting little, medium or huge fire. The proposed strategy is video cut on an i3 Intel processor and the caution was acquired inside three seconds that is practically continuous. Fire identification makes a colossal misfortune human life and property, henceforth early discovery of fire is significant.

One of the quick methods for discovery is the vision based fire recognition. Customary strategies like sensor based techniques have numerous sources: they have transmission delay, they are material for the most part for indoor locales and can't be utilized for open air areas to screen an enormous zone. While vision based fire identification has numerous favorable circumstances: a huge zone can be checked, the specific area of the fire can be found and can be manufactured alongside the observation camera.

Distinguishing fire gives security to valuable articles, for example, Museums, ATMs, and Banks. These days security is the principle issue for ensuring invaluable items like gold, cash, precious stone, uranium. Giving security to such items is an extreme test, especially for open historical centers and exhibitions. These establishments face the clashing difficulty of protecting items, yet permitting a great many guests an opportunity to see them. Home security has additionally become a significant issue today expanding the need for security frameworks. In this manner in all cases it is imperative to follow the articles and shield the things from the fire and accomplish open safety. This is an especially major issue in circumstances of clogged vehicle traffic, enormous industry vessels.

The Conventional security frameworks incorporate CCTV cameras, cautions and sensors to identify warmth or smoke particles and are very fruitful for indoor fire discovery. In any case, they can't be applied in huge open spaces, for example, ships, woods zone and carports. Notwithstanding covering a wide review goes, camcorders catch information from which extra data can be removed; for instance, the exact area, degree, and pace of development.

Surveillance cameras have become a significant angle in security and have become a need to keep legitimate check. There are many number of observation cameras are introduced by governments for different applications in different fields, for example, tag acknowledgment and theft prevention. PC vision based fire location can take preferences of these cameras and can add to open security.

PC vision, this is the errand of finding a given article in a picture or video grouping. We propose the optical stream strategies to figure the stream investigation of fire which can be utilized to separate the fire from the other moving articles. Optical stream is a significant system moving examining for machine vision.

II. LITERATURE SURVEY

An Autonomous IoT Infrastructure for Forest Fire Detection and Alerting System [1] - In this paper, they have constructed fire indicator utilizing Arduino which is interfaced with a temperature sensor, a smoke sensor and signal. With the assistance of IoT innovation, they have attempted to make it more intelligent by interfacing the entire checking cycle to the site page made by the PHP apparatus and constrained by the Arduino programming. In this paper the framework is planned and assessed for its viability just as versatility because of the improvement of sensor innovation. In this paper, the furthest down the line innovation can assist with lessening disastrous mishaps caused because of fire. With the improvement of IoT sensor innovation, the framework is more productive and helpful. IoT Enabled

Backwoods fire recognition and web based observing framework [2] - The goal of this undertaking was to recognize the woods fire as ahead of schedule as conceivable by estimating the degree of temperature and CO₂ level. They have utilized Temperature and smoke sensor to recognize the start disturbing temperature and the degree of carbon dioxide gas (CO₂). Early cautioning and quick reaction to a Wildfire is the best way to keep away from incredible misfortunes. Subsequently, the main objectives in fire observation are early and solid identification and restriction of the fire. It is a lot simpler to stifle a fire when the beginning area is known, and keeping in mind that it is in its beginning phases. Data about the advancement of fire is additionally exceptionally significant for taking care of the fire during every one of its stages. In view of this data, the firefighting s can be guided on track to smother fire.

An IOT based fire disturbing and confirmation framework for workhouse utilizing raspberry pi3 [3] - In this paper, they have planned and executed a fire discovery framework for industrial facilities utilizing Raspberry pi3. They utilized temperature, fire and smoke sensors for detecting fire and PIR sensor and camera for Intruder location for example Validation. They have given an affirmation of the fire presuming framework to keep away from any bogus caution and System will begin terminating. concealment framework, such as starting to shoot dousing water valves when fire happens.

Woodland fire identification utilizing advanced sun oriented fueled ZigBee remote sensor networks [4] - In this paper, they have built up a framework for Forest Fire Detection which beats the negative marks of the Existing innovations of Forest Fire Detection. It tends to be guaranteed that the framework created can be carried out for an enormous scope with its promising outcomes. The framework is given low-power components, higher renditions of Zigbee , Maximum force point following Algorithm is utilized to make the framework run for longer periods effectively.

III. PROPOSED SYSTEM

In this model, we have fitted a fire indicator by making practical and effective use of NodeMCU ESP8266 which is connected with a smoke sensor and a Flame sensor. The smoke sensor detects if there's any smoke produced because of ingesting any type of gas and Flame sensor is for fire detection. Buzzer interfaced with it makes an alert sound and for the prevention, it is enabled with the automatic Water sprinkling system. A fire warning can also be activated by a little smoke from the flame of burning candle or fire lamps or a burning cigarette which may be used in any family. The buzzer gets stopped itself at whatever point the temperatures falls to comfortable indoor temperature and the amount of smoke decreases. NodeMCU fire and Smoke finder serves best because at whatever point it indicates fire or smoke, then it immediately alarms the admin or user about the fire through the Blynk App. At whatever point a fire happens, the user gets the alert notification through smart phone.

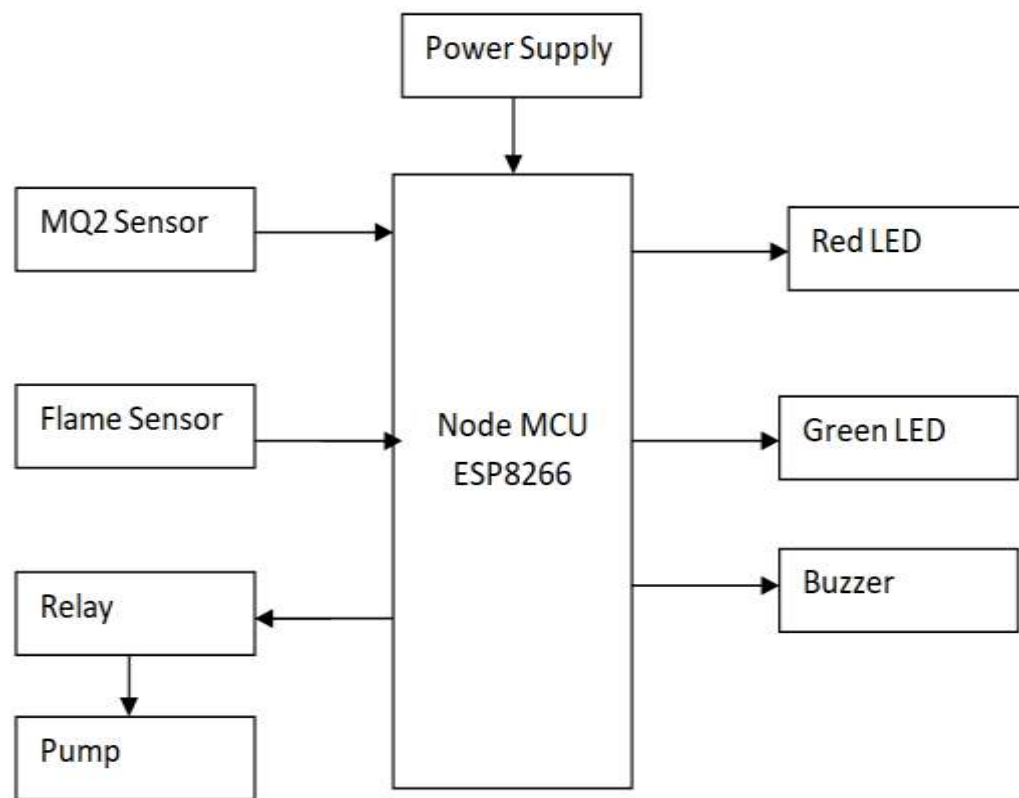


Fig. 1: PROPOSED SYSTEM

Flame sensor: Fire sensor is a sensor which will distinguish presence of Flame. It will recognize fire which is produced when fire is caused. At the point when fire of any power will be identified the sensor will give esteem as one, if no specific fire is recognized it will give esteem zero. This mix of nothing and ones will be utilized to recognize fire. Subsequently worth of this three sensors will be utilized to frame blend which will be used to distinguish fire has happened or not. In the event that among this three assuming worth of at least two sensor is one, fire will be available that implies alert will ring as the fire will be distinguished. It worth of only one sensor is one at that point fire won't be identified.

Microcontrollers: In microcontroller framework has center product that sends information to framework and recognizes fire age or not. Microcontroller is the primary piece of this framework. To which all the sensor yields are given as contribution to microcontroller. Force supply is given for the arrival of the capacities in the microcontroller. As PIC18f4550 has highlight of inbuilt ADC it makes the circuit less massive. In regulator move simple sign to advanced sign and move information to worker.

Gas sensor: Gas sensor is a sensor which will identify gas. It will distinguish gases which are delivered when fire is caused like carbon dioxide, carbon monoxide and some more. At the point when any gases will be identified the sensor will give esteem as one, if no specific gas is recognized it will give esteem zero. This blend of nothing and ones will be utilized to identify fire. The gas sensor will especially distinguish the gases that are delivered when fire is identified.

Ringer: A bell or beeper is a sound flagging gadget, which might be mechanical, electromechanical, or piezoelectric (piezo for short). Run of the mill employments of signals and beepers incorporate caution gadgets, clocks, and affirmation of client info, for example, a mouse snap or keystroke.

IV. RESULTS

From results it can conclude that the smoke sensor detects if there's any smoke produced because of ingesting any type of gas and Flame sensor is for fire detection. Buzzer interfaced with it makes an alert sound and for the prevention, it is enabled with the automatic Water sprinkling system. A fire warning can also be activated by a little smoke from the flame of burning candle or fire lamps or a burning cigarette which may be used in any family. The buzzer gets stopped itself at whatever point the temperatures falls to comfortable indoor temperature and the amount of smoke decreases. NodeMCU fire and Smoke finder serves best because at whatever point it indicates fire or smoke, then it immediately alarms the admin or user about the fire through the Blynk App. At whatever point a fire happens, the user gets the alert notification through smart phone.

V. CONCLUSION

The device is finally tested and proven to work optimally but as always there always is room for modification. Such recommendation and modification would be stated and explained in the section below. This device –automatic temperature control of distribution transformers and can be applied in various aspect of our society where a steady temperature is required such as industries, bakeries, incubators, homes, halls and offices, etc.

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