INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad-500 043

Project Based Learning

(Prototype / Design Building)

External Evaluation Report

Title of your Idea : FIRE DETECTOR

Thrust Area / Sector : FIRE DETECTION SECTOR

Branch : EEE

Year / Semester : 3rd Year 5th semester

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1. Background of the Idea (Min. 500 words):

The process of oxidation of any material into the exothermic process of combustion releasing heat and light as by product is called fire. The light parameter and the colour information has many applications is computer Vision and the other domains our colour model-based method used for fire detection has many advantages over conventional methods of smoke detection etc. Such a simplicity, Possibility, and the understandability. In order to enhance the performance parameters of fire the performance parameters of fire flame detection based on the live video stream; we propose an effective colour model-based methods for fire detection.

Now a days people want to make their life secure and to survive. In this research we present an Arduino based prototype of early detection technology.

Early the detection of fire in the home/work places the important action is to prevent the more fire and save lives. Protecting fire worth sensor can grow the ability the detection performance and early alarm. It monetarized the fires using a smoke level or threshold. The combination of fire sensor and smoke sensor give the compared result that can handle the non-fire situation. The fire detection and monitoring

the use flame, smoke gas temperature and humidity sensor had been proposed and the combination gave the good result.

The fire system detection is difficult to sense.

2. Problem Statement (Min 100 words):

The main object of the project is to be detect the fire or smoke by using sensors. It is an imperative that fire detection is regularly maintained by checking operative properly. Automatic fire detection usually sensory or heat and it can be difficult to setting avoid false alarm in the immediate action.

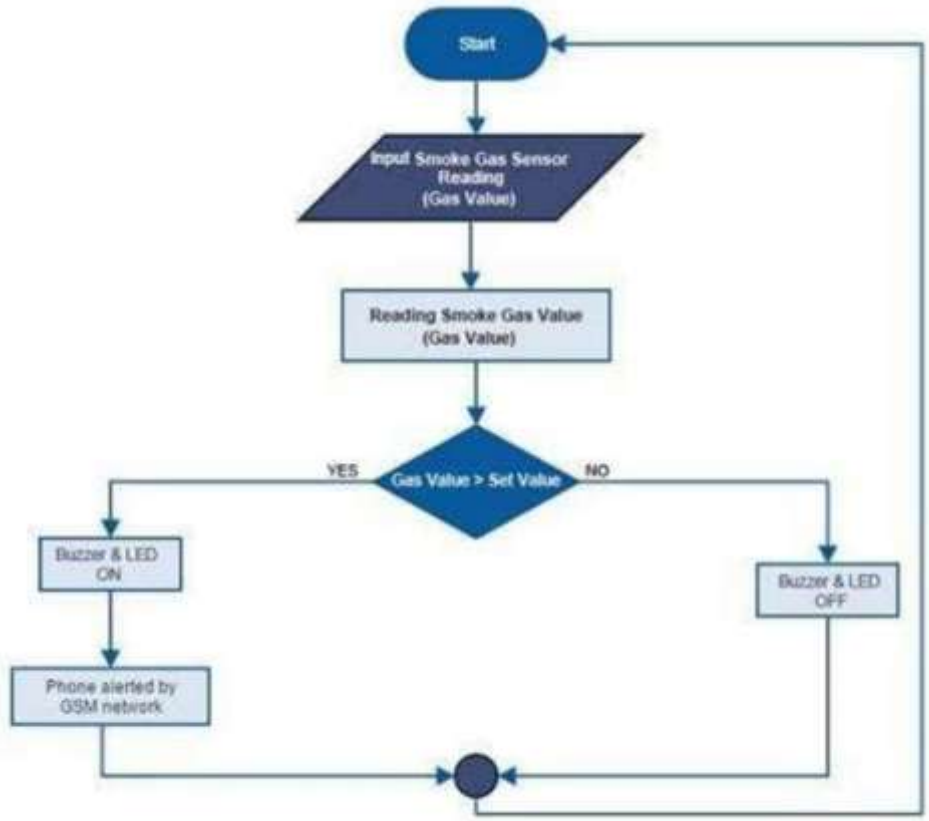
3. Proposed Solution (Min 100 words):

To overcome the problem in the existing I have introduced new method in the fire detection . The task of a fire-fighting system is to early detect and minimise the consequences of a fire, and thus protect people and property. Simple fire-fighting systems consist of a fire and smoke detector, a control panel and fixed fire-fighting systems, e.g. a system of pipes filled with an extinguishing agent and provided with outlet nozzles. Fire-fighting systems may be divided into four main types, depending on the applied extinguishing agent: water, water mist, foam and gas extinguishing systems.

4. Technology concept formulation:

- Key Trends in Fire Alarm Systems. ...
- Trends in Fire Alarm Aspiration Detection. ...
- IoT in Fire Safety Systems. ...
- IoT Enabled Connected Detectors. ...
- IoT Retrofitting. ...
- Mass Notification system. ...
- Advancements in Central Alarm System Technology. ...
- Multi-Sensor Detection.

5. Prototype of proposed system (UI screens / block diagrams / circuits / designs):



6. Detailed description of prototype / product / project (Min 1000 words):

A **fire detector** is a fire alarm device designed to respond when the converted thermal energy of a fire increases the temperature of a heat sensitive element. The thermal mass and conductivity of the element regulate the rate flow of heat into the element. All heat detectors have this thermal lag. Heat detectors have two main classifications of operation, "rate-of-rise" and "fixed temperature". The heat detector is used to help in the reduction of property damage.

Fixed temperature heat detectors

This is the most common type of heat detector. Fixed temperature detectors operate when the heat sensitive eutectic alloy reaches the eutectic point changing state from a solid to a liquid. Thermal lag delays the accumulation of heat at the sensitive element so that a fixed-temperature device will reach its operating temperature sometime after the surrounding air temperature exceeds that temperature. The most common fixed temperature point for electrically connected heat detectors is 58°C (136.4°F).

Rate-of-rise heat detectors

Rate-of-Rise (ROR) heat detectors operate on a rapid rise in element temperature of 6.7° to 8.3°C (12° to 15°F) increase per minute, irrespective of the starting temperature. This type of heat detector can operate at a lower temperature fire condition than would be possible if the threshold were fixed. It has two heat-sensitive thermocouples or thermistors. One thermocouple monitors heat transferred by convection or radiation while the other responds to ambient temperature. The detector responds when the first sensing element's temperature increases relative to the other.

Rate of rise detectors may not respond to low energy release rates of slowly developing fires. To detect slowly developing fires combination detectors add a fixed temperature element that will ultimately respond when the fixed temperature element reaches the design threshold.

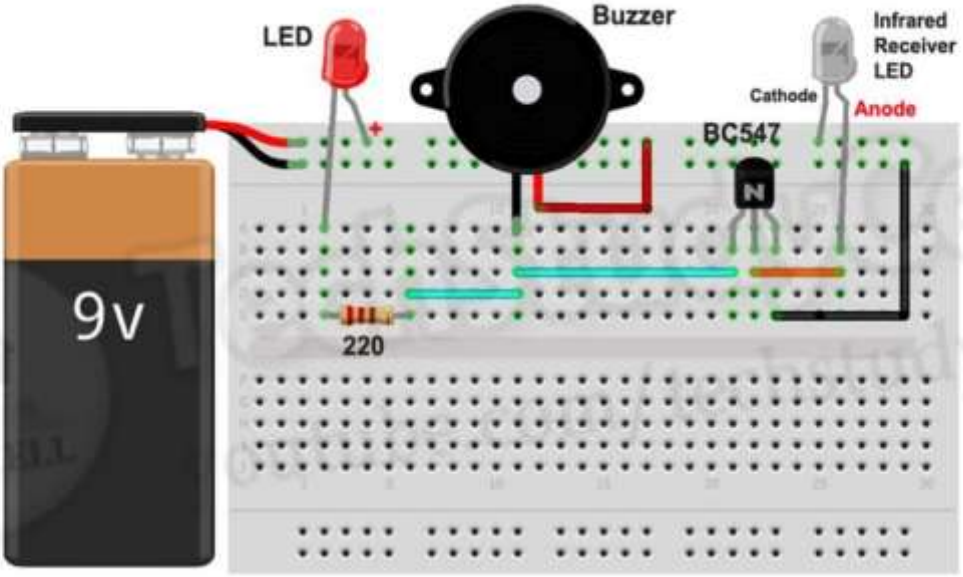
Heat detector selection

Heat detectors commonly have a label on them that reads "Not a life safety device". That is because heat detectors are not meant to replace smoke detectors in the bedrooms or in the hallway outside of the bedrooms. A heat detector will nonetheless notify of a fire in a kitchen or utility area, *e.g.*, laundry room, garage, or attic, where smoke detectors should not be installed as dust or other particles would affect the smoke detector and cause false alarms. This will allow extra time to evacuate the building or to put out the fire, if possible.

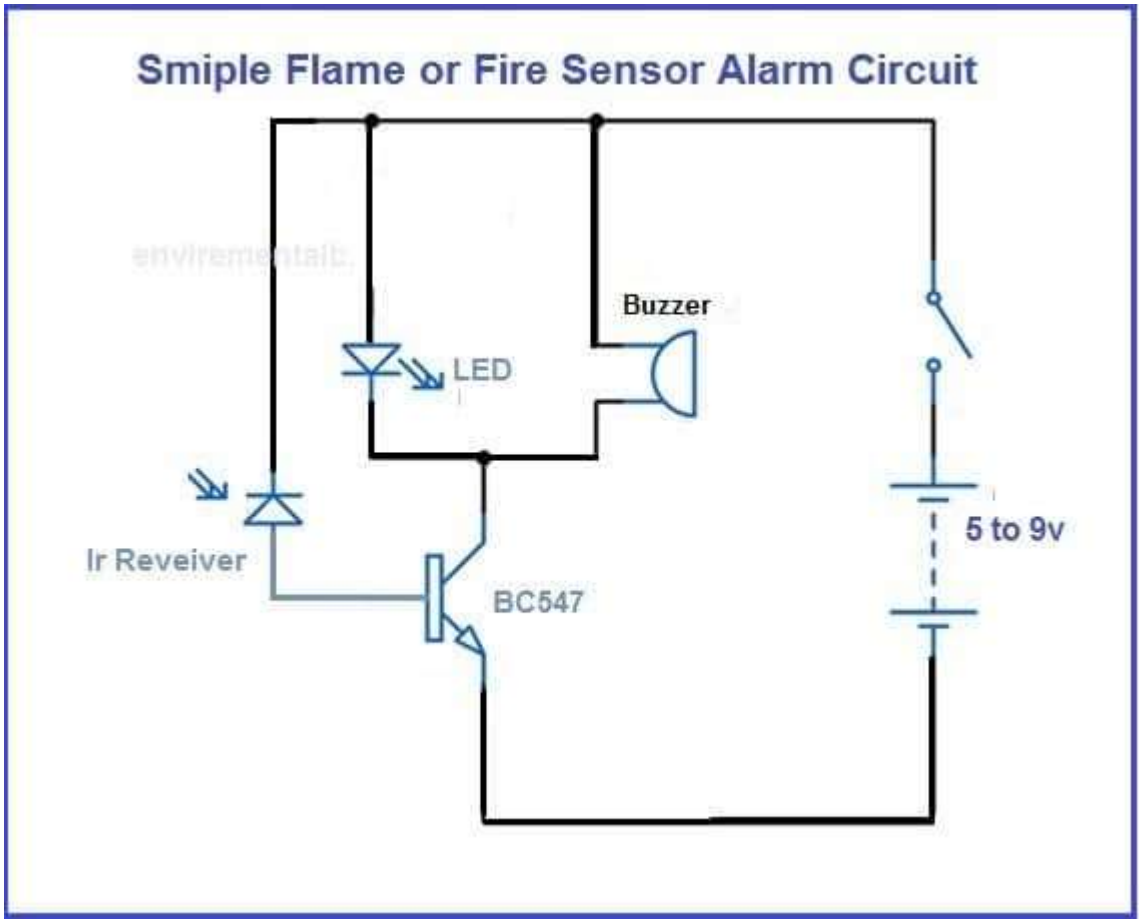
Mechanical heat detectors are independent fire warning stations that — unlike smoke detectors — can be installed in any area of a home. Portability, ease of installation, and excellent performance and reliability make this a good choice for residential fire protection when combined with the required smoke detectors. Because the detectors are not interconnected, heat activation identifies the location of the fire, facilitating evacuation from the home.

Each type of heat detector has its advantages, and it cannot be said that one type of heat detector should always be used instead of another. If one were to place a rate-of-rise heat detector above a large, closed oven, then every time the door is opened a nuisance alarm could be generated due to the sudden heat transient. In this circumstance the fixed threshold detector would probably be best. If a room filled with highly combustible materials is protected with a fixed heat detector, then a fast-flaming fire could exceed the alarm threshold due to thermal lag. In that case the rate-of-rise heat detector may be preferred

7.Final version of prototype



8.Circuit Diagram



9. Any other information:

Based on our research we feel that the line detector is an essential to every one's household. A fire alarm is a device that detect the presence of fire and atmospheric changes relating to smoke. In some cases, a fire alarm is a part of complete security system. In addition to burglary protection system. The fire alarm operates to alert people evacuate a location in which fire will accumulation is present. When functioning properly, a fire alarm will sound to notify people of and immediate fire emergency.

Fire accidents can be controlled to a great extension a places such as forest, homes, collages, industries, trains and some other public places. Fire accidents leads to death of excess of people, by using this technique we can save those life's easily.

10.References

1. *Mariani, Michael (April 8, 2020). "The Components Of A Commercial Fire Alarm System". Commercial Fire And Communications.*
2. *Chenebert, A.; Breckon, T.P.; Gaszczak, A. (September 2011). "A Non-temporal Texture Driven Approach to Real-time Fire Detection". Proc. International Conference on Image Processing (PDF). IEEE. pp. 1781–1784. doi:10.1109/ICIP.2011.6115796. hdl:1826/7588. ISBN 978-1-4577-1303-3. S2CID 11394788. Retrieved 8 April 2013.*
3. *Dunnings, A.; Breckon, T.P. (2018). "Experimentally Defined Convolutional Neural Network Architecture Variants for Non-temporal Real-time Fire Detection". Proc. International Conference on Image Processing (PDF). IEEE. Retrieved 9 August 2018.*
4. *National Fire Protection Association (February 2001). "Chapter 3 Fundamental Fire Protection Program and Design Elements". NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants. National Fire Protection Association. standard: Gaseous Fire Suppression Systems 3.10.7.*

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