

Fire eye



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Introduction:

Gartner predicted that more than half of consumers would be using a tablet or smartphone first for all online activities, instead of the traditional laptop or desktop. And increasingly these devices belong to the user. Business users switch between their tablet, smartphone and computer. Previously, the only 'devices' on an average employee's desk were a phone and a desktop computer. Currently, laptops, smartphones, perhaps a tablet or an e-reader are used in addition to fans, Air coolers, TV, Mixie and grinders at home. This increased use of gadgets can lead to Fire in Homes. Fires continue to occur in modern architecture, the people's lives and property has brought huge losses. In order to reduce the fire in the building automatic Fire safety equipment placed into a necessity. This project discusses the automatic Fire safety system called the Fire Eye. The system will be connected through the Fire alarm detector to the fire, fault and other signals sent to the sub-machine, Submachine re-transmission of such information will be sent to the Fire alarm control, and then start from the controller, sound and light alarm display, alarm and other devices, and automatically print a fire information.

Fire Alarm:

Currently, different types of fire and smoke detectors are available in the market. Smoke detectors are used to detect smoke which indicates that fire is present. Fires with high availability of oxygen burn at high temperature and with small amount of smoke produced; the particles are mostly composed of ash, or with large temperature differences, of condensed aerosol of water. Smoke detectors works mainly on two principles: Optical and Ionization. In optical smoke detectors, LED acts as a light source and at a distance from LED we have a photo detector. In absence of smoke, light reaches the detector without any decrease in intensity. When smoke enters the room, some light is scattered by smoke particles and hence light intensity reaching the detector is less and thus the alarm is triggered. Optical smoke detector has a very high response time. Ionization smoke detector uses radioactive isotope americium-241 to detect smoke. But Ionization smoke detector is rejected as it is more prone to false alarm. All these are not a reliable tool to detect fire and smoke. Even when fire is detected, it is detected in a very late stage where any precautionary measures will prove futile.

Issues in Fire Alarm:

Multiple issues in Fire Alarm exist like incorrect installation, lost connections, faulty or aging equipment, and improper maintenance. False Alarms Are a Big Problem. They have to be fixed. Fire Detection equipment is still advancing rapidly. Individual smoke detector sensitivity adjustment, drift compensation, and maintenance-needed indicators are a just few of the most recent tech advances helping to improve fire detection equipment. Unfortunately, electronic devices also age, which could cause equipment to malfunction over a period of time. Any number of things could also break the connection between the alarm system and the monitoring station, which is why we recommend installing at least one backup connection in every monitoring scenario. People Often Fail to React to a Fire safety. Even if a fire system is in good working order, there's always a risk that people won't respond correctly during a fire, especially in a group setting, like an office building or public facility. Hence this project is aimed at an automation for detection of Fire to warn building occupants of a fire situation, they do not generally intervene in the fire growth process except where interfaced with a fire suppression or other fire control system.

Project Objective:

The traditional approach for fire detection is based on using Smoke detector, Temperature Induction . But all these methods have got limitations. They are not sensitive and the response time is high. The results of these methods depend solely on the performance of the sensors which require frequent maintenance. In Ionization smoke detector if the smoke reaches the ionization chamber then only it can be detected. These available techniques are slow and cannot detect the fire in the early stage. The main objective of this project is to develop an automatic system which will warn when fire breaks in the area under consideration and automatically turn off the power source. The proposed method first detects smoke and then the potential fire region. Then again the area of the potential fire region is observed. If it keeps on varying then it is confirmed as a fire region and it reacts to the situation.

Functional Description of Project:

Nowadays we would have bought many gadgets like Laptop, Mobiles, by increasing amount of gadgets there is a more chance of fire due to over charging, using the device in correctly by the more amount of gadgets need more sockets for which extension boxes are used. In case of a fire the outer plastic layer will melt and the copper wires get be exposed. During fire, If we keep our feet on it we will get shock, but if there is no power at that moment we would just get a burn mark , The proposed device of this project shuts down the power if there is any fire detected. It can also be turned off manually. This is the circuit at first when the fire is detected the flame sensor will send that there is fire detected after that arduino will controll the servo motor to 90 Degree this is the pcb this is the schematic. Figure 2 depicts the circuit Diagram of Fire Eye

Hardware Schematic of Project:

Components used in this schema are Flame sensors, 90g Servo motor and Arduino no/ATmega328P. Motor (9g Servo)(TowerPro)

Specifications:

- Weight: 9 g
- Dimension: 22.2 x 11.8 x 31 mm approx.
- Stall torque: 1.8 kgf•cm
- Operating speed: 0.1 s/60 degree
- Operating voltage: 4.8 V (~5V)
- Dead band width: 10 μ s
- Temperature range: 0 oC – 55 oC
- Position "0" (1.5 ms pulse) is middle, "90" (~2ms pulse) is all the way to the left. ms pulse) is all the way to the right, ""-90" (~1ms pulse) is all the way to the left.
- Modulation: Analog
- Torque: 4.8V: 25.0 oz-in (1.80 kg-cm)
- Speed: 4.8V: 0.10 sec/60°
- Weight: 0.32 oz (9.0 g)
- Dimensions:
- Length: 0.91 in (23.1 mm)

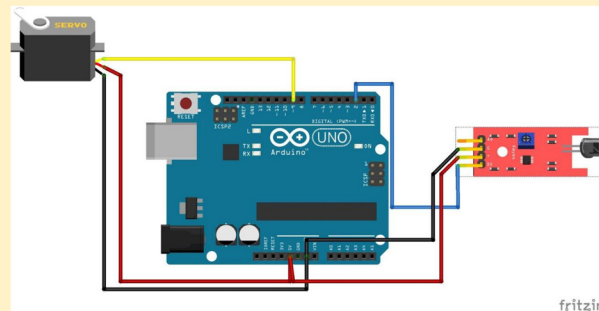


Fig. 2 - circuit Diagram of Fire Eye



Fig. 3 – Servo Motor

Sensor(KY-026):

The sensor has 3 main components on its circuit board. First, the sensor unit at the front of the module which measures the area physically and sends an analog signal to the second unit, the amplifier. The amplifier amplifies the signal, according to the resistant value of the potentiometer, and sends the signal. to the analog output of the module. The third component is a comparator which switches the digital out and the LED if the signal falls under a specific value. You can control the sensitivity by adjusting the potentiometer.

Note: The signal will be inverted; that means that if you measure a high value, it is shown as a low voltage value at the analog output. Figure 4 displays the image of the sensor.

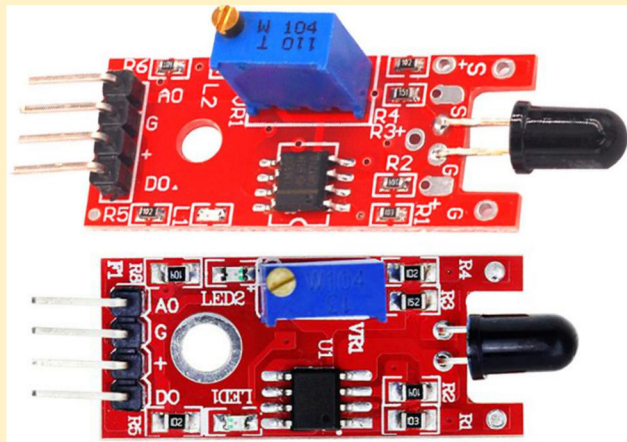


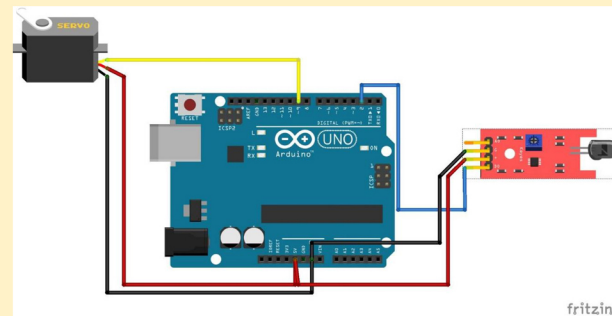
Fig.3 – Fire sensor

Software Coding and Documentation:

Click the below Link

http://bit.ly/Fire_Eye_code

Bill of Materials and Costing:



- Flame sensor - ₹50
- 90g Servo motor - ₹150
- Arduino Uno/ATmega328P - ₹300

INR Rs.500/-

Results and Discussion:

Automatic fire detection and alarm systems are designed to warn building occupants of a fire situation, they do not generally intervene in the fire growth process except where interfaced with a fire suppression or other fire control system. These systems generally use smoke, heat or flame detectors to detect the outbreak of fire and to alert building occupants and the fire service. Manual call points which allow an occupant who discovers fire to raise the alarm may also be included in the system. Single station residential smoke alarms, as installed in most homes, are the simplest system for detecting a fire and warning the building occupants. The time between the outbreak of fire and the commencement of fire fighting is the single most important factor in fire control and can be effectively reduced by having the system monitored directly by the fire service. Fire Alarm systems must be heard by the building occupants in all parts of the building. To achieve this, they are often connected to occupant evacuation warning and intercommunication systems which sound a defined 'beep - beep - beep' throughout the building when the detection system has been activated. Sometimes these systems automatically close smoke and fire doors, operate flashing warning lights, stop air-conditioning systems or alert critical staff via personal pagers. Today these systems extensively rely upon computer systems and are changing at the same rapid pace as is computer technology. Today's systems can be "intelligent" defining exactly where the fire is, determining if the smoke is from a fire threat or just burnt toast and advising the maintenance manager when the detector needs cleaning or other routine maintenance work is required. The advantages of Fire Eye are listed below:

- easy to install
- lower cost
- MCB can be tripped manually or automatically
- No high voltage
- this consumes very little power
- can be used for industrial and domestic purpose

Conclusion:

This is a device which can be used in home or offices. This device will turn off the power if there is any fire detected, it can be installed easily, this device is cheaper than the commercial ones, this device save our lives by turning off the power during an fire, this will prevent more electrical fire and shock when there is an fire

Salient features:

- easy to install
- low cost
- MCB can be tripped manually or automatically
- No high voltage
- consumes very little power
- can be used for industrial and domestic purpose especially fire-prone areas

Prototype video link:

http://bit.ly/Fire_Eye_video

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Thanks & Regards,



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