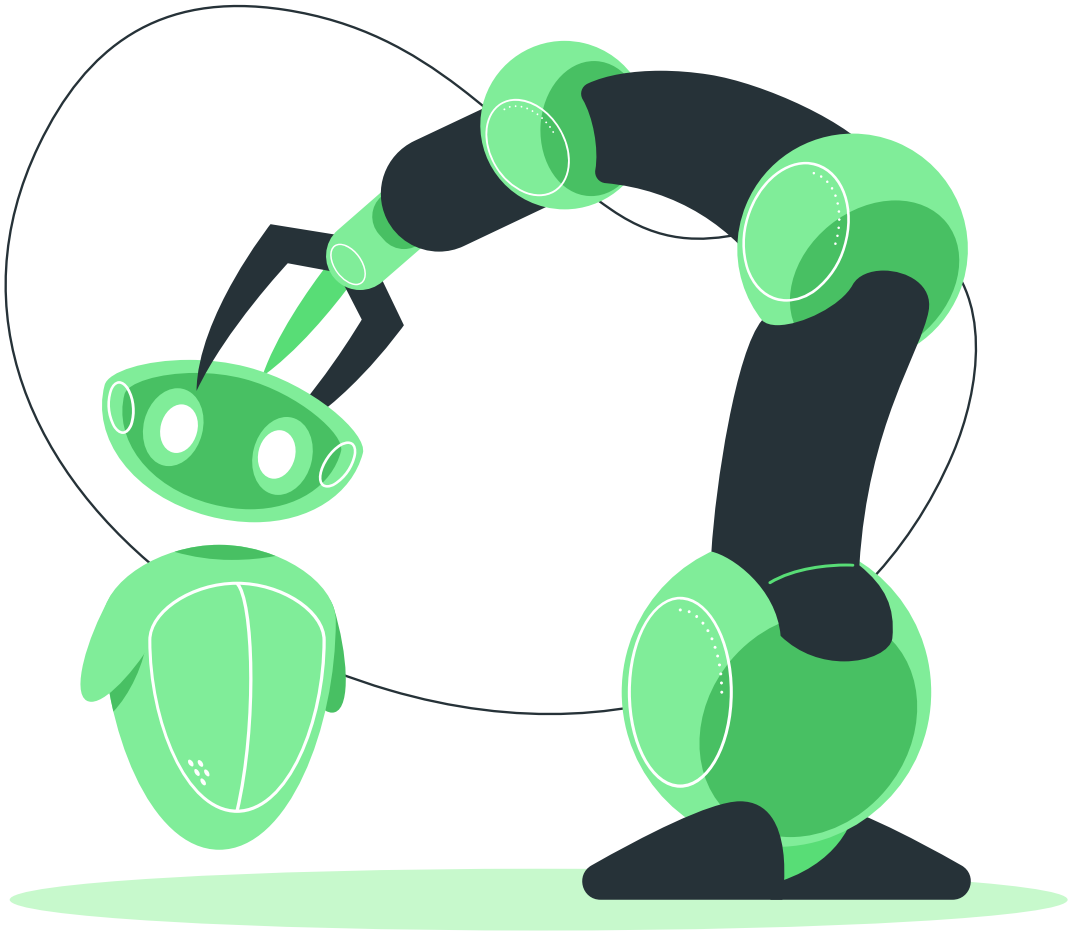
INVERTIS UNIVERSITY

Smoke Detector sensor



Introduction

According to , Smoke detector has been reviewed as a fundamental component of active fire detection strategy of modern commercial and residential building. In the 1970's, industries recorded increased use of smoke detectors and these growth was accompanied by several significant research projects that reinforced the life safety protection provided by smoke detectors, thereby providing significant evidence that supported increase in use of smoke detectors. Also in order to understand the response, working principle of these detectors in the environment, several researches was embarked. Accurate prediction of smoke detector is a very significant way of assessing detector system performance because occupants and fire service notification can be dependent upon smoke detector response. Fire Dynamic Simulator software, can be used to predict the response of smoke detector . Reference stated that "fire loss data reveals that in buildings with automatic sprinklers, 96% were controlled and extinguished by these systems". Once there a fire, the fire detection system activates the alert thereby triggering the automatic sprinkler system. It's very important for fire protection system to be installed in all commercial building . There are concerns associated with automatic smoke detection system arising from inappropriate techniques for quick notification, false noise tolerant and different sensor combinations . Researchers have been studying fire taking place in various places such as residential area and commercial buildings.A smoke alarm is a device that senses smoke, typically as an indicator of fire. It may issue a signal to a fire alarm control panel as part of fire alarm system ,especially in commercial security devices or may issue a local audible or visual alarm in the household.Smoke can be detected either optically (photoelectric) or by physical process(ionization). Detectors may use either or both methods.
Smoke detectors have prior detection when compared with heat detectors, hence are preferred for fire detection. They also find application in detecting, and thus deter smoking in premises where it is banned .

Literature Survey

The A smoke detector is a device that senses smoke typically as an indicator of fire or non smoking zone .In order to ensure human safety and safeguard property against fire in both domestic and commercial settings, different solutions for smoke detection have been developed. These designs vary depending on the method of smoke detection..However, the different designs are derived .the two basic types of smoke detectors, namely:

1.The photoelectric smoke detector

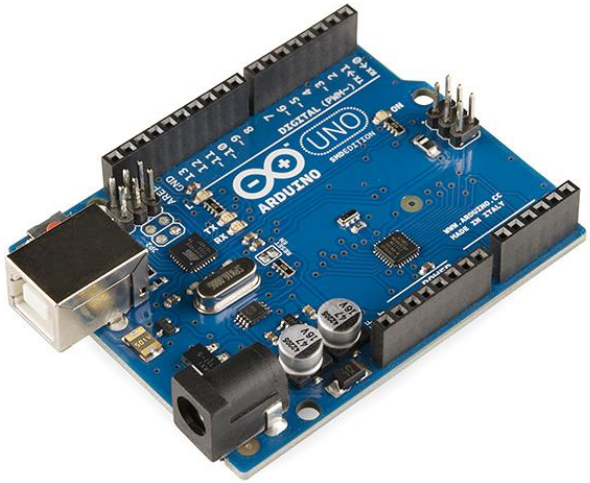
2. The ionization chamber smoke detector (ICSD)

The photoelectric smoke detector uses an optical beam to search for smoke. When smoke particles cloud the beam, a photoelectric cell senses the decrease in light intensity and triggers an alarm. This type of smoke detector reacts most quickly to smoldering fires that release relatively large amounts of smoke. On the other hand, the ionization chamber smoke detector is quicker at sensing flaming fires that produce little smoke. It employs a radioactive material to ionize the air in a sensing chamber; the presence of smoke affects the flow of the ions between a pair of electrodes, which triggers the alarm .In a typical system, the radioactive material emits alpha particles that strip electrons from the air molecules, creating positive oxygen and nitrogen ions. The electrons attach themselves to other air molecules, forming negative oxygen and nitrogen ions. Two oppositely charged electrodes within the sensing chamber attract the positive and negative ions, setting up a small flow of current in the air space between the electrodes, but when the smoke particles enter the chamber, they attract some of the ions, disrupting the current flow.

Problem Statement

Safety is a crucial consideration in design of residential and commercial buildings in order to safeguard against loss of life and damage to property. Fire is a key element in safety considerations. This project therefore seeks to design a microcontroller based smoke alarm that will continuously monitor the presence of significant amount of smoke and activate an alarm to prompt a safety measure to contain the situation. When it come to Fire safety , it's best to have a smoke detector in every bedroom and hall way, as well as on every floor in our home . with so many smoke detector, we can rest assured our home is protected from the unthinkable. Smoke detector is one of the easiest and low costly .Most of industries use it, because it work fatly to protect and most effective This system can be of great in domestic as well as industrial settings to detect smoke and alert people on an impending fire since smoke is a precursor for fire, instead of relying on heat/temperature sensorswhichsounds alarm when the fire has already started. This can go a long way in helping to save human life. This system can also be used to detect and deter smokers in areas where smoking is prohibited. The cost of implementing this system is relatively low since the components used are relatively cheap and are easily available in the market. The single microcontroller can be used to interface several sensors with alarms located in different locations as long as more pins are freed for multiple inputs multiple outputs.This system comes with a power supply that can be directly plugged to the mains (240V AC)source and give the appropriate operating voltage.smoke detectors respond faster to fire in its early, smouldering stage (before it breaks into flame). The smoke from the smouldering stage of a fire is typically made up of large combustion particles—between 0.3 and 10.0 μm. Ionization smoke detectors respond faster (typically 30–60 seconds) in the flaming stage of a fire. The smoke from the flaming stage of a fire is typically made up of microscopic combustion particles between 0.01 and 0.3 μm. Also, ionization detectors are weaker in high air-flow environments, and because of this, the photoelectric smoke detector is more reliable for detecting smoke in both the smoldering and flaming stages of a fire.

Arduino UNO



- There are 20 Input/Output pins present on the Arduino UNO board. ...
- The PWM pins are Pulse Width Modulation capable pins.
- The crystal oscillator present in Arduino UNO comes with a frequency of 16MHz.
- It also has a Arduino integrated WiFi module.

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- The input voltage of the UNO board varies from 7V to 20V.

Buzzer

- Color is black
- The frequency range is 3,300Hz
- Operating Temperature ranges from – 20° C to +60°C
- Operating voltage ranges from 3V to 24V DC
- The sound pressure level is 85dBA or 10cm
- The supply current is below 15mA

Connecting wire

Jumper wires typically come in three versions: male-to-male, male-to-female and female-to-female. The difference between each is in the end point of the wire. Male ends have a pin protruding and can plug into things, while female ends do not and are used to plug things into.

MQ-2 Sensor

- Operating Voltage is +5V
- Can be used to Measure or detect LPG, Alcohol, Propane, Hydrogen, CO and even methane
- Analog output voltage: 0V to 5V
- Digital Output Voltage: 0V or 5V (TTL Logic)
- Preheat duration 20 seconds
- Can be used as a Digital or analog sensor
- The Sensitivity of Digital pin can be varied using the potentiometer

Thanks!

Do you have any questions?
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