

SMART HOME

INTRODUCTION

The purpose of this project is to introduce two important features in a normal household which are usually not provided, which are namely Security and Energy Efficiency.

Simply showing each sensor detecting the flaw wouldn't work for such a project hence we chose to showcase all the safety measures coupled with sensors work encapsulated in a 3d model build by cardboard and decorated by chart papers that show a dummy model of a house.

We have incorporated all the sensors using a breadboard because there are many sensors and they had to be used together in a single Arduino. Arduino Uno has been programmed in such a way that whenever any security is breached the buzzer is ringed and at the same time we have also made sure intimidation to the house inmates also happens simultaneously, hence for that we provide a feature of sending an E-Mail and a text message to the house inmates.

METHODOLOGY

LM 35 TEMPERATURE SENSOR



Description

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies of $\pm 1/4^{\circ}\text{C}$ at room temperature and $\pm 3/4^{\circ}\text{C}$ over a full -55°C to 150°C temperature range. Lower cost is assured by trimming and calibration at the wafer level.

Features

- Calibrated Directly in Celsius (Centigrade)
- Linear + 10-mV/ $^{\circ}\text{C}$ Scale Factor
- 0.5°C Ensured Accuracy (at 25°C)
- Rated for Full -55°C to 150°C Range
- Suitable for Remote Applications

Usage:

Used to detect abnormal rise in the temperature of household in case of fire.

MQ2 GAS/SMOKE SENSOR



The Grove - Gas Sensor(MQ2) module is useful for gas leakage detection (home and industry). It is suitable for detecting H₂, LPG, CH₄, CO, Alcohol, Smoke or Propane. Due to its high sensitivity and fast response time, measurement can be taken as soon as possible. The sensitivity of the sensor can be adjusted by potentiometer.

Features

- Wide detecting scope
- Stable and long lifetime
- Fast response and High sensitivity

Usage

Used to detect Smoke or Gas Leakage in cases of emergency in the household.

PIR MOTION SENSOR

A PIR-based motion detector is used to sense movement of people, animals, or other objects. They are commonly used in burglar alarms and automatically-activated lighting systems. They are commonly called simply "PIR", or sometimes "PID", for "passive infrared detector".

Operation

An individual PIR sensor detects changes in the amount of infrared radiation impinging upon it, which varies depending on the temperature and surface characteristics of the objects in front of the sensor. When an object, such as a human, passes in front of the background, such as a wall, the temperature at that point in the sensor's field of view will rise from room temperature to body temperature, and then back again. The sensor converts the resulting change in the incoming infrared radiation into a change in the output voltage, and this triggers the detection.

Objects of similar temperature but different surface characteristics may also have a different infrared emission pattern, and thus moving them with respect to the background may trigger the detector as well.

PIRs come in many configurations for a wide variety of applications. The most common models have numerous Fresnel Lenses or mirror segments, an effective range of about ten meters (thirty feet), and a field of view less than 180 degrees. Models with wider fields of view, including 360 degrees, are available—typically designed to mount on a ceiling. Some larger PIRs are made with single segment mirrors and can sense changes in infrared energy over thirty meters (one hundred feet) away from the PIR. There are also PIRs designed with reversible orientation mirrors which allow either broad coverage (110° wide) or very narrow "curtain" coverage, or with individually selectable segments to "shape" the coverage.

Usage:

Energy Efficiency is only possible because of PIR Sensor, using PIR Sensor in the corridor to light up the LED whenever motion is detected is an excellent way to make sure Electricity bill is kept in check.

IMPLEMENTATION

The aim of the project is to introduce two important features in a normal household which are usually not provided, which are namely Security and Energy Efficiency.

Simply showing each sensor detecting the flaw wouldn't work for such a project hence we chose to showcase all the safety measures coupled with sensors work encapsulated in a 3d model build by cardboard and decorated by chart papers that show a dummy model of a house.

SMOKE DETECTION :

MQ2 Smoke Sensor is used for this security breach. We have programmed the Arduino Uno in such a way that if the Smoke Detection exceeds a safe value the buzzer starts ringing indicating the inmates to evacuate, at the same time in order to contact the correct authorities we also send an email and a text message to the house inmates, in case they are not in the house this will help them to save the house or other inmates.

FIRE DETECTION :

LM35 Temperature Sensor is used for this security breach. We have programmed the Arduino Uno in such a way that if the Temperature exceeds a safe value the buzzer starts ringing indicating the inmates to evacuate, at the same time in order to contact the correct authorities we also send an email and a text message to the house inmates, in case they are not in the house this will help them to save the house or other inmates.

DOOR LOCKING :

Keypad is used which allows the inmates to type the correct password, once the password is typed the door lock gets opened, in case someone

enters a wrong password the house inmates are intimidated about it by an email and text message.