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# Fire and Smoke Detector Alarm Using Arduino and MQ2 Sensor

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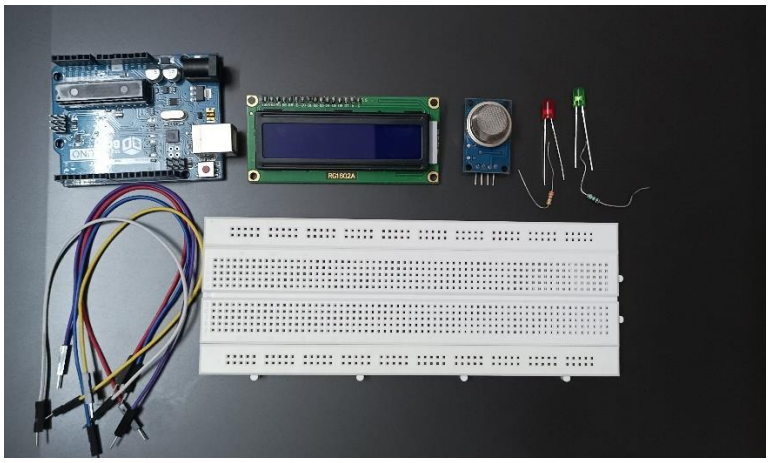
**Abstract:**
The Goal of this Research is to prevent the fires caused by the electrical short circuits and LPG Leakages. This Research helps to understand the fire and smoke detection system based on an embedded system which includes an Arduino Uno board, MQ2 Sensor, Piezo Buzzer, 16*2 LCD display, Breadboard and Jumper wires.

**Keywords:** Embedded System,Fire,Smoke,Arduino Uno,Buzzer

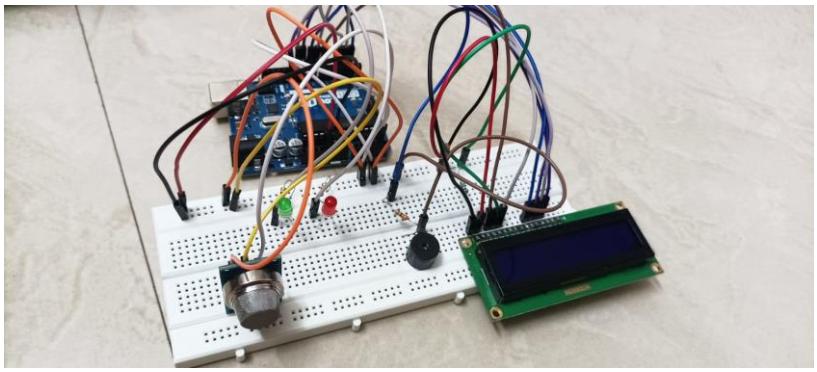
**Introduction:**
Fire is the Rapid Oxidation of a material in the chemical process Of Combustion releasing heat, light, and Dangerous elements. Some of the Causes that occur in Houses are Cooking equipment which includes Gas stoves and LPG cylinders. Electrical equipment such as low-capacity wire, short circuits due to poor connection, and many more.

**Literature Review:**
This Project is implemented by referring to various research papers mainly IEEE 2020, 2021, Science direct 2022, Elsevier –2020 which helped to optimize the basic idea about smoke and fire detection in an Embedded system.

**Design:**
Design of whole project includes Arduino Uno, MQ2 Sensor, 16*2 LCD Display, Breadboard, 2 LED (red and green), Jumper cables, Resistors 220ohm and 1kohm.the image below will give more clarity about the component has been used in the project

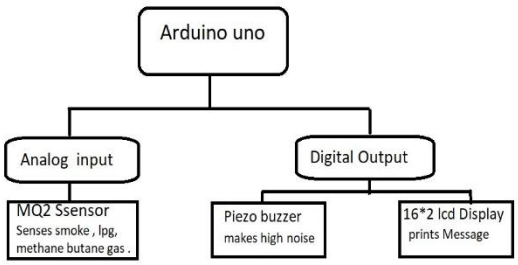


**Methodology:** This project is about a Fire and Smoke detection System when there is Smoke generated in the indoor Area of the house an Mq2 sensor will sense smoke as an Analog input value, and this is run by an Arduino program so the Output will be in digital form that is the red LED will be On, the piezo buzzer will make a sound and 1682 LCD will print the message of "ALERT!! Smoke detected".



The MQ2 buzzer will take Analog value as an input value connected to A4 pin of Arduino along VCC and Ground. Piezo buzzer,16*2 LCD,2 LED (red and green) color are Output devices connected to digital pins Arduino Uno board.

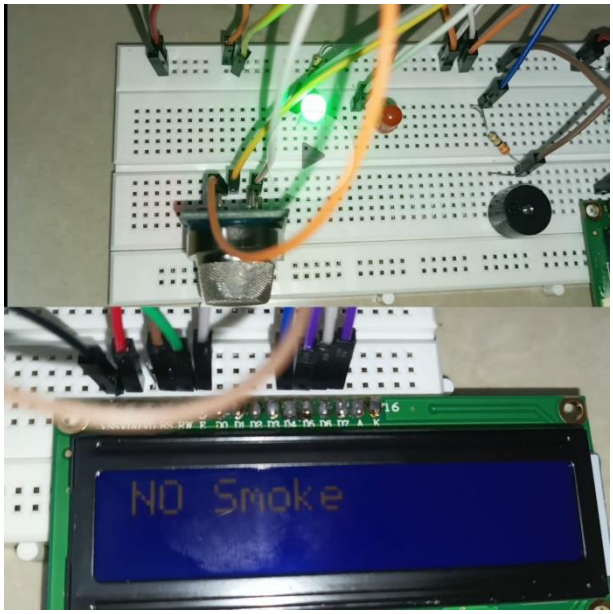
**Block Diagram:**

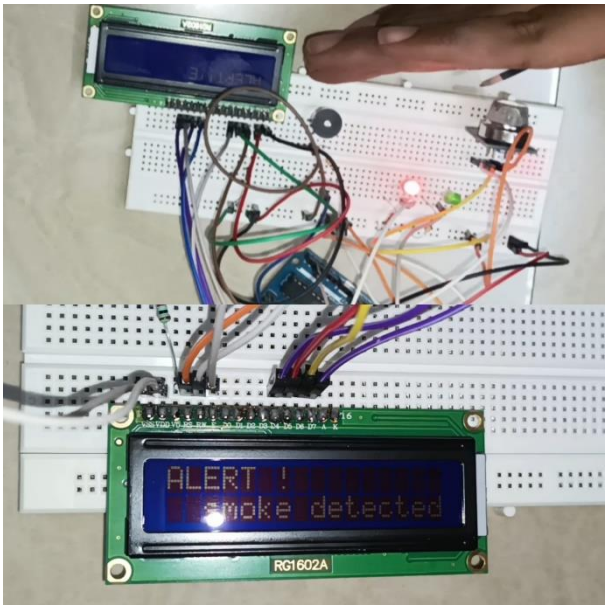



**Result:**

Currently, there is no smoke, so the green LED is On and 16*2lcd showing the message" NO SMOKE". As soon as the Smoke is made around the system the Mq2 sensor will sense the smoke and pass the

message to the Arduino, it will accept the message and process it. After that the red LED will glow On and the Green will be Off, the Piezo Buzzer will make a high sound and the 16*2 LCD will show the message ‘ALERT SMOKE DETECTED”.




**Conclusion:** Smoke alarms detect smoke by sensing small particles in the air using different technologies. Once they detect those particles above a certain threshold, they signal the alarm to sound so that you and your family can get to safety and call 911. However, because of its principle of operation, this sensor may be better suited for use in more localized, high-risk areas, such as conveyor belt drives, fuel storage areas, or underground maintenance areas. Gas and smoke detectors are one of the easiest and most available cheaply.

**References:**

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2. Science Direct-2022- Fire detection based on Gas sensors Springer-2020-A fire detection model based on power-aware Scheduling for IoT sensors in smart cities.
3. IEEE-2020- A Comprehensive Review of Visual Programming tools for Arduino.