DEPARTMENT OF INFORMATION TECHNOLOGY

Synopsis of Minor Project On

SMOKE DETECTION SYSTEM

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CERTIFICATE

This is to certify that following students:

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Has submitted Project-A on "Smoke Detection System" as the partial fulfillment for the requirement of T. E. (Information Technology) under my guidance during the academic year 2021-22.

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Date of Examination: _____

Internal Examiner   **External Examiner**

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CHAPTER 1

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.

CHAPTER 2

AIM AND OBJECTIVES

Aim:

The main aim of the project is to A smoke detector is an electronic fire-protection device that automatically senses the presence of smoke, as a key indication of fire, and sounds a warning to building occupants. Commercial and industrial smoke detectors issue a signal to a fire alarm control panel as part of a building's central fire alarm system. smoke detector, device used to warn occupants of a building of the presence of a fire before it reaches a rapidly spreading stage and inhibits escape or attempts to extinguish it.

Objectives:

1. To study the working principle of smoke detector system

2. To design and construct of the smoke detector system and control system using Arduino

3. To implement smoke design in the project

4. At the very first time of smoke creation so that avoided the unwanted accident

CHAPTER 3

LITERATURE REVIEW

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

CHAPTER 4

PROBLEM DEFINITION

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

CHAPTER 5

METHODOLOGY:

The concept of object detection system focuses on the functioning of all sensor modules used in the project. This helps explain the inputs received by modules and the outputs they produce.

Hardware Requirements:

The various sensors form the hardware part of the project are

specified as follows:

1) GSM Module (Sim 900A)

2) Arduino uno

3) Red led/ Green led/ Yellow led

4) Buzzer

5) Jumper Wires

6) Gas sensor(mq-2)

7) Bread board

Software Requirements:

For the implementation of the modules, the coding language is specified in this part and

also the platforms used for coding are as follows
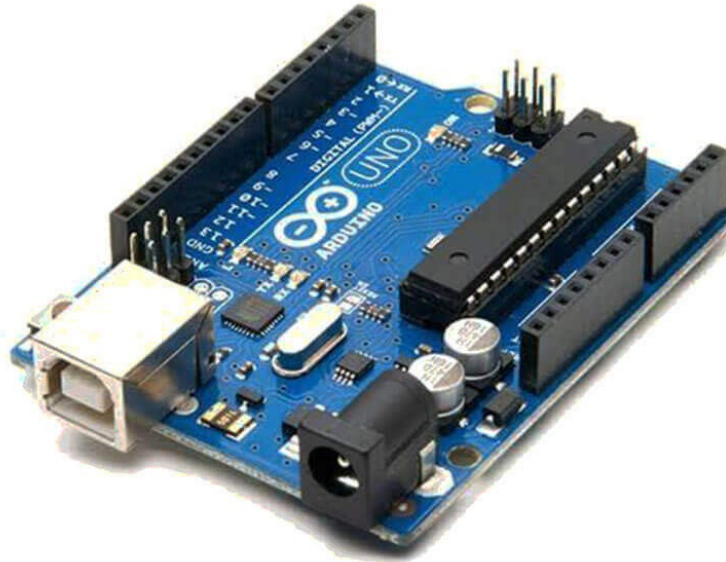
1. **Arduino Uno:**

Fig: Arduino Uno

Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects. This board can be interfaced with other Arduino boards, Arduino shields, Raspberry Pi boards and can control relays, LEDs, servos, and motors as an output. Arduino UNO features AVR microcontroller Atmega328, 6 analogue input pins, and 14 digital I/O pins out of which 6 are used as PWM output.

2. **Buzzer:**

Fig: Buzzer

A buzzer is an audio signalling device which may be used in alarm devices, timers and other forms of alerts. They may be mechanical, electromechanical, or piezoelectric. Electromechanical buzzers use a relay connected to interrupt its own actuating current, causing the contacts to buzz. Mechanical buzzers are purely mechanical and require drivers. Piezo electric elements are driven by an oscillating electronic circuit or other audio signal source, driven with a piezoelectric audio amplifier. For this project, the buzzer used is the compact, pin terminal type electromagnetic buzzer with 2048 Hz output. Pin type terminal construction enables direct mounting onto printed circuit boards.

3. **Gas Sensor(mq-2):**

Fig: Gas Sensor

MQ2 gas sensor is an electronic sensor used for sensing the concentration of gases in the air such as LPG, propane, methane, hydrogen, alcohol, smoke and carbon monoxide. MQ2 gas sensor is also known as chemi resistor. It contains a sensing material whose resistance changes when it comes in contact with the gas. This change in the value of resistance is used for the detection of gas. MQ2 is a metal oxide semiconductor type gas sensor. Concentrations of gas in the gas is measured using a voltage divider network present in the sensor. This sensor works on 5V DC voltage. It can detect gases in the concentration of range 200 to 10000ppm.

CHAPTER 6

IMPLEMENTATION

SCHEMATIC DIAGRAM :
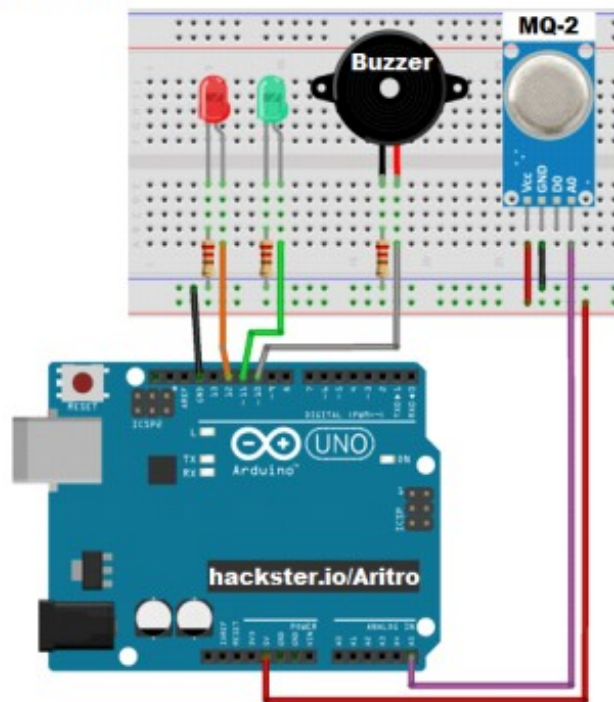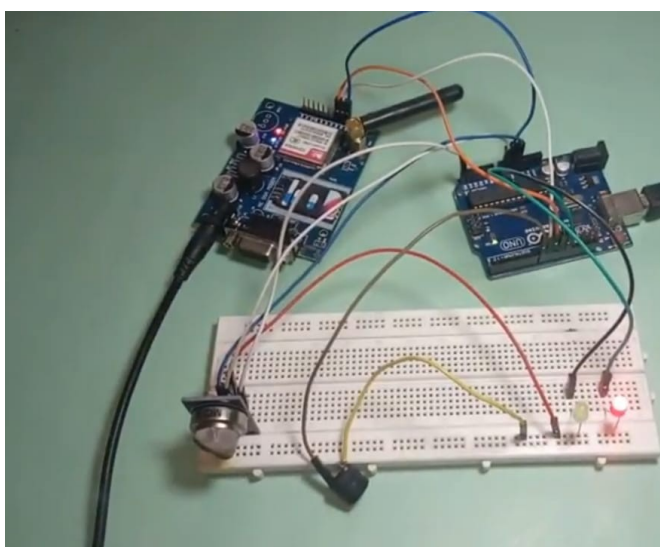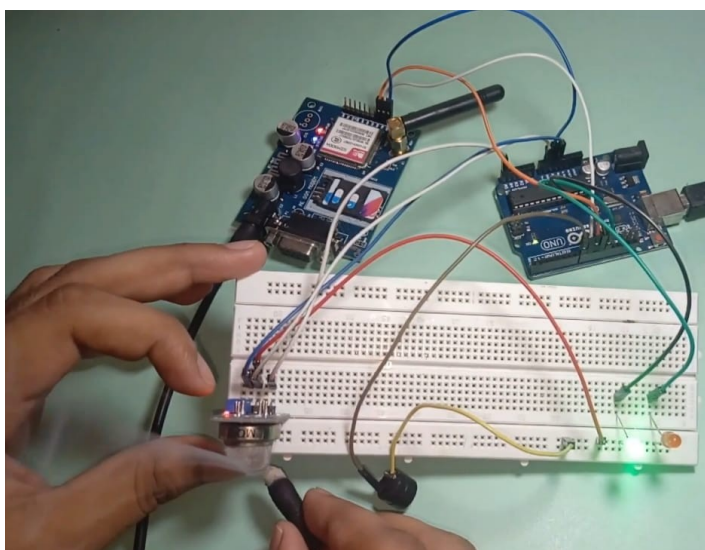
CHAPTER 7

RESULT:

1) 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 sensors which sounds alarm when the fire has already started.

2) This system can also be used to detect and deter smokers in areas where smoking is prohibited

3) We can use the project fire accidents can be controlled to a great extract in a place such as forests, home ,colleges industries ,trains and some other public places.

4) This can go a long way in helping to save human life.

5).The cost of implementing this system is relatively low since the components used are relatively cheap and are easily available in the market.

CHAPTER 8

CONCLUSION:

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 sensors which sounds alarm when the fire has already started. This can go a long way in helping to save human life.

Future Recommendations:

Motion sensor cameras can also be installed which will detect any motion in the house plus record the video at that moment and house owner can see live video on his phone. It can also capture the images of the affected area in order to guide the fire brigades. This will help the authorities to know about the severity of the fire and hence they can prepare the help according to that.

CHAPTER 9

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