Air Quality/Pollution Monitoring System

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Abstract—**Air Quality/Pollution Monitoring System is designed to assess air quality in real time using a gas sensor integrated with an Arduino UNO board. This system includes a resistor and a Buzzer which detects and indicates the changes in air quality, it acts as an alert mechanism and provides an audible warning when pollutant levels increase. This project showcases an accessible and effective approach for monitoring air pollution and promoting awareness about environmental health.**

Index Terms—**Air Quality, Arduino UNO, Buzzer Alert Mechanism, Pollutant Levels, Audible Warning, Environmental Health.**

I. INTRODUCTION

Air Pollution is a major problem that effects both people's health and the environment. With increasing urbanization and industrialization, air quality is getting worse, creating negative impact on human health and nature. To sort this issue, the "Air Quality/Pollution Monitoring System" was developed as a simple and effective way to check air quality in real time. This system uses an Arduino UNO board as its main controller, along with a gas sensor to detect harmful gases in air. When pollution levels rise, the system's alert mechanism warns the user immediately, helping them to take action to stay safe. By offering a reliable and affordable solution, this project supports efforts to reduce environmental risk and promote awareness about air pollution. This system uses key components like a resistor and a buzzer to function effectively. The gas sensor measures pollution levels and sends the data to the Arduino board, which analyzes it to determine if air quality is unsafe. If pollution levels are too high, the buzzer sounds an alarm to notify users. The system also displays the air quality data in real time on the serial monitor, making it easy to understand pollution levels at any moment.

This project is unique because it is both affordable and effective, making it easier for more people to access technology for monitoring air pollution. It shows how simple electronics can solve big problems like air pollution. By using a gas sensor, a buzzer and a resistor, the system can give accurate results and warn people quickly when pollution levels increase. Overall, this projects also highlights how innovation can promote awareness about protecting the environment and encourage people to take steps towards a cleaner and healthier atmosphere.

II. LITERATURE SURVEY

Air Quality using ZigBee
This paper discusses a monitoring system that gives information about environmental conditions and briefly touches the technological advancements in monitoring the environment and bringing out the new scope in monitoring the current environmental problems. The system is developed using Arduino, Raspberry Pi 3, and ZigBee which proves to be cost-ineffective and having low power consumption.[1]
Air Quality Monitoring Using Raspberry Pi A prototype for an environmental air pollution monitoring system for monitoring the concentrations of major air pollutant gases has been developed. The system uses low-cost airquality monitoring nodes comprised of a low-cost semiconductor gas sensor with a Wi-Fi module. This system measures concentrations of gases such as CO, CO_2, SO_2 and NO_2 using semiconductor sensors.

A MEAN stack is developed to display data over a website.[2]

A Smart Air Pollution Monitoring System The ecosystem and standard of living on the planet are both at risk from air pollution. The air pollution monitoring system proposed in this project was created using an Arduino microcontroller. The system was created to track and assess air quality in real-time while logging data to a distant server and updating the data online.[3]

III. METHODOLOGY

Air quality monitoring system built on tinker cad using a resistor, buzzer, gas sensor, and Arduino would essentially detect the presence of harmful gases in the air, alerting the user through a buzzer sound when the pollution level exceeds a set

threshold, with the gas sensor measuring the concentration and the Arduino processing the data to trigger the alarm; the resistor is often used in the gas sensor circuit to control the current and calibrate the readings   NO

Arduino UNO: The Arduino UNO acts as the brain of the system. It collects data from the gas sensor, processes it, and decides whether the air quality is YES safe or not. It also controls the buzzer and the serial monitor.

Gas Sensor: The gas sensor is the main sensing component of the system. It measures the concentration of harmful gases in the air. When the gas levels increase, the sensor sends this data to the Arduino for further processing. Resistor: The resistor is an important component that helps regulate the current flowing through the circuit, ensuring the proper functioning of the other components.

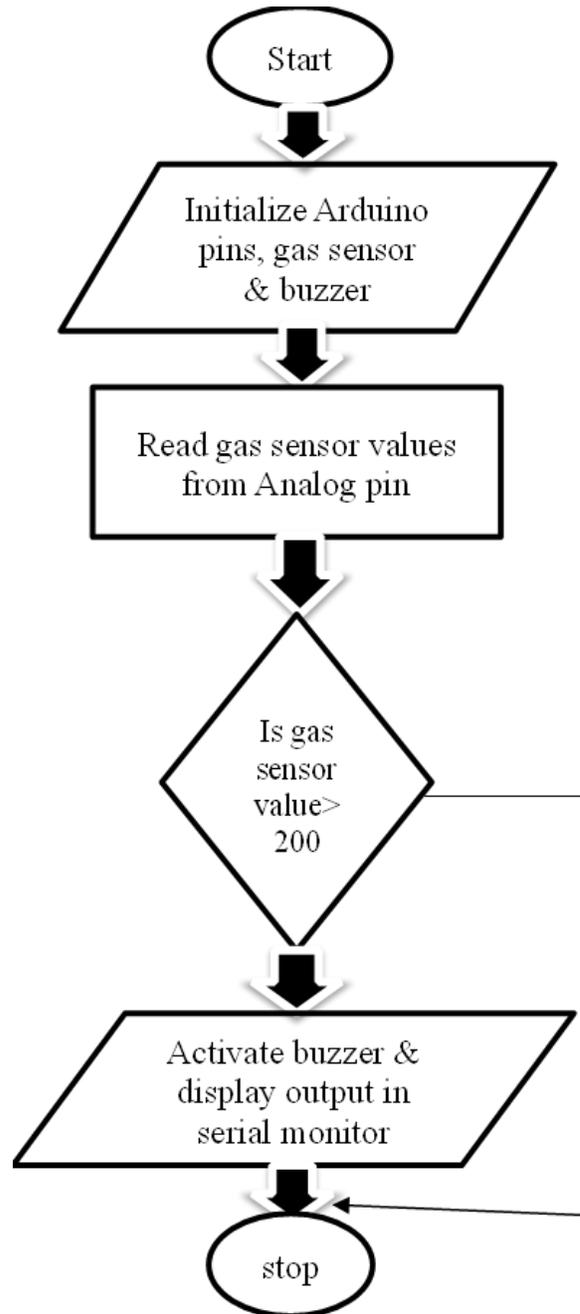Buzzer: The buzzer serves as an alert mechanism.

IV. FLOW CHART

Fig 4.1: flowchart

V. ARCHITECTURE

It emits a sound whenever the pollution levels are too high, warning users of poor air quality.

Serial Monitor: The serial monitors display realtime information about air quality, showing users the exact levels of harmful gases detected by the system.
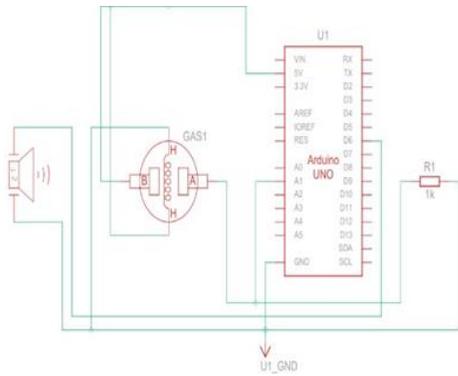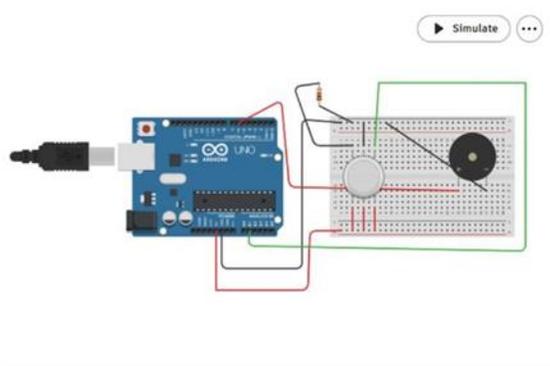
Fig 5.1: Architecture
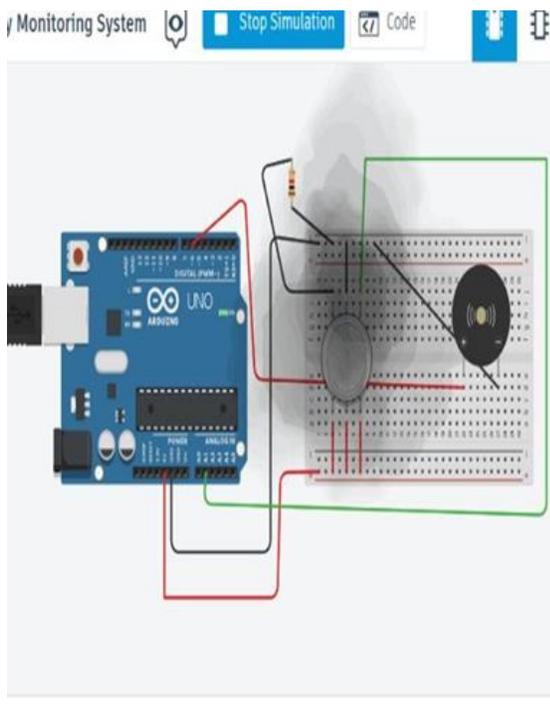
VI. OUTPUT

Fig 6.1: circuit diagram

VII. RESULT

The Air Quality/Pollution Monitoring System was successfully designed and simulated using tinkercad. The system effectively measured key pollutants using virtual sensors. The real time data was displayed on the

simulation, helping to analyze pollution levels in different conditions. The system also provided alerts when pollutant levels exceeded safe limits. This demonstrates that such a monitoring system can be useful for tracking air quality and promoting awareness about pollution control. Overall, the project successfully validated the concept of an air quality monitoring system using a software simulation.

VIII. CONCLUSION

Implemented Air Quality/Pollution Monitoring System which detects and produces audible warning when the pollutant levels get increased. So, this system is going to promote awareness among the people about environment. And we can get to know about the limit for pollution as the buzzer gets activated when the air pollution increases. Overall, this project tells that how the Arduino UNO and the gas sensor got integrated, observed how the output in the serial monitor is increasing and decreasing when the smoke particles are getting nearer and moving far.

This project highlights the potential of simulation tools like Tinkercad in prototyping and testing IoTbased solutions for addressing environmental challenges. The system's adaptability and scalability make it a valuable tool for promoting awareness and fostering proactive measures to improve air quality.

Fig 6.2: Gases detected by Gas Sensor

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