SENSORY DETECTOR TO DETECT NH3 AND H2S GASES IN POULTRY FARM

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PROBLEM STATEMENT

How can we create an automatic sensor model to address ammonia/H2S gas emissions from bird litter in the poultry sector. The goal is to assess gas emissions and trigger alerts when limits are exceeded, prompting necessary measures for effective management.

ABSTRACT

This project proposes the development of an automatic sensor model to tackle ammonia/H2S gas emissions originating from bird litter in the poultry sector. The innovative solution aims to create a sensory detector capable of continuously monitoring gas emissions in poultry farms. When predefined limits are exceeded, the system triggers alerts, prompting timely intervention for effective management of odor and fly issues. This advancement in gas detection technology holds significant potential for enhancing overall poultry farm management and ensuring a healthier environment for both poultry and workers.

EXISTING SYSTEM

There is no existing system for the detection of ammonia and h2s gases in poultry farm. Elevated ammonia levels adversely affect poultry, inducing respiratory issues such as coughing and breathing difficulties. This irritates the respiratory tract, hampers weight gain, and hinders overall growth and productivity. Additionally, ammonia exposure can lead to skin diseases and eye problems in poultry, further impacting their well-being.

LITERATURE SURVEY

S.no	Literature	Description	Disadvantages
1.	Conducting Polymer Based Ammonia and Hydrogen Sulfide Chemical Sensors	This research focuses on the timely detection of harmful gases like ammonia (NH3) and hydrogen sulfide (H2S) in food stocks.	Hazardous chemical presence is detected only after food processing.
2.	Effects of UV-A Light Treatment on Ammonia, Hydrogen Sulfide, and Greenhouse Gas Emissions from Poultry Manure	This study investigates the effects of treatment UV-A light treatment on NH3 and H2S emitted from poultry manure.	Only the effects of toxic gases in poultry are studied and no further actions are taken.
3.	Preliminary Analysis on a Paper-based Ammonia Sensor for Future Food Smart Packaging	This paper have been exploring innovative ways to create low-cost and eco-friendly gas sensors for poultry farm ammonia sensing.	This sensor can be used only for post-processed food to find ammonia presence

DISADVANTAGES OF EXISTING SYSTEM

✓ In some existing system the quality of raw broiler meat (presence of H2S) is monitored, rather than preventing it before affecting the poultry and humans.

✓ In some existing projects, systems are limited to distinguishing various gases without the capability to take further actions.

✓ The detection and action taking procedures are expensive and are defective sometimes.

PROPOSED SYSTEM

The proposed solution focus on developing an innovative sensory detector for continuous gas emission monitoring in poultry farms, triggering alerts upon surpassing set limits, ensures timely intervention for efficient management of poultry farm.
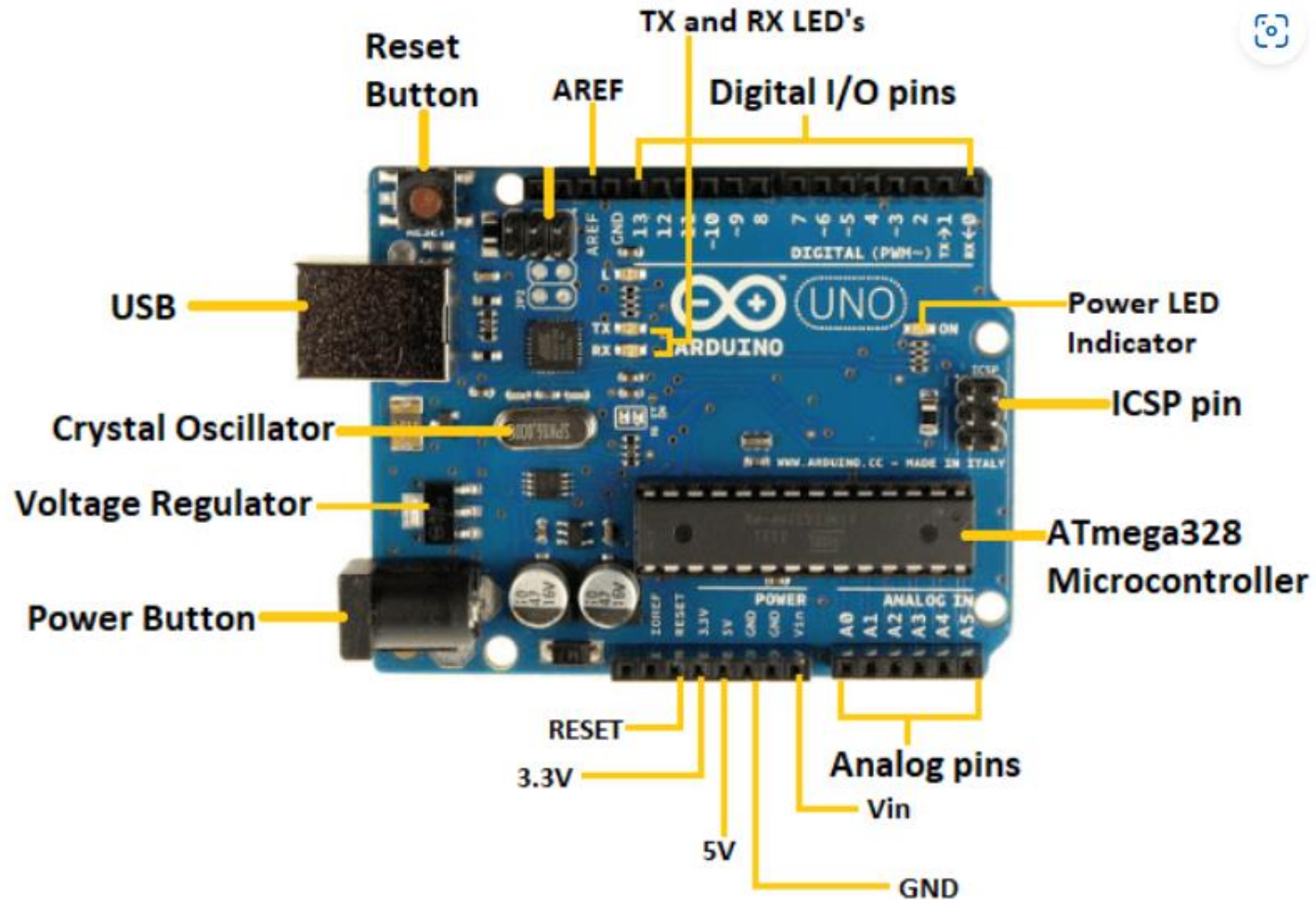
REQUIRED ITEMS

HARDWARE USED :

- ✓ Arduino UNO
- ✓ LCD display(16x2)
- ✓ Resistor
- ✓ Sensors(MQ135, MQ136, MQ137)
- ✓ Jumped wire
- ✓ Data Cable
- ✓ Alarm System
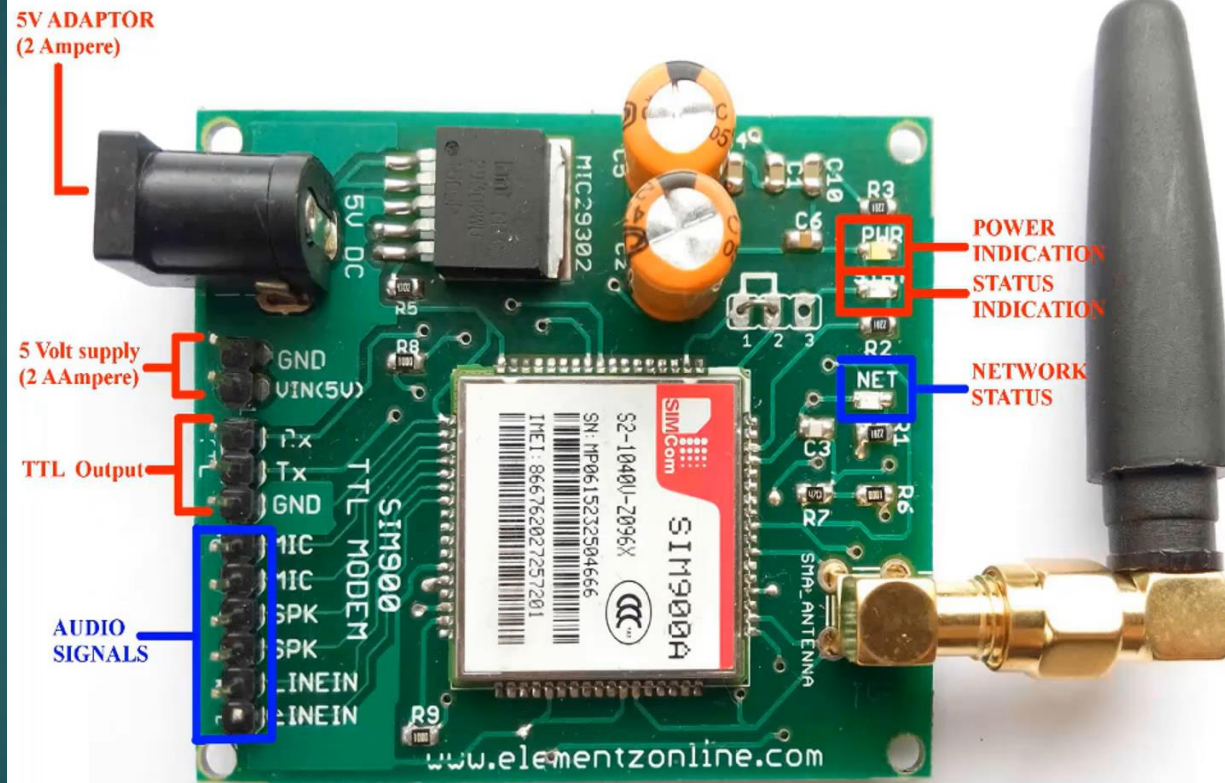- ✓ GSM Module

SOFTWARE USED:
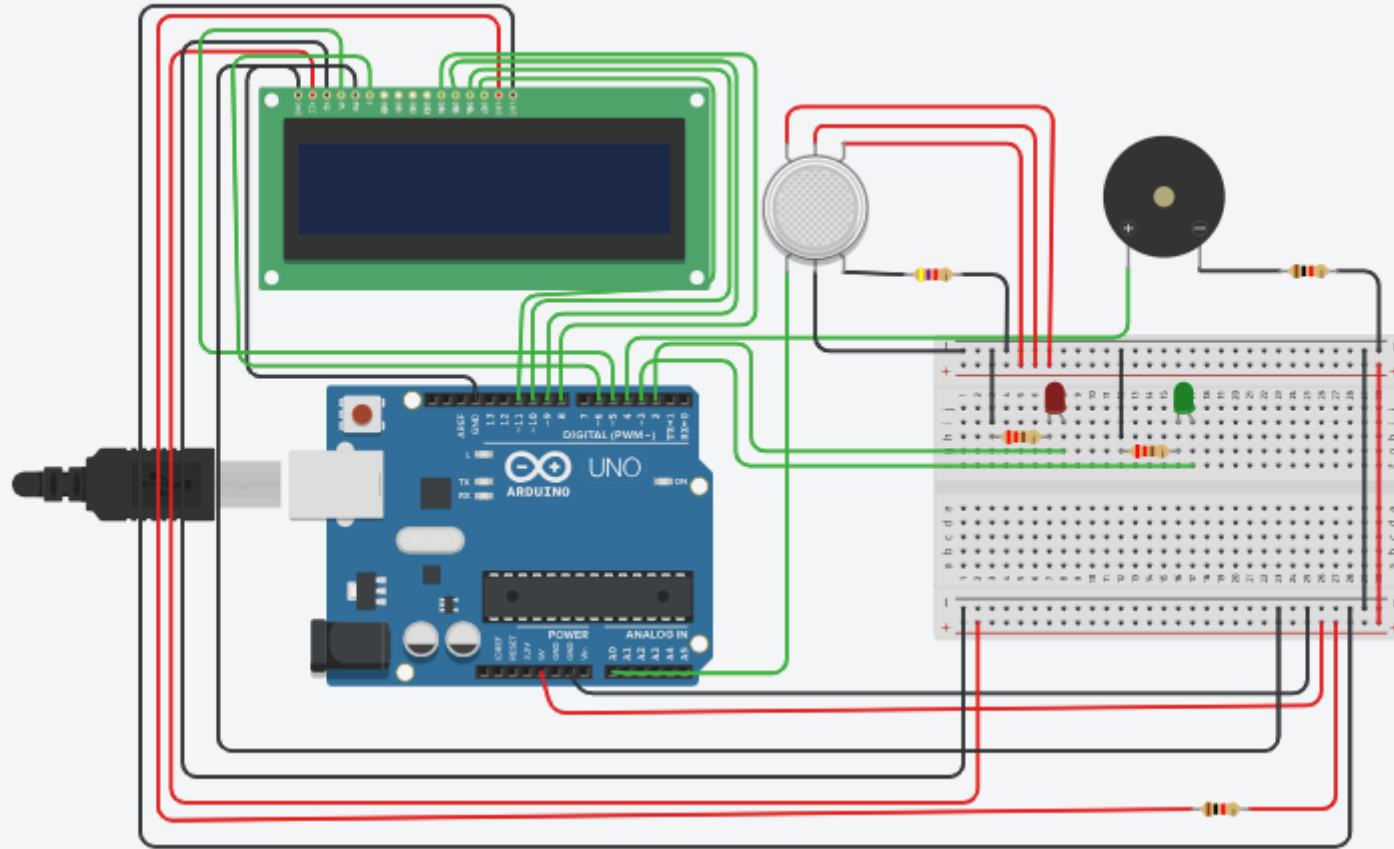
- ✓ C Programming

Arduino Uno

GSM MODULE

GSM Module Sim800/900

SYSTEM DESIGN

- Connect the gas sensor to the microcontroller. The sensor may communicate with the microcontroller via analog signals.

- Continuously monitor the sensor readings.

- Define threshold levels for gas concentration. These levels determine when an alert should be triggered.

- Thresholds can be set based on safety standards .

- When the sensor readings exceed the predefined thresholds, the microcontroller triggers the alert system.

- For sound alerts, activate the buzzer or speaker to generate a loud noise, alerting people in the vicinity.

- For message alerts, the microcontroller can send predefined messages or notifications to stored contacts.

- The system will make calls or send messages ,since we integrate a GSM module with the microcontroller.

- When an alert is triggered, the microcontroller sends a command to the GSM module to initiate a call or send a message to predefined contacts.

CIRCUIT DIAGRAM

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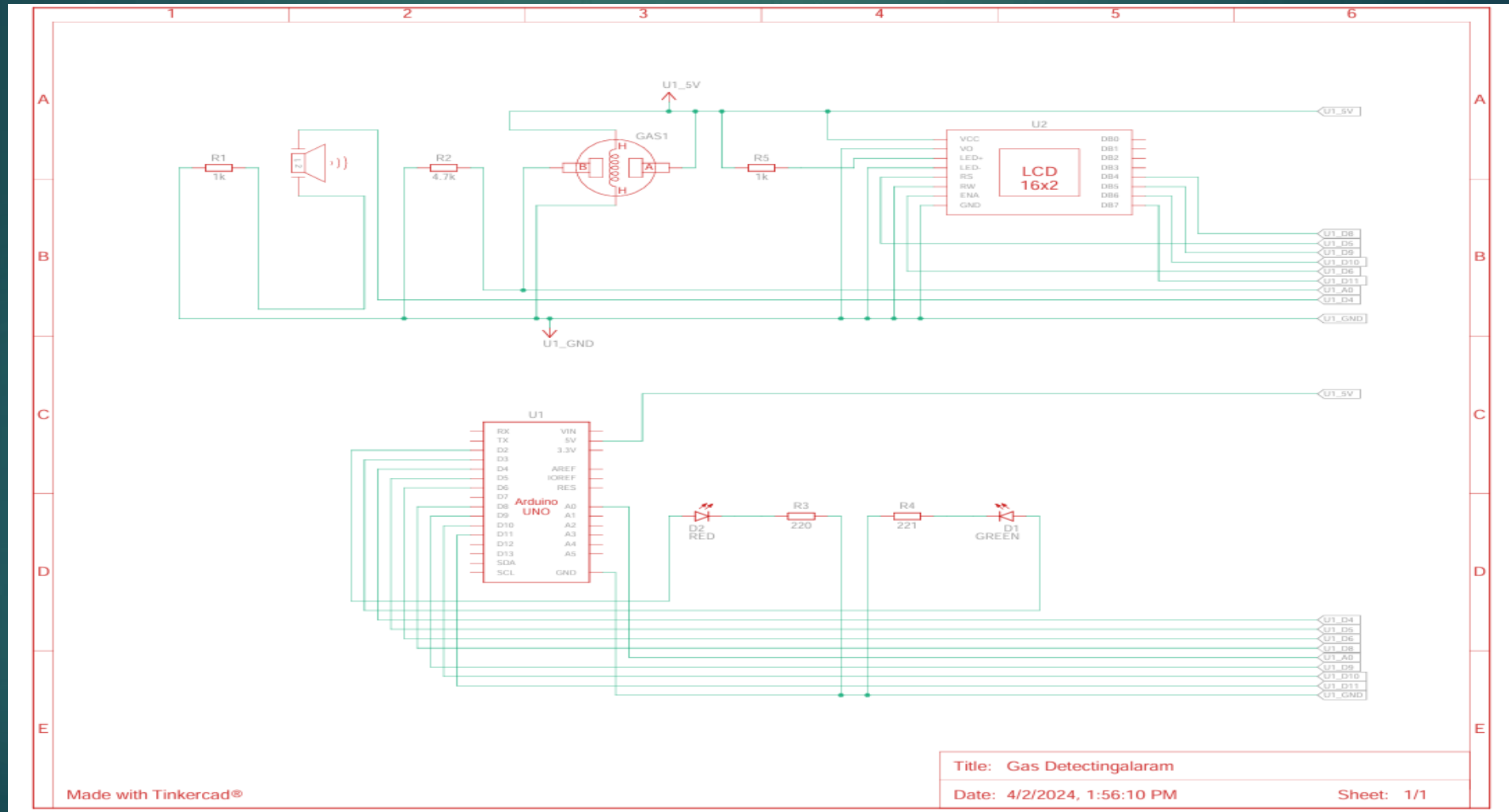
MODULES

- Sensor module
- Alert system
- Power management
- Calibration module
- Maintenance and diagnosis
- Documentation and training

SENSOR MODULE

- ✓ The sensor module is a component within a system that detects and measures specific physical quantities or environmental conditions (such as temperature, pressure, humidity, light, etc.).

- ✓ It provides input data to the system, allowing it to respond appropriately based on the detected changes.

ALERT SYSTEM

✓ The alert system module is responsible for monitoring predefined conditions or thresholds within a system.

✓ When these conditions are met (e.g., exceeding a temperature limit, low battery voltage, or abnormal pressure), the module triggers alarms or notifications to alert users or other parts of the system.

POWER MANAGEMENT

- ✓ The power management module oversees the distribution and consumption of electrical power within a device or system.

- ✓ It ensures efficient utilization of power resources, manages battery life, and may include features like power-saving modes or dynamic voltage regulation.

CALIBRATION MODULE

- ✓ The calibration module fine-tunes and adjusts system components (such as sensors) to ensure accurate and precise measurements.

- ✓ It compares system outputs to known standards and makes necessary corrections to maintain reliability.

MAINTENANCE AND DIAGNOSIS

- ✓ This module monitors the health and performance of the system.

- ✓ It performs routine checks, identifies potential issues, and may recommend maintenance tasks or provide diagnostic information to prevent failures.

DOCUMENTATION AND TRAINING

- ✓ The documentation and training module provides resources (such as manuals, guides, and tutorials) to help users understand how the system works.

- ✓ It facilitates proper usage, troubleshooting, and training for system operators.
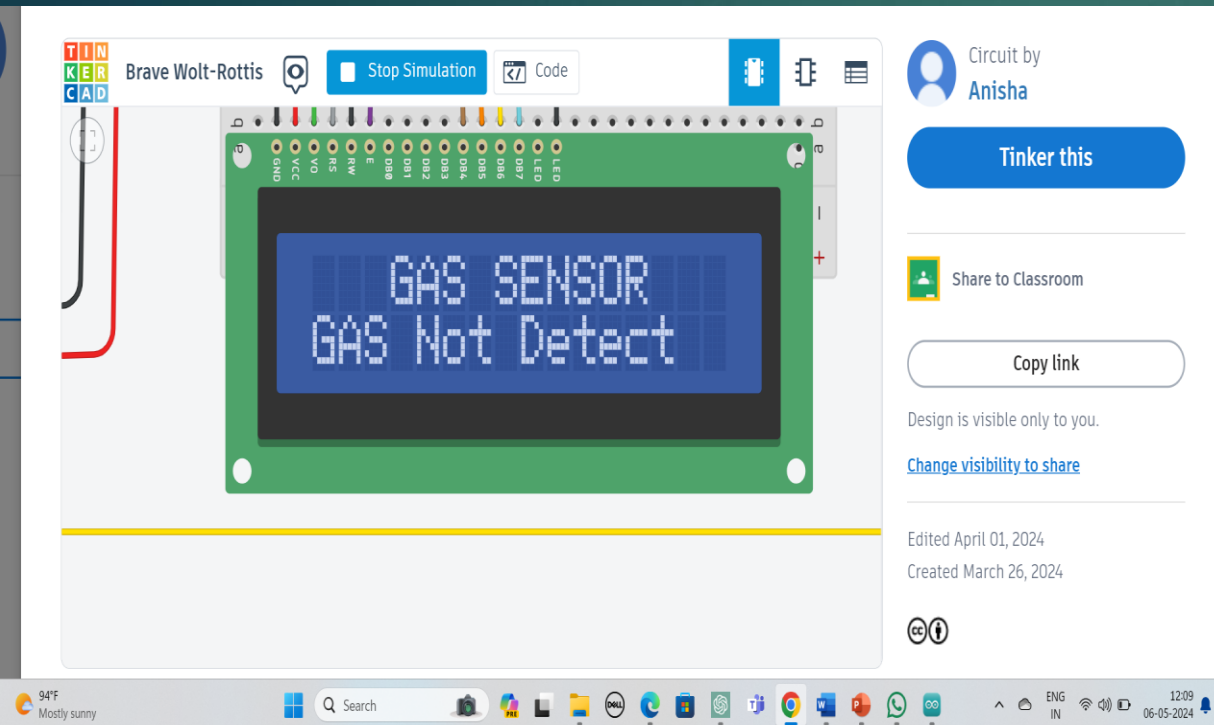
OUTPUT SCREENSHOTS
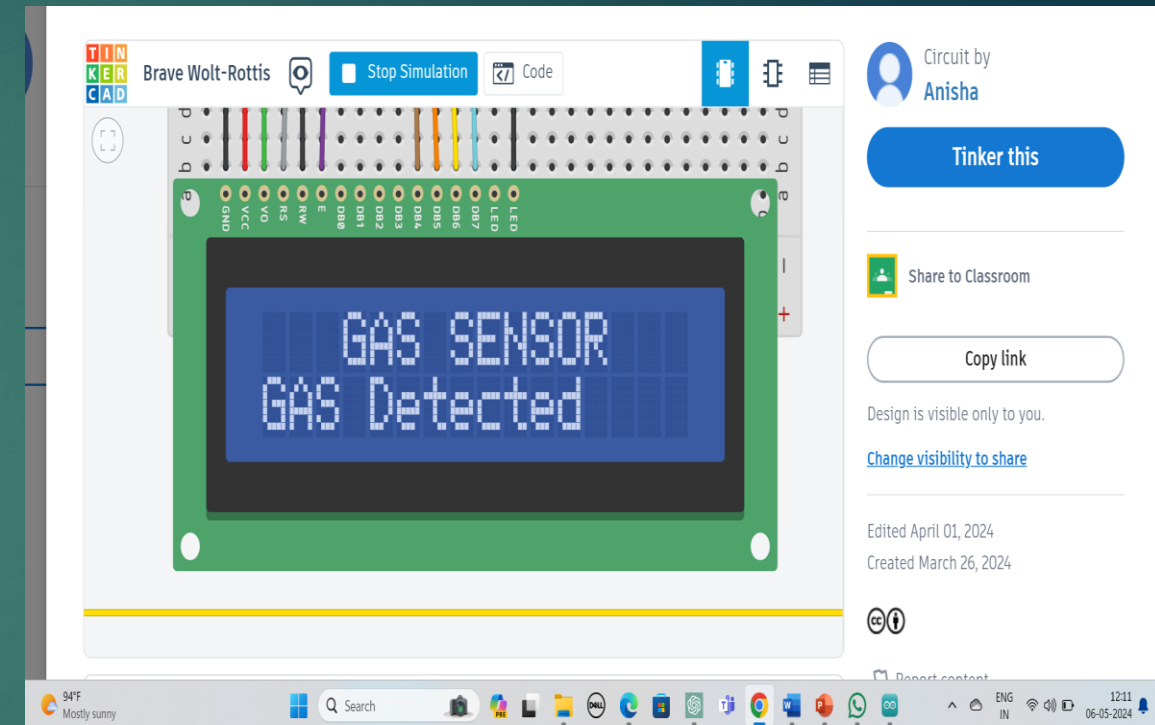

Fig1 : Before gas detection

Fig2 : After gas detection

ADVANTAGES OF PROPOSED SYSTEM

- ✓ This system allows the poultry farmer to take immediate action since the system provides alert messages and alarm sound immediately when the normal limit of gases exceeds.

- ✓ This system help to prevent poultry diseases and infections before them being consumed as food.

- ✓ Increased Efficiency: Automated monitoring reduces the need for manual checks, saving time and labor costs for farm operators.

- ✓ This system help farmers make more informed decisions about feeding, ventilation, and other aspects of poultry management, leading to more precise and efficient operations.

- ✓ This system has the potential to enhance business operations by mitigating the mortality rates and infection risks in poultry, thereby minimizing financial losses.

CONCLUSION

By implementing the proposed Automated Hazardous Gas Detection and Alarm System, poultry farms can significantly improve safety standards, reduce health risks, and streamline operational processes. This proactive approach ensures a healthier environment for both poultry and the dedicated farm workforce.

FUTURE WORK

- ✓ Leveraging artificial intelligence (AI) and machine learning can further enhance the capabilities of sensory detection systems.

- ✓ The integration of Internet of Things (IoT) technologies can enable remote monitoring and control of sensory detection systems

- ✓ Implementing renewable energy sources to power sensory detection systems

THANK YOU