AIR QUALITY MONITORING-PHASE II

INNOVATION:

Air pollution has become a common phenomenon everywhere. Specially in the urban areas, air pollution is a real-life problem. A lot of people get sick only due to air pollution. In the urban areas, the increased number of petrol and diesel vehicles and the presence of industrial areas at the outskirts of the major cities are the main causes of air pollution. The problem is seriously intensified in the metropolitan cities. Also, the climate change is now apparent. The governments all around the world are taking every measure in their capacity.

Select Appropriate Sensors: Choose sensors for detecting specific pollutants.

Calibration: Adjust sensor responses for accuracy.

Sensor Placement: Strategically position sensors near pollution sources.

Data Collection: Collect real-time air quality data.

Data Transmission: Send data to a central platform wirelessly.

Data Storage: Securely store collected data for analysis.

Data Analysis: Process and interpret sensor data.

Real-time Monitoring: Continuously track pollutant levels.

Pollutant Identification Algorithms: Develop algorithms to identify pollutants.

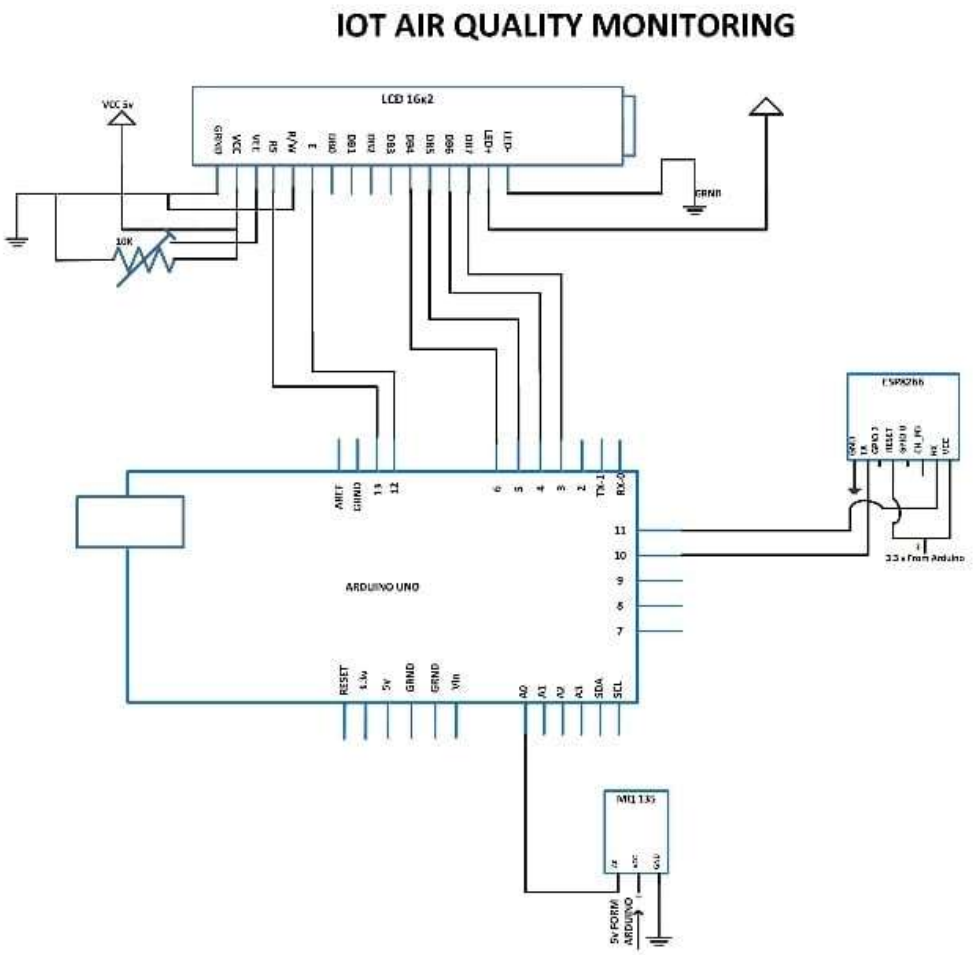
Data Fusion: Combine data from various sources for accuracy.

Alerts and Notifications: Notify authorities and the public of high pollutant levels.

Integration with GIS: Map and visualize pollution data geospatially.

Validation and Quality Assurance: Ensure data accuracy through validation.

Continuous Improvement: Refine algorithms and maintain sensors.

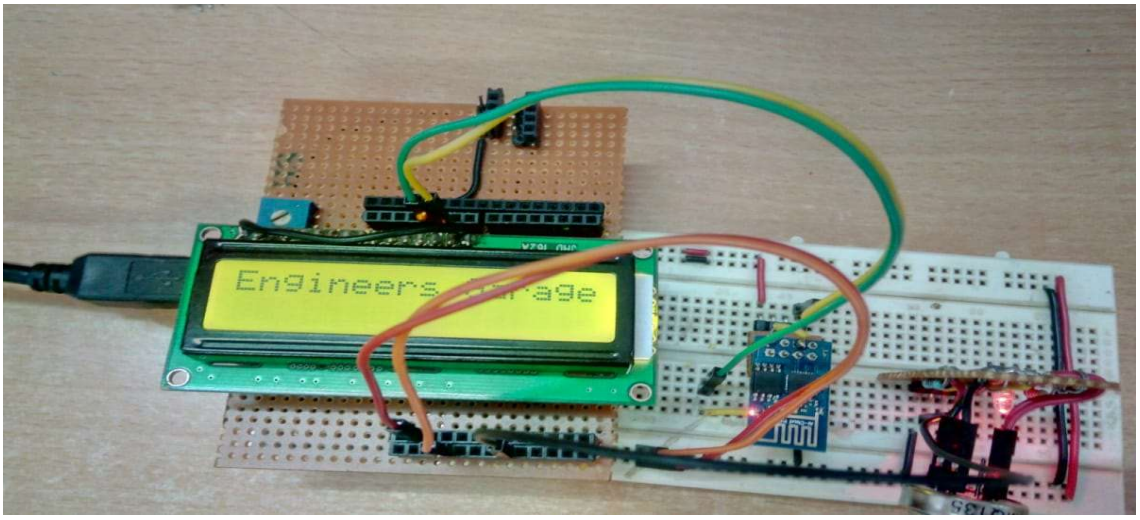


CIRCUIT WORKS AS:

- The device developed in this project can be installed near any Wi-Fi hotspot in a populated urban area.
- As the device is powered, the Arduino board loads the required libraries, flashes some initial messages on the LCD screen and start sensing data from the MQ-135 sensor.
- The sensitivity curve of the sensor for different combustible gases is already mentioned above.

- The sensor can be calibrated so that its analog output voltage is proportional to the concentration of polluting gases in PPM.
- The analog voltage sensed at the pin A0 of the Arduino is converted to a digital value by using the in-built ADC channel of the Arduino.
- The Arduino board has 10-bit ADC channels, so the digitized value ranges from 0 to 1023.
- The digitized value can be assumed proportional to the concentration of gases in PPM.
- The read value is first displayed on LCD screen and passed to the ESP8266 module wrapped in proper string through virtual serial function.
- The Wi-Fi module is configured to connect with the ThingSpeak IOT platform.
- ThingSpeak is an IOT analytics platform service that allows to aggregate, visualize and analyze live data streams in the cloud.
- ThingSpeak provides instant visualizations of data posted by the IOT devices to ThingSpeak server.
- With the ability to execute MATLAB code in ThingSpeak one can perform online analysis and processing of the data as it comes in.

DEVICE MODEL:



CONCLUSION:

In conclusion, the innovation of an IoT-based air quality monitoring device represents a significant step forward in addressing environmental and health concerns. These devices offer real-time data collection and analysis, providing valuable insights into air pollution levels and enabling informed decision-making.

With their ability to connect to the internet and share data seamlessly, they enhance our ability to monitor air quality on a large scale, potentially leading to improved public health outcomes, reduced environmental impact, and more sustainable urban planning. However, it's important to continue refining and expanding these devices to ensure their accuracy, accessibility, and affordability, as well as to foster collaboration between stakeholders to effectively tackle air quality challenges globally. The future of air quality monitoring holds great promise, driven by ongoing innovations in IoT technology and data analytics.