Topic: Microcontroller -Based Air Quality Monitoring System.

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Abstract

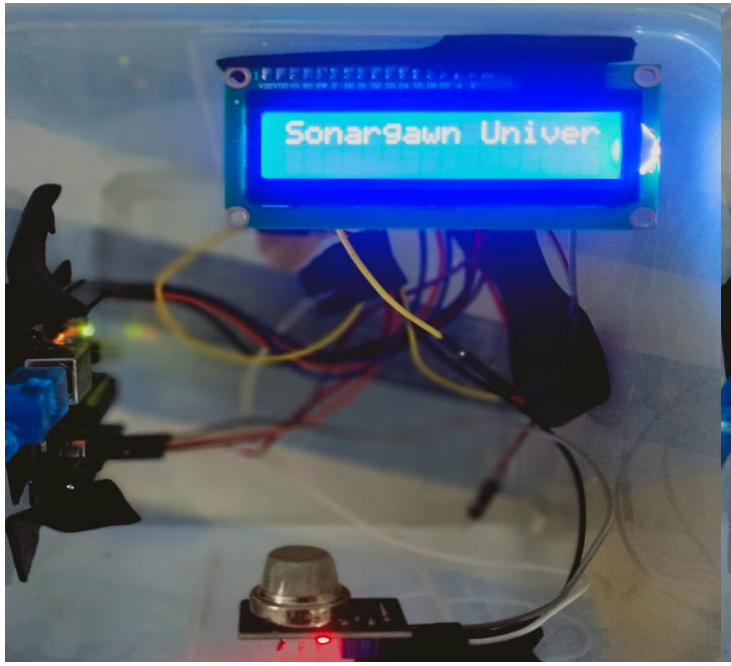
- Air pollution, stemming from both human activities and natural phenomena, poses a pressing global challenge. Various pollutants, including CO, CO2, SO2, NO2, O3, SPM, RSPM, and VOCs, profoundly impact human health. Cities worldwide, irrespective of their developmental status, are confronting the adverse effects of air pollution. Thus, the development of a Microcontroller-Based Air Quality Monitoring system is crucial. This study introduces such a system characterized by reliability, rapid response, long lifespan, affordability, user-friendliness, and low power consumption. Its mobility and data collection capabilities make it suitable for comprehensive air quality assessments. The accompanying software facilitates precise data analysis. This instrument, though simple, holds significant promise for commercial use in monitoring and mitigating air pollution.

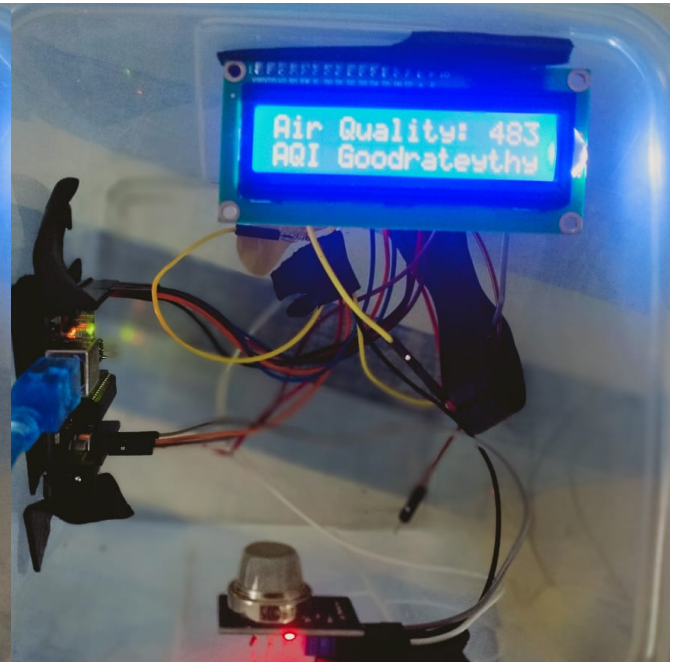
Objectives

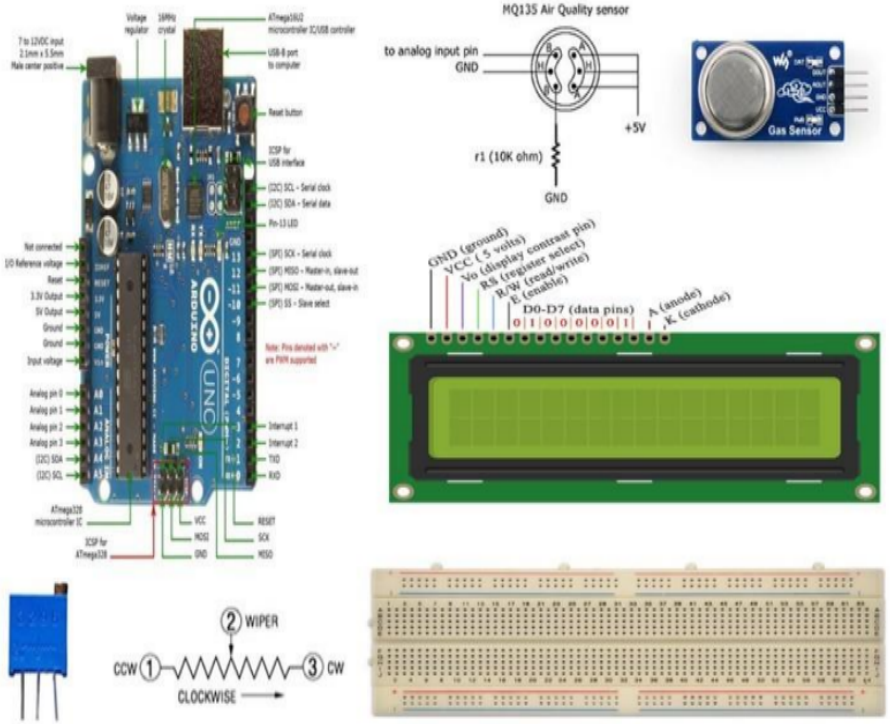
- 1. Develop a Microcontroller-Based Air Quality Monitoring System capable of measuring pollutant levels in the environmental air .
- 2. Design the monitoring system to accurately identify and quantify the presence of harmful air pollutants, including carbon monoxide (CO), nitrous oxide (NOx), ozone (O3), sulfur dioxide (SO2), and particulate matter.
- 3. Implement sensors and data collection mechanisms to monitor air quality both indoors and outdoors, providing comprehensive coverage of pollution levels.
- 4. Integrate the monitoring system with a user-friendly interface, such as an LCD display, to enable easy access to real-time air quality data .
- 5. Raise public awareness about the detrimental effects of air pollution on human health and the environment through air Quality monitoring system device .
- 6. Continuously evaluate and improve the performance of the air quality monitoring system through feedback from users and technological advancements.
- 7. Contribute to the global effort to combat air pollution by sharing insights, findings, and best practices with other cities and regions facing similar challenges.

Method

- In this project work we have chosen a very simple method to and find out the sufficient amount of air pollutants presents in Room air. First, I have developed a simple Atmega 328p based sensor module for collecting air pollutant elements using MQ135 sensors.







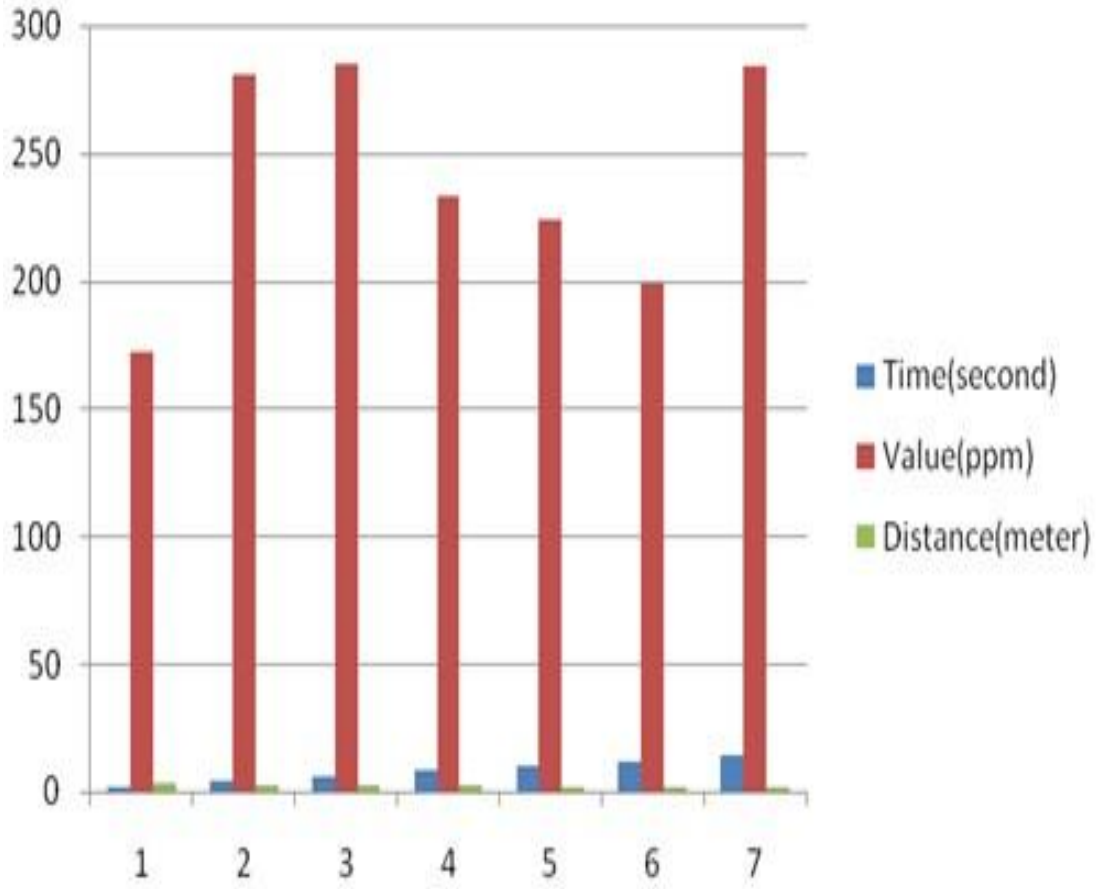
Data collection

Air Quality Index (AQI) Values	Levels of Health Concern	Air Quality Index (AQI) Values	Qualitative name
0 to 50	Good	0 to 25	Very low
51 to 100	Moderate	25 to 50	Low
101 to 150	Unhealthy for Sensitive Groups	50 to 75	Medium
151 to 200	Unhealthy	75 to 100	High
201 to 300	Very Unhealthy	>100	Very high
301 to 500	Hazardous		

Graph

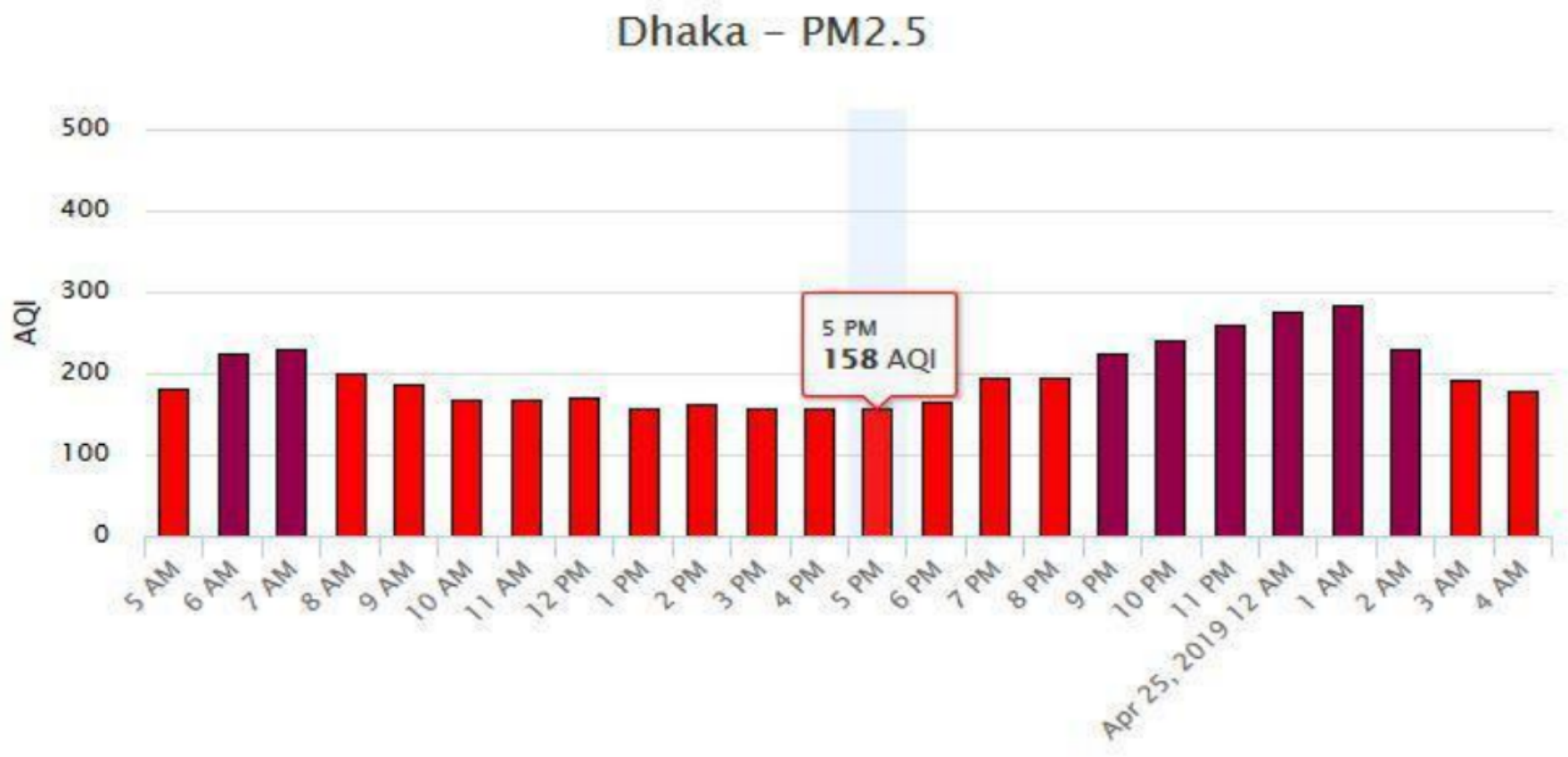
Motorcycle Smoke

Time(second)	Value(ppm)	Distance(meter)
02	172(Polluted air)	3
04	281(Very Polluted air)	2.3
06	285(Very Polluted air)	2.2
08	233(Very Polluted air)	2.5
10	224(Very Polluted air)	2.1
12	199(Polluted air)	2.7
14	284(Very Polluted air)	1.9
16	246(Very Polluted air)	1.3

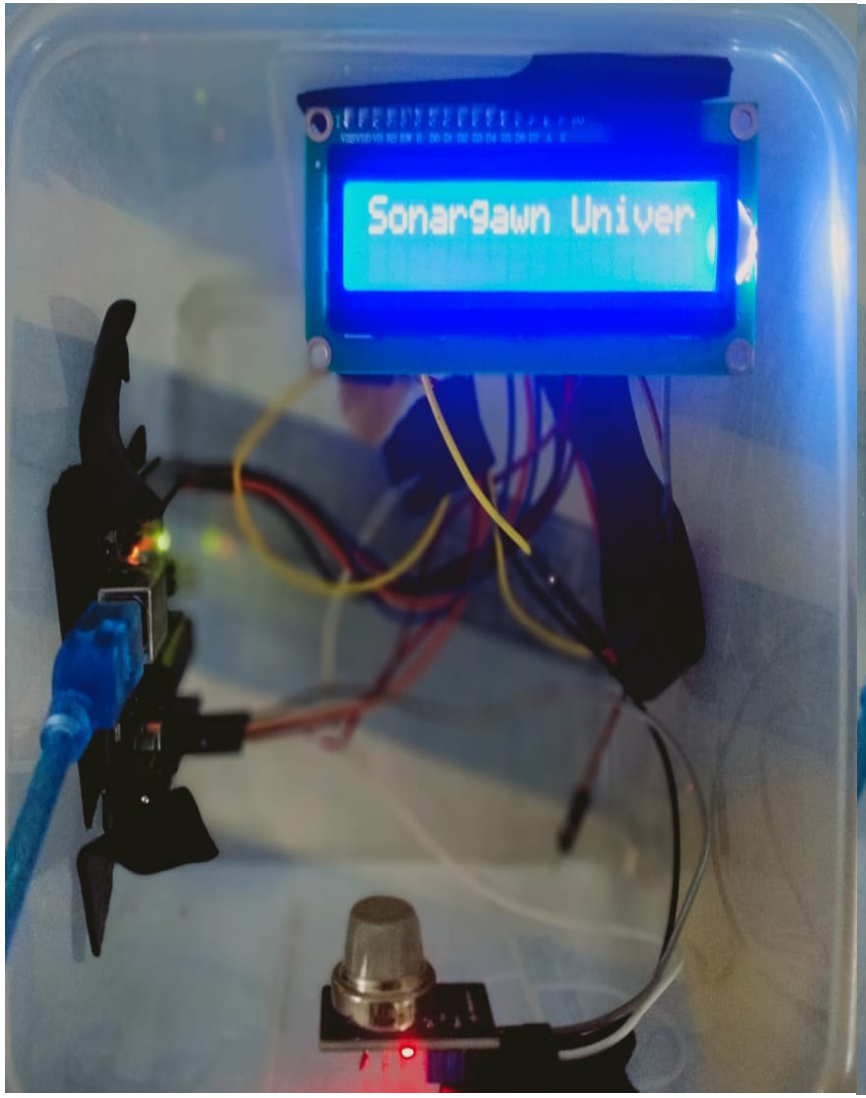


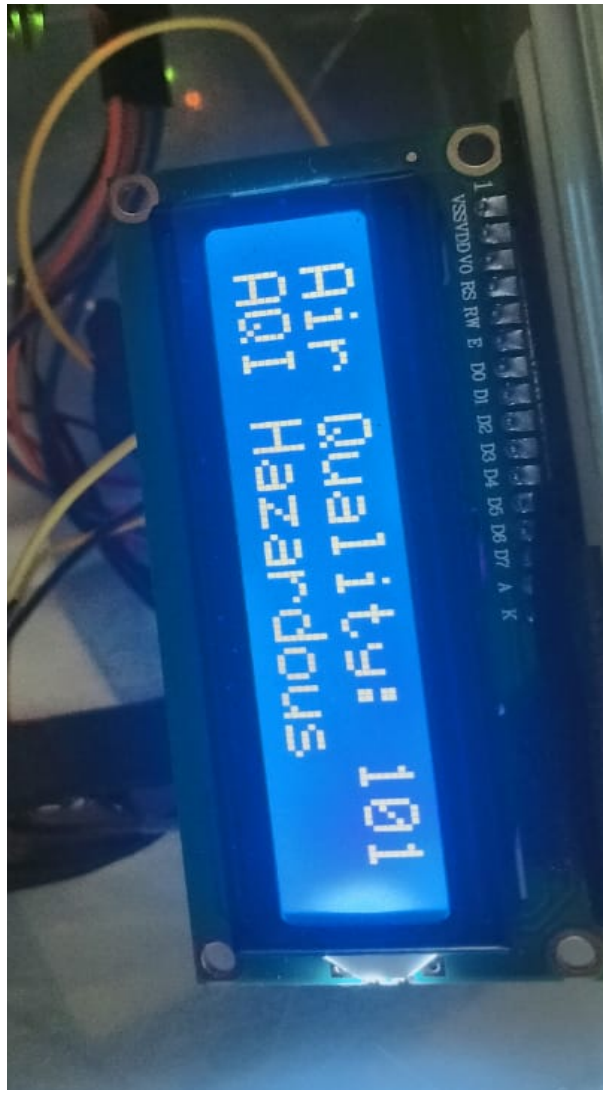
Graph

Air quality graph of Dhaka city



Project Output





Result

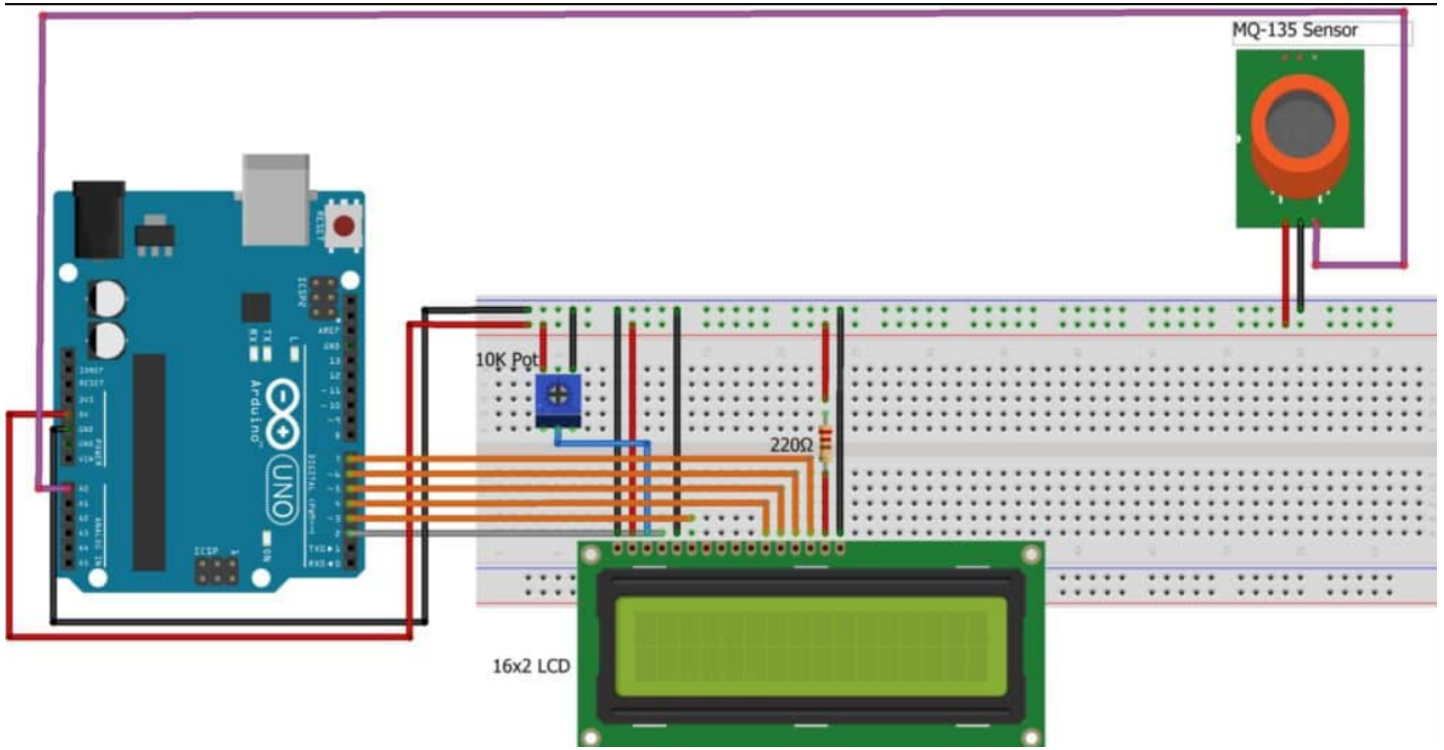
The design of the Arduino-based air quality monitoring detector system encompasses both hardware setup and data collection through Arduino code. Microcontroller -Based Air Quality Monitoring system, measured in parts per million (PPM), was obtained using our customized sensor-detector in various environmental scenarios, including exposure to cigarette smoke, coil burning smoke, and vehicle emissions from the street.

Area	CO(ug/m3)	CO2(ppm)	AQI(ppm)
Uttara(Diabari)	621	397	247
Uttara(House Building)	610	406	213
Tongi Bazar	661	429	278
Khilkhet	598	392	194
Notun Bazar	648	441	259
Badda	657	424	273
Shahbag	604	438	232
Mirpur Circle	646	472	279

Area wise collected data (Average of 30 days)

CONCLUSION

In conclusion, our MICROCONTROLLER -BASED AIR QUALITY MONITORING SYSTEM represents a significant leap forward in the field of environmental monitoring. Through our research and development efforts, we have created a highly effective system that not only rivals costly alternatives in performance but also surpasses them in terms of accessibility and ease of use. By harnessing the power of microcontroller technology, we have crafted a portable solution that empowers users to monitor air quality with precision and convenience.

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We will shine

Thank You