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IoT Based Air Pollution Control System

Abstract:

As the total populace is turning out to be progressively metropolitan, the urban areas are feeling the squeeze to remain reasonable. Lately, the air nature of the urban areas has become one of the significant reasons of worry all throughout the planet.

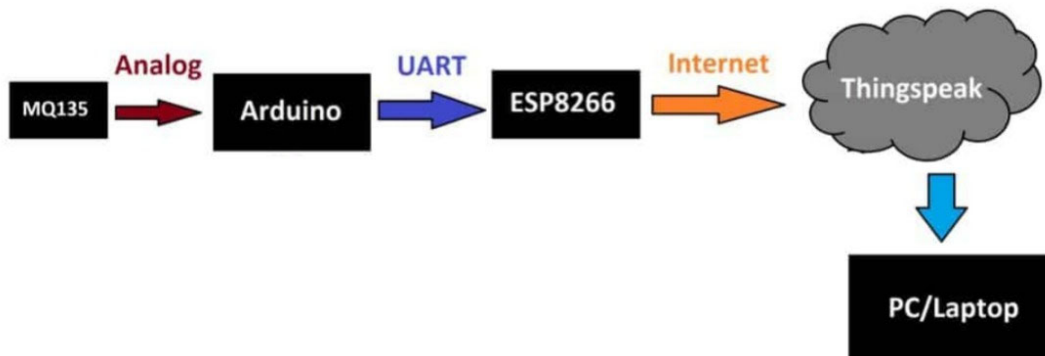
In today's world, air pollution, climate change, and its consequences are of a great concern to the environmentalists and climate change scientists [1]. Emission of various poisonous gases from industries and vehicles are not only hazardous for the terrestrial organism, but the marine life is also getting adversely affected. As the world's population is becoming increasingly urban, the cities are under pressure to remain liveable. Health problems arising due to poor air quality are in increase like stroke, heart diseases, lung cancer, respiratory diseases including asthma [2].

Subsequently, it is important to continually screen the air quality record of a city to make it brilliant and decent by creating an IoT based Air Quality Monitoring System for Smart Cities. The ongoing information of the air quality is gotten to through the brilliant gadgets and broke down to quantify the effect on city inhabitants. The tech-savvy gadgets are fit for estimating the Temperature, Humidity, Carbon Monoxide, LPG, Smoke and other risky particulate issue like PM2.5 and PM10 levels in the air. The accumulated information is open universally through an Android Application.

Requirements:

- MQ135
- ARDUINO KIT
- ESP8266
- THINGSPEAK ACCOUNT
- PC/LAPTOP
- TWITTER ACCOUNT (for live twitter update)

Block Diagram [3]:



Addition and Updates:

- Added Twitter account using 'THINGSPEAK' portal in order to be able to provide real time updates OTA.

Applications:

- Assessing the level of pollution in relation to the ambient air quality standards.
- Providing the real-time contamination in air in ppm.
- Used in hospitals to maintain quality of air.
- Used in air purifiers.
- Used in Industries to measure air contamination.
- Twitter access to share the details on social media.

Advantages:

- Ease of availability of sensors.
- Detection of wide range of gases.
- Simple compact and easily handled.
- Continuous update from time to time.

Challenges:

- Requires PC/laptop to view the pollution level as no direct LCD display is connected.

Conclusion:

In this project A few sensors are deployed in the atmosphere to constantly monitor the Temperature, Humidity, Carbon Monoxide, Smoke, LPG, PM2.5 and PM10 levels in the atmosphere. In this work, a one-way communication between ThingSpeak, an open-source cloud platform. Arduino has been used as a gateway to interface the hardware system. The Graphs are plotted in ThingSpeak according to the sensors data received. The Air Pollution Monitoring System will be implemented and tested in real-life working condition after simulation is done. A large-scale node placement and data gathering can be planned for the purpose of forecasting of air pollution.

References:

- [1] Frances Moore, "Climate Change and Air Pollution: Exploring the Synergies and Potential for Mitigation in Industrializing Countries", Sustainability, 2009. Vol. 1(1), pp. 43-54.
- [2] Brook RD, F.B., Cascio W, Hong Y, Howard G, Lipsett M, Luepker R, Mittleman M, Samet J, Smith SC Jr, Tager I; "Air pollution and cardiovascular disease: a statement for healthcare professionals from the Expert Panel on Population and Prevention Science of the American Heart Association", Circulation, Vol. 109 (21) June 1, 2004.
- [3] [IoT Based Air Pollution Monitoring System – Arduino – DIY Electronics Projects \(electronics-project-hub.com\)](https://electronics-project-hub.com)