

IoT Air Pollution Monitoring System

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ABSTRACT

Air quality must be monitored and kept under control for a better future and a healthy life. Here we propose an air quality as well as an air pollution monitoring system enable us to monitor and control the quality of live air through IoT in specific areas. This system used sensor to constantly detect harmful gases in the air. System also maintains the air level measurement and reports it via IoT to the Blynk application. The sensor interacts with the microcontroller to process the data and transmit through the internet. This allows authorities to monitor and take action against air pollution in various areas. Authorities can also monitor air pollution in the vicinity of school, and hospital. Where the system detects the air quality problem, the authorities are alerted so they can take control measure. The main component of IoT air pollution monitoring system is Arduino Mega 2560 as a microcontroller. The input used is MQ135 sensor and MQ-7 to detect contaminated air. This sensor will place at a higher place to easily detect the pollution air. There are 3 output are LEDs, Wi-Fi module, and LCD display. This probably uses a LED and buzzer as an indicator on this system to show the system is running. The LCD is used to show the air concentration either the safe air or not. If the air is polluted, the system will bring alerts to nearby areas. This Wi-Fi module helps a nearby people to know information about air concentration. This surely can make they feel safe because they can know about current air concentration.

KEYWORDS: Air pollution, Internet of Thing (IoT), Arduino Mega, air quality

1 INTRODUCTION

Today, air pollution monitoring system is one of the most important things around the world where people can monitor by themselves at anywhere and anytime. The systems are very useful especially at public area to prevent unhealthy life. Each industry area must have an air pollution system to keep on monitor about their air quality at their area. As results, many people show a lot of interest on this system from engineering level itself.

The Changing Paradigm of Air Pollution Monitoring team from Environmental Science & Technology has been implemented this system to collects data by using air pollution sensors [1]. This project can measure concentration of gas phase species and kept the data. The

prototype was successfully developed with low cost maintenance and in a good condition at all the time.

Secondly, Kavi K. Khedo and their team has designed a wireless sensor network air pollution monitoring system [2] for Mauritius. They also monitor the quality of air when the numbers of vehicles increase. Next, their team also make a node at certain area based on Air Quality index (AQI) at 6 areas by using their system to make a data and level air quality.

A team from Department of Electrical and Information Engineering, Covenant University, Ogun State, Nigeria has been design a smart air pollution monitoring system. Air is one of the essential elements of human's surroundings. The earth's atmosphere is full of air which contains gases such as Nitrogen, Oxygen, Carbon Monoxide and traces of some rare elements. Humans need an atmosphere of air that is free from contaminants [3]. This project is using Arduino Uno as a microcontroller, ESP8266 Wi-Fi Module and also MQ-135 as their gas sensor that can detect quality air at surrounding. The data has been record and by daily and show by using graph on part per million (PPM) value.

2 OBJECTIVE

This work embarks on the following objectives:

- i. To design an IoT air pollution monitoring system by using Arduino Mega 2560 microcontroller.
- ii. To develop a system that can detect air pollution

3 SIGNIFICANCE (S)

This project will help to detect harmful gas and give an information to nearby area. With this project, people can avoid from food poisoning. Other than that, the authority can take first action to control the gasses from spread out to another place. Next, the budget to make this project is low and this system can be apply at all places especially at the factory site. Last but not least, this project is also environmentally friendly that people can use it to monitor the air quality at surrounding

4 METHODOLOGY/TECHNIQUE

The block diagram of the IoT Air Pollution Monitoring System is shown in Fig. 1. The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analogue inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. This microcontroller has been connecting to MQ-7, MQ-135, ESP8266 Wi-Fi module, LED, LCD and buzzer on this project. Sensitive material of MQ135 gas sensor is SnO₂, which with lower conductivity in clean air. The LCD will display the reading from MQ-135 and also MQ-7 based on ppm value.

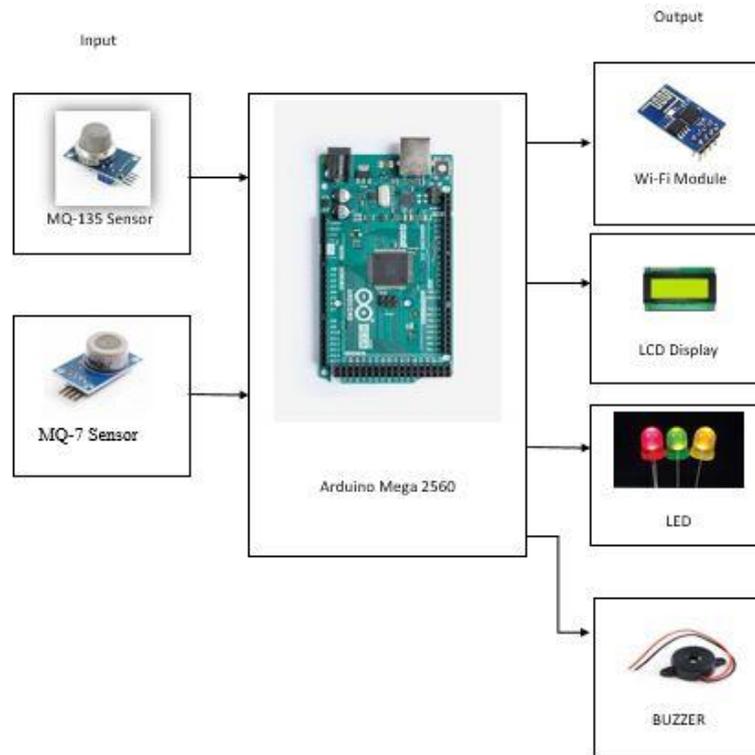


Fig. 1: IoT Air Pollution Monitoring System

5 RESULT



Fig. 2: LCD Reading

The Fig. showed the value of gas that have been detected by sensor and has been displayed on LCD. The LCD shows the concentration of gas in good condition. So people can breathe air safely.



Fig. 3: Testing Air Concentration at Terminal Bus Pasir Gudang



Fig. 4: Terminal Bus Pasir Gudang

Based on Fig. 3 and Fig. 4, the value of gas was detected at bus area. The value was increased because of the sensor detect gases from vehicles around the bus station. Based on results, the reading of Carbon Monoxide (CO) is 39 PPM and this reading can be monitored by using Blynk application.

6 CONCLUSION

This project can be used to give a warning about the air pollution to make sure people from the surrounding does not affect with harmful gas. This can avoid from poisonous food and water that make the people sick and vomit. With this system, human live can be safe from a harmful gas.

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