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# Air Quality Analyzer using Arduino to Measure Dust Particle Density and PM2.5, PM10 Particle Concentrations in Air

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**ABSTRACT:** Recently, there is increasing public awareness of real-time air quality due to air pollution that could have negative effects on human health and environment. Measuring air quality is important to bring more information to people so that they can care for future generation's healthy lives. Already, New Delhi is still known as the world's most polluted city recording more than 300PPM air quality. In this project a cost-effective and portable air quality measurement device has been made. This device allows people to measure air quality in any location they want. It can measure dust particle density and PM10 & PM2.5 particle concentrations in the air.

**KEYWORDS:** Air quality, air pollution measurements

## I. INTRODUCTION

It is very important for people to know the current level of air around them. They should know that they are breathing clean air or polluted air. This is because air pollution is ranked fourth in the world at risk of death. Air pollution can cause serious health effects such as respiratory and cardiovascular diseases besides air pollution resulted in global warming and climate change. Malaysia uses the Air Pollutant Index (API) to determine air quality. Different countries have different quality indicators for example, the United States and China use the Air Quality Index (AQI), Canada and Hong Kong use the Air Quality Health Index (AQHI), Singapore use the Pollutant Standards Index (PSI) and Europe use the Common Air Quality Index (CAQI). Recent haze incidents in Southeast Asia has shown the importance and urgency of developing a portable and low cost air quality monitoring device. The main objective is to supply a reliable, convenient and efficient system for air quality analyzing. pollution may be a major issue in several cities and also the air quality index is obtaining worse a day. in step with the Environmental Protection Agency (EPA), indoor air may be two to five times additional venomous than out of doors air. Thus this method is made to observe air quality by measure PM2.5, PM10, and dust particle density within the air.

## II. RELATED WORK

[1] K.J. Maji, M. Arora, and A. K. Dikshit Burden of malady attributed to close PM2.5 and PM10 exposure in a hundred ninety cities in China. Burden of malady attributed to close PM2.5 and PM10 exposure in a hundred ninety cities in China. Burden of malady attributed to close PM2.5 and PM10 exposure in a hundred ninety cities in China. [2] DOE-Malaysia A Guide to Air waste matter Index (API). The Air waste matter Index (API) in Malaysia is measured by Department of atmosphere (DOE) victimization stationary and dearly-won observation station known as Continuous Air Quality observation stations (CAQMs) that are solely placed in areas that have high population densities and high industrial activities.

[2] A. Azid, H. Juahir, M. E. Toriman, M. K. A. Kamarudin A. S. M. Saudi, C. N. C. Hasnam, N. A. A. Aziz, F. Azaman, M. T. Latif, and S. F. M. Zainuddin. Prediction of the amount of pollution victimization principal element analysis and artificial neural network techniques. from 5 days activity consecutively, within which the activity took eight hours per day by victimization affirmative and LGA Meter to capture the prevailing greenhouse emission

### III. METHODOLOGY

The circuit diagram consists the components of core components of 12V Power supply, regulator IC, NANO microcontroller, GP2Y1014AU Sensor, (SDS011) Sensor, LCD Display.12v Power Supply is given to regulator for voltage regulating 12v to 5v then 5v supply is given to Nano microcontroller.VCC and GND pins are connected to regulator.GP2Y1014AU & (SDS011) SENSOR are connected to Nano microcontroller. VCC is connected to positive and GND is connected to negative. Output pins are connected to analog pins. LCD displays the value of air quality range of the atmosphere.

### IV. EXPERIMENTAL RESULTS

This project will be used to measure the particle concentrations of PM2.5, PM10 and dust particle density in the air and the data can be successfully implemented and will be displayed in LCD.



FIGURE 1: when no input is given

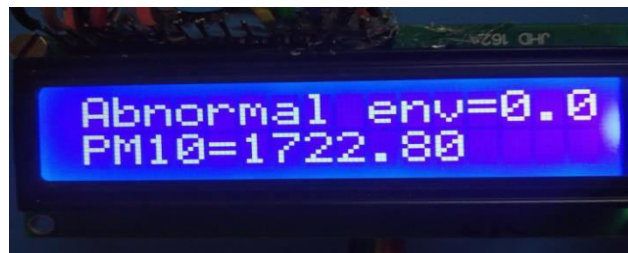


FIGURE 2: when the pm are concentrations are high

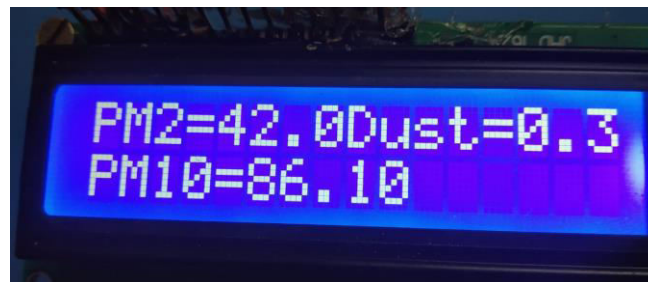


FIGURE 3: when the particle concentrations and the dust particle is present



## VI. CONCLUSION

In this project, an air quality monitoring system has been successfully developed and implemented. The device uses the microcontroller and two pollutant sensors which are PM and IR dust sensor. This system is cost efficient and portable compared to the existing monitoring systems which are stationary and costly. It is convenient to be used by people of all ages and also can be used anytime and anywhere.

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