

## DESIGN AND ANALYSIS OF IOT BASED AIR QUALITY MONITORING SYSTEM

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### ABSTRACT

This system develops an Internet of Things (IoT) that enabled air quality monitoring system mobile in nature analyzing real-time surrounding data measuring Carbon Monoxide, Smoke and PPM level. The system can measure local area air contamination and generate analyzed data based on which it alerts the people through a buzzer device integrated into the system. We have proposed a cost-efficient air quality monitoring system that senses the real-time data of surrounding various parameters like smoke, carbon monoxide, and PPM level and alerts the people when the quantity of these elements goes beyond a certain limit and shows the data in an easily understandable format.

### INTRODUCTION

The prototype connects with Wi-Fi and uploads all air. When air gets mixed with harmful gases and substances, it is called air pollution. The major pollutants of air are gases such as ammonia, carbon monoxide, Sulphur dioxide, Nitrous oxides, methane and etc.,

The sources of pollutants are Industrial emissions, hazardous emissions from vehicles, burning of fossil fuels etc., Pollutant air can cause severe effects such as heart disease, lung cancer, Respiratory infections etc.,

This project is aimed to develop an IoT based application to deal with air pollution, with the help of sensors such as MQ135 various air parameters are sensed and transmitted.

NodeMCU plays an important role in this project.

parameters to the centralized server.

### BLYNK

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things.

There are three major components in the platform:

- **Blynk App** - allows to you create amazing interfaces for your projects using various widgets we provide.
- **Blynk Server** - responsible for all the

communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi.

- **Blynk Libraries** - for all the popular hardware platforms - enable communication with the server and process all the incoming and outgoing commands.

### 3.2 Features

- Similar API & UI for all supported hardware & devices
- Connection to the cloud using:
  - Wi-Fi
  - Bluetooth and BLE
  - Ethernet
  - USB (Serial)
  - GSM
- Set of easy-to-use Widgets
- Direct pin manipulation with no code writing

### HARDWARE REQUIREMENT

We can see from the pinout image above, there are five ground pins and three 3V3 pins on the board. The board can be powered up using the following three ways. USB Power. It proves to an ideal choice for loading programs unless the project you aim to design requires separate interface i.e.

disconnected from the computer. Provide 3.3V. This is another great option to power up the module. If you have your own off-board regulator, you can generate an instant power source for your development kit. Power Vin. This is a voltage regulator that comes with the ability to support up to 800 mA. It can handle somewhere between 7 to 12 V. You cannot power the devices operating at 3.3 V, as this regulator unable to generate as low as 3.3V.

Power up the board and open the serial monitor from arduino IDE after connecting to the wifi it will show you the IP address. type that IP address on the web browser(Edge, Chrome, Firefox etc..) A webpage will open you can change the status of LED by turning it ON or OFF. Copy, Paste and Upload the Tutorial Sketch The sketch is one that comes as an example from ESP8266.COM. `#include "ESP8266WiFi.h" void setup() { Serial.begin(115200); // Set WiFi to station mode and disconnect from an AP if it was You can either use the digital pin or the analog pin to do this. Simply power the module with 5V and you should notice the power LED on the module to glow and when no gas it detected the output LED will remain turned off meaning the digital output pin will be 0V. Remember that these sensors`

have to be kept on for pre-heating time (mentioned in features above) before you can actually work with it. Now, introduce the sensor to the gas you want to detect and you should see the output LED to go high along with the digital pin, if not use the potentiometer until the output gets high. Now every time your sensor gets introduced to this gas at this particular concentration the digital pin will go high (5V) else will remain low (0V).

You can also use the analog pin to achieve the same thing. Read the analog values (0-5V) using a microcontroller, this value will be directly proportional to the concentration of the gas to which the sensor detects. You can experiment with this values and check how the sensor reacts to different concentration of gas and develop your program accordingly.

A voltage regulator is an electrical regulator designed to automatically maintain a constant voltage level. It may use an electromechanical mechanism, or passive or active electronic components. Depending on the design, it may be used to regulate one or more AC or DC voltages. There are two types of regulator are they.

- Positive Voltage Series (78xx) and
- Negative Voltage Series (79xx)

78xx:'78' indicate the positive series and 'xx' indicates the voltage rating. Suppose 7805 produces the maximum 5V.'05'indicates the regulator output is 5V.

79xx:'78' indicate the negative series and 'xx' indicates the voltage rating. Suppose 7905 produces the maximum -5V.'05'indicates the regulator output is -5V

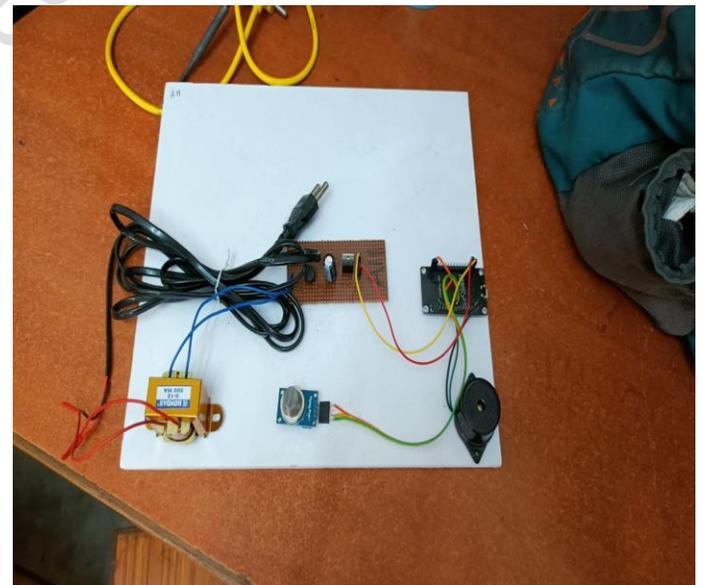
These regulators consists the three pins there are

Pin1: It is used for input pin.

Pin2: This is ground pin for regulator

Pin3: It is used for output pin. Through this pin we get the output.

## RESULTS



## CONCLUSION

Monitoring the environmental parameters especially with respect to air plays very important role to ensure healthy environment for living beings. We have seen

various hazards being caused at Delhi due to air pollution. There are many reasons for causing air pollution but knowing their concentration at various locations helps to take decisions on prevention measures.

The proposed application works on the principle of IOT, data is read from the sensor and processed by the processor (ESP32) then uploaded to the database, these data are analysed and displayed to users, and user could fetch this information over phone or webserver and take proper action to prevent pollution.

## REFERENCES

- [1]<https://securedstatic.greenpeace.org/india/Global/india/Airpocalypse--Not-just-Delhi--Air-in-most-Indian-cities-hazardous--Greenpeace-report.pdf>
- [2]<content/uploads/2008/04/5v-regulator-using7805.JPG>
- [3]<https://store.arduino.cc/arduino-uno-rev3>
- [4]<https://www.arduino.cc>
- [5]<https://www.aliexpress.com/item/1PCS-LOTSolution-PH-valuo-Temperature-detector-sensormodule-for-arduino-Freeshipping/32620995019.html?spm=2114.4001>