

# IoT based Air Quality Monitoring and Controlling System using Raspberry Pi

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**Abstract** - With the tremendous increase in the level of population and mechanisation pollution has increased many folds. This results in deterioration of individual health thereby by directly affecting health of entire population. An IOT Based Air Pollution Monitoring System is proposed which will monitor the level of pollution and Air Quality over a web server using internet. Sensors can be deployed at various locations which can sense and collect the data. The big data can be uploaded on the Google cloud which facilitates monitoring from any part of the globe. The presence of harmful gases like CO<sub>2</sub>, Smoke, carbon monoxide above a particular limit may turn fatal which can lead to severe accidents. This type of accidents can be prevented by implementing an effective pollution monitoring and controlling system. The air quality can be displayed on the LCD and as well as on webpage which makes environment monitoring easy. Air quality monitoring and controlling system is proposed in this project, which enable us to monitor and check real time quality or the air temperature, humidity in specific region through IOT.

In this project we can also control the quality of air pollution by using air filtering which absorb the carbon in the air and produce a fresh air.

**Key Words:** IoT, Sensors, monitoring, pollution, web server, internet, cloud, filter.

## 1. INTRODUCTION

In this day and age, air pollution is certainly an issue of significance. To keep it in control and provide a better quality of life for all, air quality should be monitor and control.

In this project we can measure air quality by using "Raspberry pi", temperature and humidity sensor, gas sensor, dust sensor. Sensors have been used to detect the presence of harmful gases/compounds, which are continually transmitted to a controller.

Air quality monitoring and controlling system is proposed in this project, which enable us to monitor and check real time quality or the air temperature, humidity in specific region through IOT.

In this project we can also control the quality of air pollution by using air filtering which absorb the carbon in the air and produce a fresh air.

## 2. RELATED WORK\LITERATURE REVIWE

This project describes the IOT Based Air Quality Monitoring and Controlling System Using Raspberry Pi. In previous paper the monitoring system is done with the help of raspberry pi. In some system GSM is used for information send but it not store large amount of data. The previous systems are only on the monitoring, so it not control the pollution. In this project we used raspberry pi, different sensors, ATmega328p-pu, firebase platform and air filter using these pollution is monitor and control. We can check pollution level on mobile/laptop through fire base platform where data is stored.

## 3. PROPOSED METHODOLOGY

### Existing system:

In earlier days monitoring system is done by using aurdino and raspberry pi. There is no any controlling system to control pollution.

### Proposed solution:

The proposed solution of our system which monitoring as well as controlling the pollution by using sensors and air filter. Our system reduces the environmental pollution.

### 3.1 BLOCK DIAGRAM

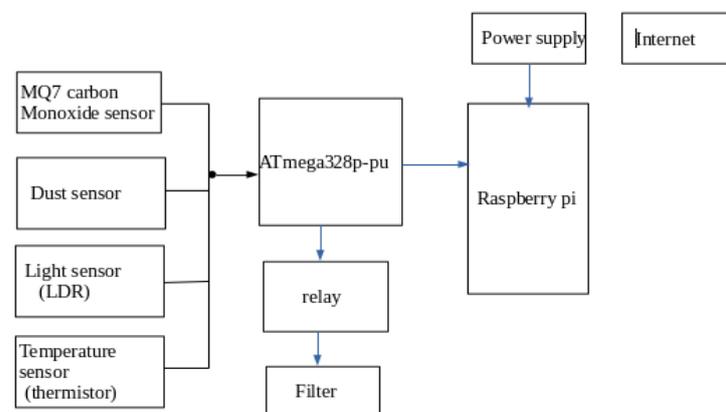
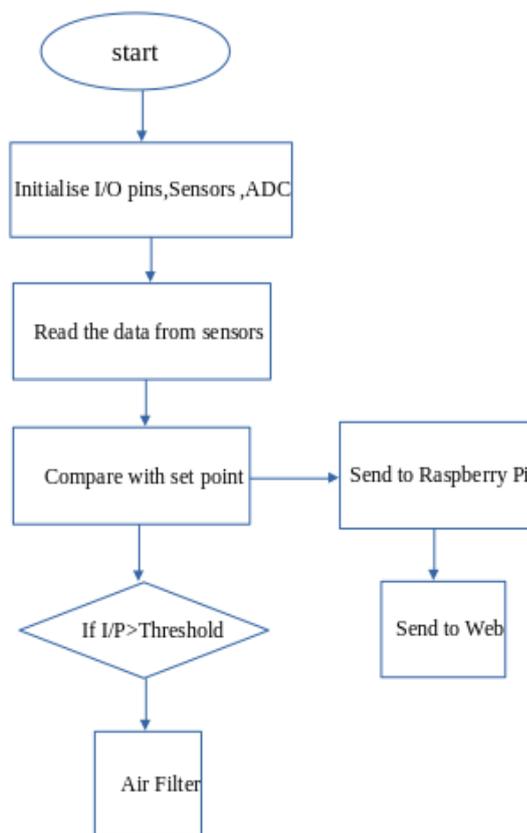


Fig 1: -Block diagram

In this project we use three sensors, power supply, Raspberry Pi, Atmega328p-pu, website access. The sensors are named as MQ 7 carbon sensor, temperature sensor, dust sensor. The sensors have been used to detect the presence of harmful gases/compounds, which are continually transmitted to a ATmega328p-pu which has in-built ADC. Threshold levels of the sensor are set at the Atmega328p-pu.

If sensors output > threshold level then it will send message to the website using IOT through Raspberry Pi and automatically air filter turns ON .Air filter is one of the vaccum chamber which will abstract carbon and dust particles from the air . It continuously detects the pollutant and send message to the website using IOT even if their is no pollution.

**3.2 FLOW CHART**



**Fig 2:** -Flow chart

**4. SIGNIFICANCE AND SCOPE**

Chemical reactions involving with air pollutants can create acidic compounds, which can cause harm to vegetables, crops, animals, humans and buildings. Sometimes, when an air pollutant, such as sulphuric acid combines with the water droplets that make up clouds, the water droplets become acidic, forming acid rain.

When acid rain falls over an area, it can kill trees and harm animals, fish, and other wild life. Air monitoring is an integral part of an effective air quality management system. Air monitoring is useful to assess the extent of pollution in urban cities.

In this project we can also control quality of the air in the environment by using air filter. Air filter is one of the vaccum chamber which will abstract carbon and dust particles from the air.

**5. RESULT:**

Using different sensors connected to a Raspberry Pi module, environmental parameters like gas density, humidity, temperature and dust are observed and recorded at frequent intervals.

We can also control the quality of air pollution by using air filter, which absorb the carbon in the air and produce a fresh air.

A system which can monitor the leakage of toxic gases and hence the level of pollution using Raspberry-Pi and IoT is proposed which can prevent fatal accidents. By the use of MQ135/6/7 gas sensors the poisonous gases can be sensed and alert can be given to save the life of people. Raspberry-Pi serves as the heart of this module which controls the entire process. Wi-Fi module connects the whole process to internet and LCD is used for the visual Output. The use of wearable technology is also a mile stone which can ensure the safety of workers in the industrial floor. The air monitoring system can help in the innovation of new practices to overcome the problems of the highly-polluted areas, which is a major issue. It supports the new technology and effectively supports the healthy life concept.

**Output:**

sensors	Output in ppm
Mq7 gas sensor (P)	110
Tempereture (T)	24
Dust (D)	46
Light (L)	18

Above results are display on LCD and firebase also using raspberry pi.

This is normal reading when pollution is low, means when dust is low output goes high and vice versa. And at night or low light intensity light sensor output goes low and vice versa.

When p >200 ,air filter turns ON.it fiter the air and when the air is filter it turns off.

## 6. CONCLUSIONS

Using different sensors connected to a Raspberry Pi module, environmental parameters like gas density, humidity, temperature and soil moisture are observed and recorded at frequent intervals.

We can also control the quality of air pollution by using air filter, which absorb the carbon in the air and produce a fresh air.

A system which can monitor the leakage of toxic gases and hence the level of pollution using Raspberry-Pi and IoT is proposed which can prevent fatal accidents. By the use of MQ135/6/7 gas sensors the poisonous gases can be sensed and alert can be given to save the life of people. Raspberry-Pi serves as the heart of this module which controls the entire process. Wi-Fi module connects the whole process to internet and LCD is used for the visual Output. The use of wearable technology is also a mile stone which can ensure the safety of workers in the industrial floor. The air monitoring system can help in the innovation of new practices to overcome the problems of the highly-polluted areas, which is a major issue. It supports the new technology and effectively supports the healthy life concept.

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