

IOT WITH ANDROID APPLICATION STUDY FOR INDUSTRIAL AIR POLLUTION

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ABSTRACT

Now a day's industrial pollution is one of the biggest questions in front of the world we know industries are helping to grow our technology but we also know its side effects because the main region of global warming, decrease ozone layer some of the symptoms of increasing air pollution into the atmosphere. Government organized many rules to overcome the industrial air pollution but day by day toxic gases are increasing into the air so the industries follow with technology such as the combination of IoT and Android becomes good result to monitor the toxicity into the atmosphere and give the best result of the day, night period including whether, date and time, however, android helps to alert the people or industrial workers about obnoxious level, IoT helps alarm system with blinking light, android support various IoT sensors few sensors we are studied in this paper which are widely used in industrial work.

Keywords: IoT, Android, air Pollution, air pollution sensors, MQ2, MQ7, MQ135, MQ138.

INTRODUCTION

Today is the World of Industries because human beings researches in different areas to develop for new technologies. Industries like oil industries or mining industries or

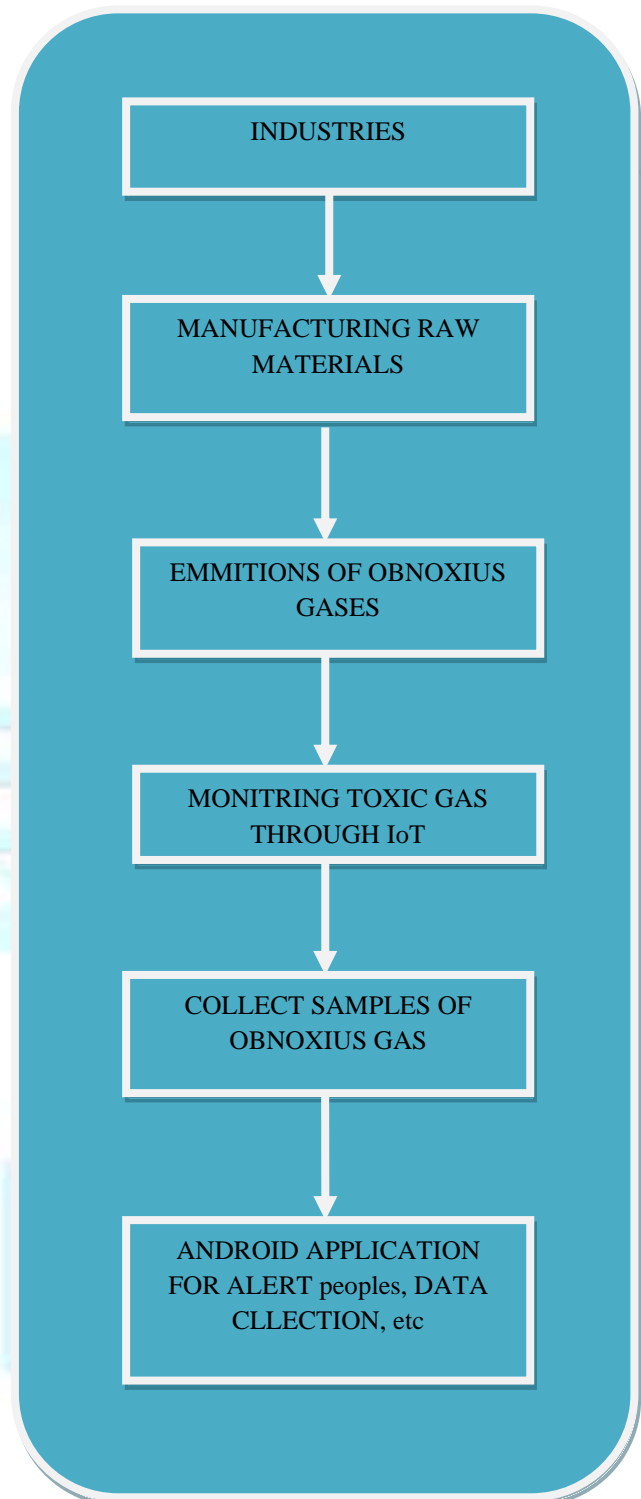
chemical industries that type of industries vomit high obnoxious gases in the air and these are harmful for humans and animals life who leave in the industrial areas. Their peoples and industry workers daily breathe the poisonous gases or air so, that's why they suffer from major diseases like Lungs Censer, Asthma etc. In our past days, people worked in the Mining areas they feared to gone in depth of mine because there some poisonous gases leakage, if humans suffer and breathed these poisonous gas during the work in depth there was no chance to save that workers life. After some few years worker got the solution. workers carried candle or bird on their hand if they have gone in-depth of mining“ if the candlelight is on so there is no poisonous gas available means they detect it “safe zone area” and “ if the candlelight is off they detect “ the danger zone area” and try to run quickly on the safe zone. But this method was less effective and most of the time workers cause to death. But now the situation is changed and human beings create many new technologies to overcome these types of problems. Now many new hardware technologies are available in the market

which helps to detect the obnoxious gases in the air with the help of sensors and help to take the right action on time and save humans and animals life also.

Information about IoT sensors with Android Application

Internet of things (IoT) and Android application are the best combination of advanced technology. It becomes help to work fast in industries. It helps to measure air pollution, industrial air pollution [1] not only to air pollution but also to detect or monitor water pollution, pressure [2], and light sensors. Android is software which becomes an android application for mobile, tablets, Smartphone, etc. android OS easy to run on any platform with languages such as java, c, c++, and kotlin.

flowchart: IOT and Android app.



IoT sensor which are easy to use with Android application

Following are some air Pollution sensors (IoT sensors) which are widely used in industry to calculate toxic and odorous gas level in air. Those sensors are easily used with an android system which makes human works easy and fast.

1) MQ2 Gas Sensor :

MQ2 gas sensors practically used to detect obnoxious or poisonous gases in homes or industries. Obnoxious gases like- LPG, smoke, Alcohol, Propane, Hydrogen, Methane, and Carbon Monoxides (CO). These are very fast to detect poisonous gases and alert at the right time. MQ2 gas sensor works on the basis of room temperature and create an analogue signal in the output form.

• Working principle of MQ2 Gas Sensor

MQ2 gas sensor is a metal oxide semiconductor (MOS) it is also called as 'chemiresistor' Because it always give the output on the basis of changing resistance when the poisonous gas bombarded or fetch to the metal.

2) MQ7 Gas Sensor :

MQ7 gas sensor is used to detect the harmful or obnoxious gases in the air like- Carbon Monoxide (CO) .it detects the carbon particles in the air which is harmful for humans and animals live and also harmful for the environment. If continuously humans and animals breathe that type of harmful gases, it may be cause to death. MQ7 gas sensor

detect the poisonous or toxic gas in the air on the basis of High or low temperature. The mapping range of the MQ7 sensor is 20 to 2000ppm for detecting carbon particles in the air and help to take a quick action on time.

• Working principle of MQ7 Gas sensor

MQ7 gas sensor having six pins but it divided into two parts in the first part four pins are used to fetch signals and in the second part remaining two pins are work to provide heating current.

3) MQ135 Gas Sensor:

MQ135 gas sensor is used to detect various types of obnoxious or poisonous gases like Benzene, Smoke, Steam, and other poisonous or harmful gases. There is also beneficial to detect other poisonous gases.

• Working principle of MQ135 Gas Sensor

MQ123 gas sensor is a sensor to detect nitrogen oxide, ammonia, alcohol, carbon dioxide and other toxic gases. This sensor unit is made up of tin dioxide (SnO₂).

4) MQ138 Gas Sensor :

MQ138 gas sensor used to detect or monitor the obnoxious gases in industries and domestic areas, it also detects the amount of Volatile Organic Compounds (VOCs) like lung cancer, Asthma. Many industries vomit the toxic gases, their workers, and surrounding people's daily breathe poisonous gases that's why they are suffering from lung cancer. MQ138 is less costly and easily available in the market it is very sensitive to detect the poisonous gas fastly.

- **Working principle of MQ138 Gas sensor**

The MQ138 gas sensor users can change the conductivity level on the basis of output signals. MQ138 gas sensor having high sensitivity to sense the poisonous gases like methanol, alcohol, acetone, and other poisonous gases like hydrogen.

Above IoT sensors widely used to detect the industrial air pollution with an android application which can be easily calculated toxic level into the atmosphere however android application helps to alert or give exact information about toxic levels everywhere any time.

Literature survey on industrial air pollution

The author Md Nazmul Hoq et al [1] considered the air pollution monitoring system with an android application having used for monitored the air quality and give accurate information as well as this device very helpful for Asthma patients to alert about unsafe zone. In this paper, the author used unsupervised learning techniques and analyzing method for frequently taken air pollution data.

The author Hossein Jafari et al [2] considered an environmental air monitoring system using a community-based approach. This system used for sensing COTS Sensordrone paired with Android Smartphones. This system has the ability to measured CO, Humidity, Pressure, Temperature, battery charge level, etc.

The author Kodrat Iman Satoto [3] considered the mobile device applications (Android) and external sensors which are used for monitoring the real-time air pollution as well as alert the people about high polluted areas.

The author Carlos Stefano Rojas-Ascate et al [4] considered the MIT app inventor that works with Android OS which has used to monitor the real-time polluted air data. This app specially developed for monitoring the CO level in the atmosphere. In this article, the author used the MQ7 gas sensor with the Zigbee protocol.

The author Swati Dhingra et al [5] considered the smart devise system for air pollution. In this article, the author used the three improved monitoring system IoT, Aurdino, and Wi-Fi with Android application IoTMobair so that users can access relevant air quality data from the cloud. This proposed system has analogous to Google traffic or the navigation application of Google Maps.

The author Ade Silvia Handayani et al [6] considered the automatic air pollution monitoring for motorized vehicles that will be applied in the indoor parking area. In this article, the author introduced the real-time monitoring system which was based on the IoT application with WSN technology.

The author Ke Hu et al [7] considered an air pollution monitoring system for a low-cost participatory sensing system called Haze Watch that uses a combination of portable mobile sensor units, smart-phones, cloud computing, and mobile apps

to measure, model, and personalize air pollution information for individuals.

The author Hans-Petter Halvorsen et al [8] considered the mobile alert system for polluted air monitoring. In this paper, the author used the NILU dataset from different locations as well as problem-based learning assignments.

Conclusion

In this study, IoT and Android app very beneficial for industrial air pollution monitoring because it gives the information about danger zone area and quickly alert. Obnoxious gas tracker apps useful for asthma patients, lungs, heart disease patients. IoT with Android performs quick action alert industrial workers and surrounding peoples before cause any death. IoT sensors capable to monitored information about the level of toxic gases, place, area, location with map through GPS, date and time, working period of day and night including weather and seasons like summer, winter, etc. these all information we can easily collect through android app, because the internet of things is a platform to connect multiple devices at a time.

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