# IOT Based Environmental Pollution Monitoring and Prediction Analysis Using Machine Learning

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ABSTRACT: Nowadays, Industries violate the environment and create the environmental issues like greenhouse effects and diseases which are harmful to human beings. To neutralize such unsteadiness in nature a pollution monitoring system is necessary in today's world. The main objective of our project is to design an efficient and robust system to control the parameters causing pollution and to minimize the effect of these parameters without affecting the plant or natural environment. This project proposes a system of monitoring and controlling pollution parameters like CO, SO2, temperature and humidity caused by industrial emissions due to process. If industry unit pollutants range above the industrial standards, then automatically the power gets terminated through the transformer and license has been abandoned by the Government. A mechanism using GSM which sends details to the authorized person of Tamil Nadu Pollution Control Board (TNPCB). Mainly Internet of Things (IoT) is used to address this problem. GSM and IOT is introduced in this proposed methodology, which will automatically monitor and control when there is a pollution affecting the environment.

#### Keyboard-- GSM Modem, CO2, DT12 Sensor, LM35, Arduino Board.

## I.INTRODUCTION

The expeditious growth in development of technology is increasing day by day, we face challenges like pollution, natural disaster etc. One of a most deleterious pollution type is air pollution, because it's colourless, savourless and odourless. Air is one of key element in our life, but because of pollution, this polluted air is being inhaled by us who may contain some toxic gases too, which may cause adverse effects on our health. Many applications of pollution controlling systems are in industries. The control of the parameters which causes pollution in the industrial and natural environment pattern is a great challenge and has received interest from industries especially in paper making industries, chemical industries, Water treatment industries, Sugar manufacturing industries and grain mills. The process of industrial quality analysis is an evaluation of the industrial quality in relation to standard quality set by pollution control board. Peculiar attention is given to factors which may influence human health and the health of the natural system itself. Industrial quality monitoring is the collection of information at set locations of different industries and at systematic intervals in order to provide the data which may be used to elucidate current conditions, establish trends etc. The Internet of Things (IoT) is a new concept by which the attention of both academics and industry is attracted. The IoT allows for virtually endless connections and opportunities to take place, which we may not understand full impact of today. On a broader scale, the IoT can be applied to things like home appliances, internet, and transportation networks: "smart cities" which can help us reduce waste and improve efficiency for things such as energy use; this helping us understand and improve how we work and live.

This project presents the implementation of a simple IOT system within an industry. This increases the safety level of workers as well as the working area from any hazards. Internet of Things (Iot) has been implemented as a network of interconnected objects, one of which can be addressed using unique id and communication is done based on the standard communication protocols. The sensor nodes are set with gas sensors and they communicate wirelessly huge number of outputs collected from individual sensors can be compared for a more precise analysis. Thus, wireless sensor networks suggest powerful new techniques to monitor industrial environmental pollution quality.

### **II.AIM & OBJECTIVE**

The objective of this work is to monitor and control level of gases released during industry process, temperature of the machineries, and other activities affecting the environment using Internet of Things (IOT). A mechanism using GSM sends the details to the authorized person of Tamil Nadu Pollution Control Board (TNPCB).

### III.EXISTING SYSTEM

In 2007, Meng designed the architecture and prototype of the IoT system. Here every consumable device is considered as objects. In 2016, Yang developed an algorithm for air pollution source estimation which uses Mobile Sensor Networks. In industrialization, especially the workers have been suffering from some endangering situations, so monitoring and controlling the parameters which causes pollution is necessary in industrial environment. This proposed model had introduced the wireless solution, based on GSM network for the monitoring and controlling of temperature and humidity in industries. In the existing system, an industrial pollution monitoring system using LABVIEW and GSM. This method is to form a system for reading and monitoring pollution parameters and to notify pollution control system when anyone of the factors crosses the threshold value declared by industry. Some of the research works are done in order to monitor the pollution parameters for making the environment smart in that area, different techniques and methods which were used in the past. Wireless Sensor Network (WSN) plays vital role in Smart Environment Monitoring. In this work they are mainly focusing on making the city environment smart, by deploying WSN all across the city, public and private transportation systems. By accessing all the dynamic global sensor networks, environmental behaviors are collected as a streaming data base to identify the environmental conditions. This methodology gives the managing of data from stationary node deployed in city to the mobile nodes on public, private transportation

### **IV.PROPOSED SYSTEM**

The IOT is an integrated communication Technology in which the objects are connected anywhere, anytime, anything, anyhow. IOT uses intelligent interfaces to attach and communicate with sensors, devices and social contexts. Air pollution has surfaced globally as a result of eruptive industrial growth. The most endangered global challenges faced today are greenhouse effect and its impacts on climate with degenerating air quality. This paper presents the design of a system to give a result for detecting pollutants causing environmental pollution. It may enable to diminish the pollution level over a certain span of time. An efficient monitoring system is required to monitor and estimate the condition by using Gas and temperature sensors in case of exceeding the prescribed level of pollution parameters, then automatically the power gets terminated through the transformer and license has been abandoned by the Government. A mechanism using GSM sends details to the authorized person of Tamil Nadu Pollution Control Board (TNPCB) such that the endangering of human lives can be avoided. The computed data can transfer through online by using IOT. This method may be integrated as an enabling tool to design intelligent transportation system for Smart City. The performance and robustness of the pollution can be monitored and controlled in additional to this, the system can be improved by implementing various type of sensors for controlling parameters which cause environmental pollution, and thereby we can enhance the industrial and natural environment.

#### V.BLOCK DIAGRAM

In this project, we would like to present effective use of Internet of Things to address the industrial pollution. Continuous monitoring of air quality is obligatory to ascertain level of pollution and presence of certain harmful pollutants. Various gas sensors may be pressed into service for this purpose. This system design represents the working flow based on IOT industrial pollution monitoring and controlling. This module proposes the use of an AT-mega 2560 Arduino board which collects the temperature and humidity parameter from the DHT-11Ssensor, ADC converter, CO2 concentration using MG-811 and the MQ-3 sensor senses smoke level in the atmosphere and amends output as a result in the form of an analog signal. The above details are updated into online database. Before data are passed to the Arduino, it must be converted in to the digital value. The ADC converts the sensor outputted analog values to corresponding digital values. Then microcontroller does the further processing. A system will detect the hazardous gases that are emitted by industries across the particular area. It simultaneously provides data to authority and organization. The main objective of the work is to design microcontroller based toxic gas detecting and alerting system. The hazardous gases like LPG and propane were sensed and displayed each and every second on the LCD display. If these gases exceed the normal level, then an alarm will get generated immediately and also an alert message (SMS) is sent to the authorized person through the GSM. The advantage of this automated

detection and alerting system over the manual method is that it offers quick response and accurate detection of an emergency and in turn leading faster diffusion of the critical situation.



Fig 1 Block Diagram

## VI.WORKING PRINCIPLE

#### VII.IMPLEMENTATION AND RESULTS

This work presents the design of a system to give a result for detecting Industrial causing environmental pollution. It may enable to reduce the pollution level over a certain span of time. This method may be integrated as an enabling tool to design intelligent transportation system for smart city.





#### VIII.CONCLUSION

An IoT based temperature and humidity monitoring system for server room was designed, implemented and tested. It is quite useful as compared to manual monitoring and also it is reliable as it is not possible to monitor always the temperature and humidity rise manually. To check the temperature and humidity measurement and thus we can recover the system in less time and faults before any uncertain failures thus resulting in significant cost saving as well as improving system reliability. A perfect trade-off between accuracy and cost is achieved by making use of single board minicomputer Microcontroller and appropriate sensors leading to a well-grounded system.

Datasheets available on the dashboard of IBM Bluemix account will help in framing good policies against the increasing level of pollution to ensure healthful environment. To detect harmful gases in particular area we have

used different sensors to get values of pollutants in the air. By using data mining algorithm, we can predict the future pollution in particular area. 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 and it supports the new technology and effectively supports the healthy life concept.

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