

Smart and Secure Industrial Pollution Monitoring and Alert System To Tnpcb Using Iot

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Abstract: Nowadays, Industries disrupt the environment and conceive the environmental consequences like greenhouse effects and epidemic which are catastrophic 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 adequate and robust system to control the pollution causing parameters like CO, SO₂, temperature and humidity to diminish the effect of these parameters caused by industrial emissions due to process.

If industry units 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 Tamilnadu Pollution Control Board (TNPCB). GSM and IOT is introduced in this proposed methodology, which will automatically monitor and control when there is a pollution affecting the environment. This system helps in achieving high security for workers and it will benefit the Government authorities to monitor the harmful gases emission as "Global Warming" perspective too.

Keywords : DHT11 Sensor ,Gas Sensor, Internet of Thing, Ethernet, LCD , ARDUINO.

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 colorless, savorless and odorless. Air is one of the key element in our life, but because of pollution, this polluted air is being inhaled by us which may contain some toxic gases too, which may cause adverse effects on our health.

The environmental parameters which causes pollution in the industrial and natural environment pattern is a enormous threat 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 the performance and 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.

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).

EXISTING SYSTEM:

The architecture and prototype of the IoT system was developed. An algorithm for air pollution source estimation using 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 industrial environment.

In the existing system, an industrial pollution monitoring system using LABVIEW and GSM. This method is to form a system for monitoring pollution parameters and to notify pollution control system when anyone of the factors crosses the threshold value declared by industry.

In the past, different techniques and methods which were used in some of the research works. 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.

PROPOSED SYSTEM:

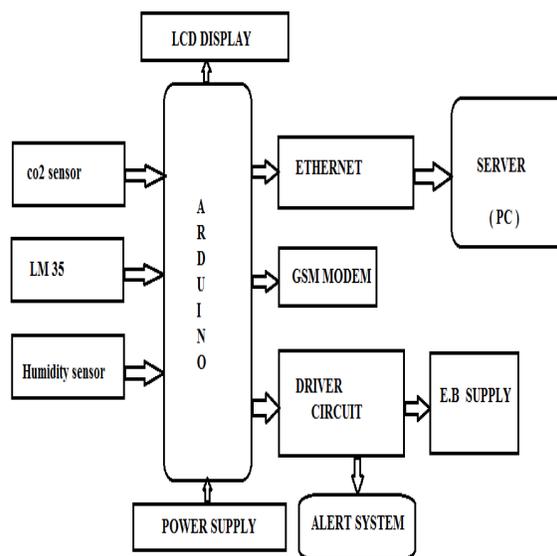
The IOT is an integrated communication Technology in which the objects are connected anywhere, anytime, anything, anyhow. IOT uses intelligent interfaces to attach and communicate with sensors, devices and social contexts. Air pollution has surfaced globally as a result of eruptive industrial growth. 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.

The proposed method may be integrated as an enabling software tool to design intelligent transportation system for Smart City. The performance and robustness of the pollution can be monitored and controlled in addition 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.

BLOCK DIAGRAM:



WORKING PRINCIPLE:

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-11 sensor, 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.

analog values to corresponding digital values. Then microcontroller does the further processing.

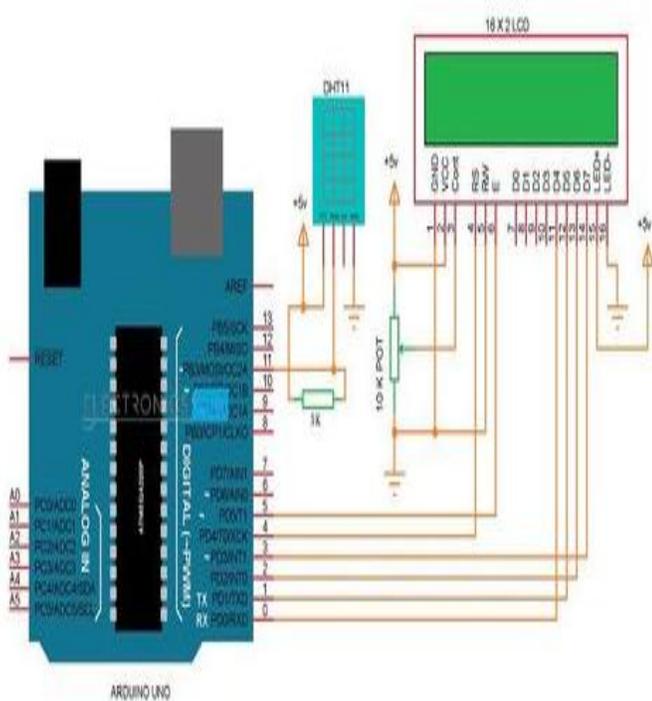


Fig. 1 Interfacing DHT11 Sensor with ARDUINO

The above details are updated into online database. Before data are passed to the ARDUINO, it must be converted into the digital value. The ADC converts the sensor outputted

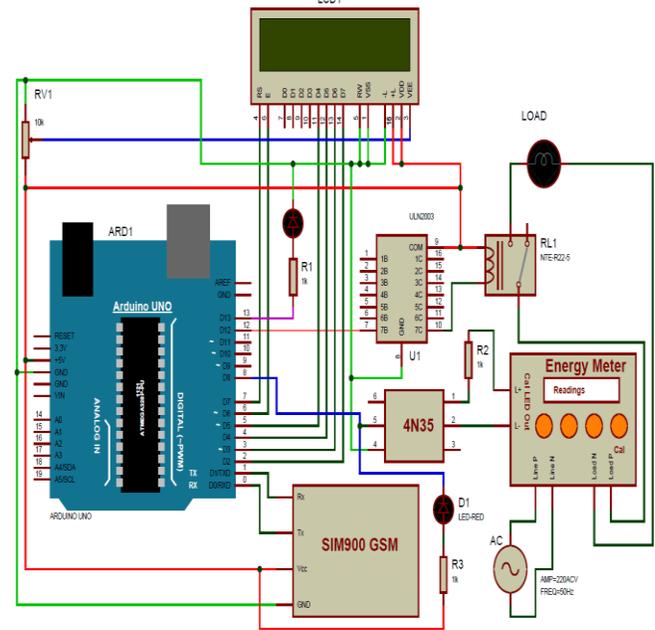


Fig. 2 Interfacing driver circuit with GSM and ARDUINO

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.

HARDWARE DESCRIPTION:

CO₂ SENSOR:

A **CO₂ sensor** is a transducer device used for the measurement of carbon dioxide gas. The most frequent postulates for CO₂ sensors are infrared gas sensors (NDIR) and chemical gas sensors. Measuring carbon dioxide is significant in monitoring indoor air quality, the function of the lungs in the form of a capnograph device, and many industrial processes.

DHT¹¹ SENSOR:

The **DHT11 Temperature and Humidity Sensor** is used to measure the digital signal output of temperature and humidity. This technology ensures the high reliability and magnificent long-term stability. It comprises of a Negative temperature coefficient measuring component and a resistive type humidity measurement component. It can be connected to a microcontroller and offers quick, anti-interference ability and cost-effectiveness.

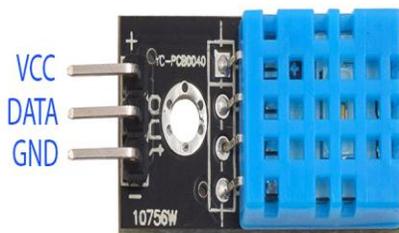


Fig. 3 DHT Sensor

ARDUINO:

ARDUINO is an open-source physical computing platform. This board is able to work with various categories of sensing and communication technologies. The ARDUINO is a flexible microcontroller and development environment that is not only used to control devices, but can also be used to read data from various types of sensors. Various hardware extensions and software libraries are enlarged, which permit wired and wireless communication with the Internet. It is used for implementing a system in the world of IoT. An ARDUINO board comprises of an ATmega328 microcontroller allows to upload new code without external hardware programmer and with complementary components to provide facilities like programming, incorporation into other circuits. Here it consists of CO and temperature sensor.

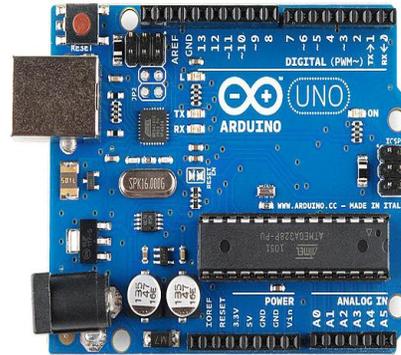


Fig. 4 ARDUINO

ETHERNET BOARD:

The most immense used local area network (LAN) technology. Defined as the 802.3 standard by the IEEE, the Ethernet access method bridges computers in a company or home network to each other and to the Internet. Ethernet is also used to connect a single computer to a modem for Internet access. All new computers have Ethernet built in, and old machines can be reconstructed. Ethernet is Wired. Ethernet uses cables to connect computers. A 10/100 Ethernet port on a computer or router transfers 10 and 100 Mbps, while the maximum speed of a 10/100/1000 "Gigabit" port is 1 Gbps. Ethernet uses the highest common speed between sending and receiving gadgets.



Fig. 5 Ethernet board

HARDWARE IMPLEMENTATION:

Hardware implementation is done using the hardware components such as Humidity and Temperature sensor, Arduino Microcontroller, Ethernet Shield is implemented by giving the A.C power supply and monitors by using the mobile controlled android applications. Connect the DHT11 sensor in pin A0. Ethernet shield is mounted on the Arduino board. Ethernet shield is connected to the PC via RJ45 cable.

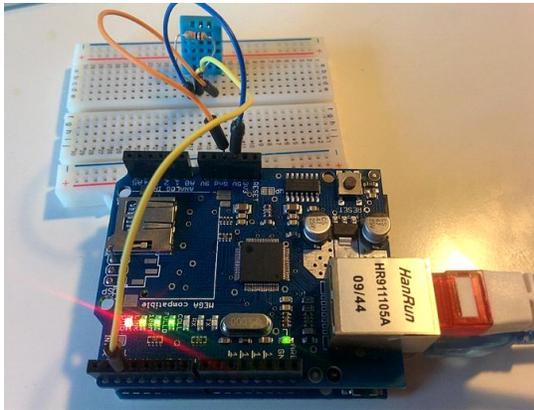


Fig. 6 Hardware implementation



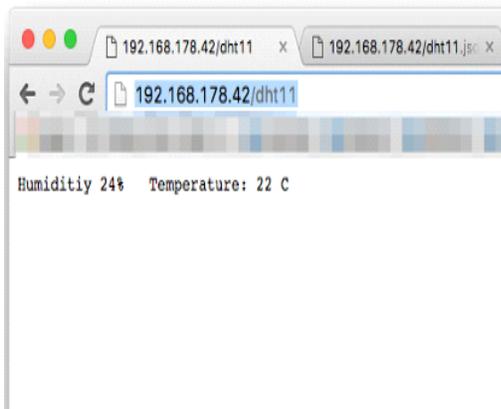
Fig. Final graphical output

APPLICATIONS:

- Industrial application
- Environmental application
- Transport pollution control

WEB SERVER:

Address Using the PC IP, we can check out the temperature and humidity value in web browser in offline mode.



CONCLUSION:

The IoT concept can be applied to a wide range of application and this project is an attempt to diminish the problem of cost and regular inspections by the utility of IoT in Industrial pollution monitoring and control. For alleviating these problems, advanced GSM with LABVIEW is used. The attainment and robustness of the industrial pollution monitoring and control system can further be improved by implementing sensors for controlling dust, noise, smoke, moisture and other parameters, thereby improving the industrial and natural environment. This system contributes quick response rate and the diffusion of the critical situation can be made faster than the manual methods.

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