Smart Pollution Monitoring using Internet Of Things

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Abstract-*In recent decades, the science and engineering have been heavily influenced by their responsibilities to the society. This responsibility has been directed towards the protection of public health and welfare.In devising controls foe emission of pollutants, scientists and engineers have developed strategies for monitoring the environmental pollution problem. Envirnmental monitoring describes the processes and activities that take place to monitor the quality of the environment. All monitoring strategies and techniques have reason and justification which are often designed to establish the current status of an environmental or to establish trends in environmental parameters. In this paper, we have proposed an idea to monitor pollution using IoT Technique. The extent to which environment gets affected is noted and corresponding control and preventation practice. The extent to which the environment gets affected is noted and corresponding control and prevention practices are implemented. The Higher Officials in that area gets notified about the pollution range and the necessary steps are taken. By controlling the environmental pollution the cities are devoid of health issues.*

Keywords-Pollution Monitoring, Smart city, Internet of Things, Arduino UNO, Cloud.

I. LITERATURE SURVEY

The internet of things (IoT)shall be able to incorporate transparently and seamless and a large number of different and heterogeneous end system, while providing open access to selected subsets of data for the development of plethora of digital general architecture for the IoT is hence a very complex task, mainly because of the extremely large variety of devices, link layer technologies, and services that may be involved in such a system, In this paper, we focus specifically to an urban IoT system that, while still being quite a broad category, is characterized by their specific application domain while still being quite a broad category, is characterized by their specific application domain. different activities. These are increasingly emerging to reach the human needs.

II. INTRODUCTION

Human needs demands different types of monitoring system these are depends on the type data gathered by the sensors devices. Event Detection based and spatial process Estimation are two categories to which application are classified. Intially the sensors devices are deployed in environment to detect the parameters (eg.co,benzinetc)When the object like environment equipped with sensors devices ,microcontroller and various software application becomes a self-protecting and self-monitoring environment and it is also called as smart environment.

In such a environment when some event occurs the alarm or LED alerts automatically. The effects due to the environmental changes on animal, plant and human being can be monitored and controlled by smart environment monitoring system. While data acquisition computation and controlling action (co level with respect to the specified levels).Sensors devices are placed at a different location to collect the data to predict the behavior of a particular area of interest. The main of this paper is to design and implement an efficient monitoring system through which the required parameters are monitored remotely using…..system through which the required parameters are monitored remotely using internet and the data gathered from the sensors are stored in the cloud and to project the estimated trend on the web browser. Human needs demands different types of monitoring systems these are depends on the type of data gathered by the sensor devices. Event Detection based and Spatial Process Estimation are the two categories to which applications are classified Initially the sensor devices are deployed in environment to detect the parameters (e.g. CO and radiation levels etc.) while the data acquisition, computation and controlling action (e.g. the variations in the CO levels with respect to the specified levels).

The IoT has a large role to play in future smart cities. The IoT can be used in practically all public services governments. By environmental trends are so complex, that they are difficult to conceptualize. The Internet of Things (IoT) is a recent communication paradigm that envisions a near future, in which the objects of everyday life will be equipped with microcontrollers, transceivers for digital communication, and suitable protocol.

The main objective of IOT Air Monitoring System is that the Air pollution is a growing issue these days. It is necessary to monitor air quality and keep under control for a better future and healthy living for all. Here we propose an

air quality monitoring system that allows us to monitor and check live air quality in an area through IOT. System uses air sensors to sense presence of harmful gases in the air and constantly transmit this data. This allows authorities to monitor air pollution in different areas.

III. EXISTING SYSTEM

The Air quality can be found across Western Europe, America. It also plays a major role in developing countries. This is a community-led air quality sensing network that allows anyone to collect very high resolution readings of NO_2 and CO concentrations outside of their envirment. The Sensor networks are also being deployed in tunnels to monitor air flow, visibility, and a range of gases (CO, CO_2, NO_2, O2, SH_2 and PM-10).The Other sensor networks measure temperature, humidity and similar parameters.

Sensing

The purpose of this unit is to detect (sense) all the parameters desired using a collection of sensors that were chosen carefully to achieve the best performance. Digital sensors will give a digital output suitable for (digital only input), while analog sensors will need analog to digital conversion.

Humidity

Most of the currently available humidity sensors are constructed based on a porous sintered body structure ceramics and utilize the ionic type humidity-sensing principle.

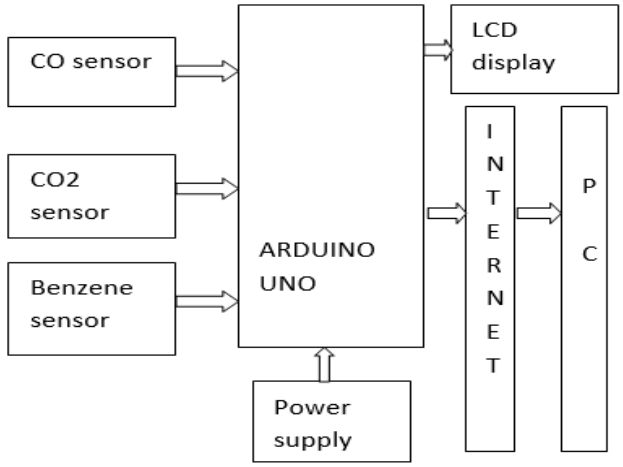

Fig.1 Block Diagram

In this implementation model we used Arduino UNO board with Wi-Fi module is as embedded device for sensing and storing the data. Arduino UNO board consist of analog input pins (A0-A5), digital output pins (D0-D13), inbuilt ADC and Wi-Fi module connects the embedded device to internet. Sensors are connected to Arduino UNO board for monitoring, ADC will convert the corresponding sensor reading to its digital value and from that value the corresponding environmental parameter will be evaluated. The Wi-Fi connection has to be established to transfer sensors data to end user.

The sensor detects in that area and Carbon Monoxide (CO) sensor MQ-2 will record the air quality in that region, if the threshold limit is crossed the corresponding controlling action will be taken (like issuing message alarm or buzzer or LED blink).

Uploading

A protocol implemented for sharing sensor data between remote environments, both physical and virtual. Additionally, it can be used to facilitate direct connections between any two environments and (many-to-many) connections as implemented by the web services that support IoT. Thus, it enables people to tag and share real time sensor data from objects, devices and spaces around the world.

Required Components:

- MQ2 CO sensor
- MQ135 Benzene
- MQ135CO2 sensor
- Arduino Uno
- Wi-Fi module ESP8266
- 16X2 LCD
- Breadboard
- 10K potentiometer
- 1K ohm resistors
- 220 ohm resistor

Due to the vast technological developments in the field of wireless communication technology it has led to the emergence of many Pollution monitoring sensors and wireless networks for monitoring pollution.

Environmental Monitoring

Environmental monitoring applications of the IoT usually use sensors to hand in environmental protection by monitoring air quality.

The analysis will be carried out for pollution due to changes in parameters because of,

- Climate (Rain, Temperature, Environment, Dust) change.
- Population.

Previous Work

Some of the research works carried out for monitoring the pollution parameters in a particular area of interest for making the environment smart in that area, different techniques and methods which were used in the past discussed in this section.

Smart Environment Monitoring using Wireless Sensor networks. In this work they are mainly focus on the making the city environment smart.and moving public transportation system buses and cars. By accessing all the sensor networks, environmental behaviors are collected as a streaming data base to identify the environmental conditions. This methodology gives the monitoring data from stationary nodes deployed in city to the mobile nodes on public transportation buses and cars.

IV. PROPOSED SYSTEM

The proposed embedded device is for monitoring CO levels in the atmosphere to make the environment intelligent or interactive with the objects through wireless communication. The proposed model is shown in figure 2 which is more adaptable and distributive in nature to monitor the environmental parameters.

The goal of smart city is to improve quality of life by using technology. Information and

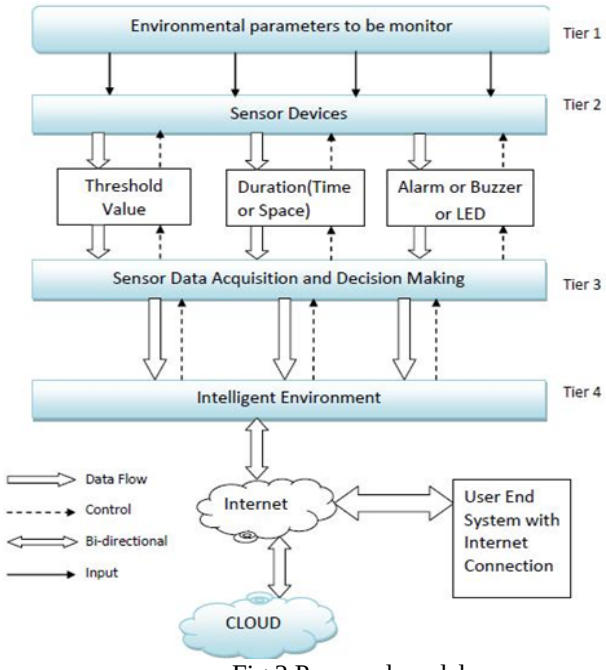

Fig 2 Proposed model

Here, the tier 1 provides information about the parameters under the region which is to be monitored for air pollution control.

Tier 2 deals with the sensor devices with suitable characteristics, features and each of these sensor devices are operated and controlled based on their sensitivity as well as the range of sensing. Communication Technology allows city to interact directly with the public to tell what is happening in the city. Consider an area that is being surveyed for estimating how much the area is affected by pollution. The constituents of air along with its proportion are calculated and if it is higher than normal then the officials are intimated about it.

More recently, portable carbon monoxide analyzers with automated data-logging have become available for personal exposure monitoring. These measurements are based on the electrochemical reactions between carbon monoxide and de-ionized water, which are detected by specially designed sensors. Nowadays the resolution, stability and sensitivity of the electrochemical analyzers are within the specifications of the reference method and, together with the data-logging systems, they fit into a small rucksack or even a pocket.

V. SYSTEM IMPLEMENTATION

Based on the framework shown in figure 2, we have identified a suitable implementation model that consists of different sensor devices and other modules, their functionalities.

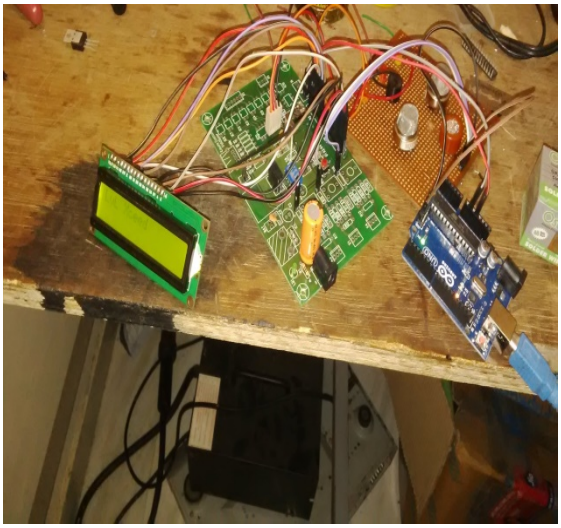

Fig 3System Implementation

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environmental parameter will be evaluated. The Wi-Fi connection has to be established to transfer sensors data to end user and also send it to the cloud storage for future usage

The sensor detects in that area and Carbon Monoxide (CO) sensor MQ-2 will record the air quality in that region, if the threshold limit is crossed the corresponding controlling action will be taken (like issuing message alarm or buzzer or LED blink).All the sensor devices are connected to internet through Wi-Fi module. The is a model of data storage in which the digital data is stored in logical pools, the physical storage spans multiple servers, and the physical environment is usually owned and managed by hosting company. These storage providers are responsible for keeping the data obtainable and accessible, and the physical environment protected and running.

VI. FUTURE WORK DEVELOPMENT

The information's that are collected by the sensors could be used by the authorities to take necessary action such as emergency warning messages and evacuation of people to safe places. Further implementing pollution monitoring systems will help to assess how bad air pollution is from day to day and save the environment from further pollution.

After sensing the data from different sensor devices, which are placed in particular area of interest. The sensed data will be automatically sent to the web server, when a proper connection is established with sever device. The web server page which will allow us to monitor and control the system. By entering IP address of server which is placed for monitoring we will get the corresponding web page. The web page gives the information about the intensity of the CO level variations in that particular region, where the embedded monitoring system is placed.

The sensed data will be stored in cloud (Google Spread Sheets). The data stored in cloud can be used for the analysis of the parameter and continuous monitoring purpose.

VII. CONCLUSION

The environmental monitoring system might offer several potential benefits; Due to its ability to automatically upload to the internet, one correctly placed system can provide easily- accessible weather data for the whole community. It can be used to predict the onset of bad weather using signs such as changing temperature and humidity. Raising the awareness of how society is affected the region's environmental policies and have the knowledge basis to push for the change bad air pollution is from day to day and save the environment from further pollution.

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