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Air and Water Superiority Monitoring Scheme

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ABSTRACT

Degradation of water resources and contamination of the air have become widespread issues. The manual collecting of water and air samples from various sites is a traditional way of monitoring. These samples are subjected to thorough testing in the laboratory. Such methods are time demanding and can no longer be deemed effective. Furthermore, contemporary approaches include examining other types of quality characteristics, such as physical and chemical ones. The conventional approach of quality detection and communication is inefficient, inaccurate, and expensive. As a result, continual real-time monitoring of water and air quality parameters is required. By concentrating on the aforementioned challenges, a low-cost monitoring system that can monitor air and water quality in real time has been developed. IoT. Each device must have a unique identifier and be able to collect real-time data on its own. Sensors, processors, gateways, and applications are the basic building pieces of the Internet of Things. Water quality parameters such as pH, turbidity, dissolved oxygen, temperature, CO2 level, and air quality are detected by different sensors in the system, and data is communicated to a platform via a microcontroller-based system.

Keywords: *IoT, Sensor, Air, Water, Quality, NGO, Government*

INTRODUCTION

With growing industrial advancement and increasing world population, environmental pollution has become a big concern. With the introduction of IoT in the modern world, many problems has been solved. Sensor-enabled devices can help monitor the environmental impact of cities, collect details about sewers, air quality, and garbage. Such devices can also help monitor woods, rivers, lakes, and oceans.

Considering the current environmental issues, systems for air and water quality monitoring are required to judge the impact of various industries such as power plants, mining sector, oil and gas industry, etc. on human beings as well as the life of plants and animals.

In this work, we have implemented a Multisensory based Air and Water Quality Monitoring system using IOT. This system can measure the purity of air at a given location and return us the values. Also, it can sense the purity of water and tell us if the water is fit for use or not. The old method of quality detection and communication is time-consuming, low precision and costly. The samples of air and water are tested in the laboratory using rigorous skills. Therefore, there is a need for continuous monitoring of water and air quality. With the use of IoT in monitoring water and air quality, various issues such as data collection, communication, data analysis and early warnings can be worked on. When installed in urban areas these systems can monitor the quality of the air in crowded areas, parks, or fitness trails. Also, these systems can monitor the quality of water in storage tanks, lakes or water supply pipelines.

REVIEW OF LITERATURE

Ashwini Doni, Chidananda Murthy. M.V, Dr MZ Kurian: Proposed “Survey On Multisensor Based Air And Water Quality Monitoring Using IOT”. The conventional method of testing water quality is to gather samples of water manually and send to the

lab to test and analyze. The water quality measuring system that has been implemented checks the quality of water in real time through various sensors (one for each parameter: pH, conductivity, temperature) to measure the quality of water. The system also has proximity sensors to alert the officials by sending a message to them via the GSM module in case someone tries to pollute the water body.

Lalit Mohan Joshi: Published “Research Paper

on IoT Based Air and Sound Pollution Monitoring System", it has a very ingeniously designed model which is more adaptable and distributive in nature to monitor the environmental parameters. The proposed architecture is discussed in a 4- tier model with the functions of each individual modules developed for noise and air pollution monitoring. The proposed model consists of 4-tiers. Tier 1 is the environment, sensor devices in tier 2, sensor data acquisition and decision making in tier 3 and the intelligent environment in tier 4.

A.C.Khetre, Prof.S.G.Hate: Investigated and defined a wireless sensor network for water environment monitoring system. It provides useful features such as large monitoring ranges, low cost, low power consumption, flexible configuration and very small damage to the natural environment. The system successfully provides online auto-monitoring of the temperature, turbidity, water level, and salinity.

Pradeep Kumar, Somasundaram and Dharon Joseph: Proposed "Monitoring Water Quality using RF Module". Here water is constantly to monitor the water available through the taps through various sensors. The sensors which are pH sensor, temperature sensor and a turbidity sensor (LED-LDR assembly).It has been implemented the project in real time and this has been found to be very reliable, and efficient in the long run. Transmit the data available to a remote base station using a 2.4 GHz RF module which makes it convenient to monitor at a remote location and requires less manpower.

PROPOSED SYSTEM

In present generation, water in rivers and ponds are getting polluted due to effluents from industries which results in increase of turbidity and variation in pH of water resulting in formation of acidic and/or basic of water, if there is an increase in temperature then the ecosystem in water will vary resulting in mass killing of fish. Due to air pollution, the atmosphere will not be suitable for habitation and will lead to several health disorders.

The Air and Water quality monitoring will be useful to determine the pollution level of the air and water and can thus help the government agencies to take necessary actions. This system collects data about the air and water quality and determines its purity. It will send us the data about quality through a wireless network. This data will be received by a machine and it will send this data to the server. Next, the data on the server can be displayed to various clients.

The objectives of this project are given below:

- To design wireless air and water quality monitoring system.
- To collect and transmit data from remote place to receiver section using IOT communication.
- Also to provide the alternative facility of private Bluetooth range in case if an internet connection is not working or service is unavailable.

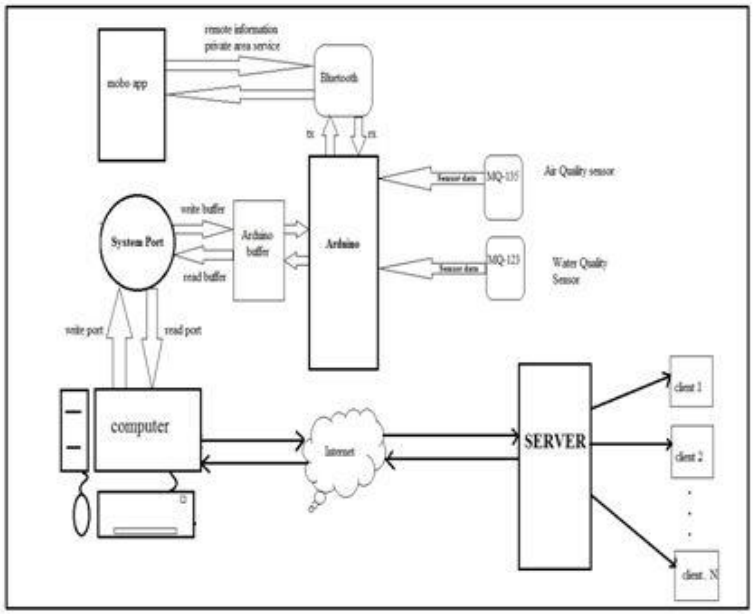

Fig1. *System architecture*

Air Quality Monitoring Circuit Assembly

Air Quality Monitoring system will check the temperature and ppm value of air at the given location. The sensors in the circuits will check the ppm value of air i.e. it will check the value of suspended particles in the air. Also, the sensor will determine the temperature of air because the pollution level in the air can be determined by temperature rise.

Water Quality Monitoring Assembly

Water Quality monitoring system will check the turbidity of water for the given sample. Turbidity sensor detects water quality by measuring the levels of turbidity. It uses light to detect suspended particles in water by measuring the light transmittance and scattering rate, which changes with the amount of total suspended solids (TSS) in water.

Integration of Circuits

Using the IOT technology we will create a sensor network which will give us the data generated by the sensors to our server with the help of internet. The sensors will return the voltage to Arduino. The Arduino will manipulate the voltage change and generate the data. This data will be sent to our server through an internet connection. We have used the Thing speak server in our project.

Program 1:

Input: Data from Sensor.

Output: Reading the data.

String air = ""; String temp = "";

String waterVoltage = ""; void setup() { Serial.begin(9600);}

void loop() {

air = String(analogRead(A1));

waterVoltage = String (analogRead(A3) * (5.0 / 1024.0)); air.concat(","+waterVoltage);

Serial.println(air); air = ""; delay(1000);}

Program 2:

Input:-Data of Arduino in string format.

Output:- Putting data at server. import time import serial import smtplib import requests ser = serial.Serial('COM5', 9600, timeout=1) if(ser.isOpen() == True): ser.close() print('port is opening...') ser.open() if(ser.isOpen() == True):

print('port opened succesfuly') while(True):

ArduinoData = ser.readline().decode() if(ArduinoData != ""):

#temp = float(ArduinoData.split(',')[2]) temp = 0

air = int(ArduinoData.split(',')[0]) water = float(ArduinoData.split(',')[1])

print(str(temp) + "," + str(air) + "," + str(water)) if(air > 500):

s=smtplib.SMTP('smtp.gmail.com',587) s.starttls()

Future Scope

Generate SMS/E-Mail alert if the quality of air or water crosses a threshold value. Also if air at a particular location gets too much polluted then we can use traffic signals for Traffic Diversion. Next, we can monitor the quality of drinking water supply & stop supply when water gets impure. Also, we can develop a physically better system so that it can be used for monitoring of large water bodies

Conclusion

In the present generation, water in rivers and ponds are getting polluted due to effluents from industries which results in an increase of turbidity of water as well as the decline of air quality. Multi-sensor based air and water quality monitoring using IoT are proposed. Literature reveals that manual data

computation using the laboratory methods is time-consuming and existing system are inefficient at providing accurate results also they do not provide long-range communication. This proposed system monitors the quality of air and water in terms of ppm and temperature. It can be used even in the unavailability of the internet through Bluetooth. The project has vast applications in the field of survey and monitoring of air and water quality.

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