

# WATER POLLUTION MONITORING SYSTEM USING RC BOAT

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**Abstract:-** Nowadays there is an ever increasing strain regarding the provision of clean, consumable water. This problem especially arises in rural areas due to the ineffectiveness of the governments and the increasing population in the country. Therefore, this particular project aims to detect and display real-time physicochemical quality of the water in a much more cost effective manner, as opposed to the current methods which involve sampling and laboratory methods, through its wireless, multi-sensor network.

**Keyword:-** Turbidity Sensor, PH Sensor, Temperature Sensor, Servo Motor, Esp 8266 Wifi Module, LCD Display 16\*2, Microcontroller, RF Data RX, Regulator.

## I. INTRODUCTION.

In the 21st century, there were lots of inventions, but at the same time were pollutions, global warming and so on are being formed, because of this there is

faces challenges because of global warming limited water resources, growing population, etc. Hence there is need of developing better methodologies to monitor the water quality parameters in real time[1]. The water quality parameters pH measures the concentration of hydrogen ions. It shows the water is acidic or alkaline. Pure water has 7pH value, less than 7pH has acidic, more than 7pH has alkaline. The range of pH is 0-14 pH. For drinking purpose it should be 6.5-8.5pH. Turbidity measures the large number of suspended particles in water that is invisible. Higher the turbidity higher the risk of diarrhoea, collera. Lower the turbidity then the water is clean. Temperature sensor measures how the water is, hot or cold. Flow sensor measures the flow of water through flow sensor. The traditional methods of water quality monitor involves the manual collection of water samples from different locations. With the rapid growth of the thrift/providence, more and more serious troubles of environment arise. Water defilement is one of these problems. Regular monitoring of water quality parameters are Conductivity, pH, turbidity, dissolved oxygen, chemical oxygen demand, biochemical oxygen demand, ammonia nitrogen, nitrate, nitrite, phosphate, various metal ions and soon. The most common method to detect these parameters

is to collect samples manually and then send them to laboratory for detecting and analyzing.

## II. LITERATURE SURVEY.

[1] **Akanksha Purohit, Ulhaskumar Gokhale in their paper titled “Real Time Water Quality Measurement System based on GSM”** this technique is time overwhelming and not economical. Since it's not feasible to take the water sample to the laboratory after every hour for measuring it's quality. The water quality measuring system can measure the essential qualities of water in real time. The system consists of multiple sensors to measure the standard of water, microcontroller and GSM to send the information to the watching centre. It's a true time system which is able to endlessly measure the standard of water and can send the measured values to the watching centre when each predefined time. The system relies on microcontroller 8051 and GSM.. Real time system for water quality measuring based on GSM is associate economical system that uses numerous water detection device and GSM network. The system is incredibly versatile and economical. It's real time system that measures numerous parameters present within the water with the assistance of device and send them to the watching centre mechanically..

[2] **Sachin Patil, Kiran Patil, Sanjay Patil in their paper titled, “Monitoring of Turbidity, PH & Temperature of Water Based on GSM”** It bases on SMS (Short Messaging Service) in the GSM (Global System for Mobile Communications) network to instantaneously transfer the collected data. It also can remotely monitor the water quality on line. The system implements automation, intelligence and network of water quality monitoring, and uses man power, material and financial resources. Monitoring of Turbidity, PH & Temperature of Water makes use of water detection sensor with unique advantage and existing GSM network. The system can monitor water quality automatically, and it is low in cost and does not require people on duty. Only by replacing the corresponding sensors and changing the relevant software programs, this system can be used to monitor other water quality parameters.

[3] **A. N. Prasad, K. A. Mamun, F. R. Islam, H. Haqva in their paper titled, “Smart Water Quality Monitoring System”**. The Smart Water Quality Monitoring System will measure the following water parameters for analysis; Potential Hydrogen (pH), Oxidation and Reduction Potential

(ORP), Conductivity and Temperature using a RS technology. While monitoring these parameters, it is perceived that one should receive a stable set of results .Therefore a continuous series of anomalous measurements would indicate the potential introduction of a water pollutant and the user will be notified of this activity with the aid of IOT technology. False positives, such as anomalous readings over a short period of time, will be recorded but not treated as an alert. Hence, with the successful implementation of this monitoring approach, a water pollution early warning system can be achieved with a fully realized system utilizing multiple monitoring station This research demonstrates a smart water quality monitoring system. Four different water sources were tested within a period of 12 hours at hourly intervals to validate the system measurement accuracy. The results obtained matched with the expected results obtained through research. The temperature relation with pH and conductivity were also observed for all the water samples

## III. PROBLEM IDENTIFICATION

The water pollution monitoring system using RC boat this system can be use for both commercial and domestic purpose and water supply agencies or in the health department for identifying the causes by using the project we can improve the water quality and its intelligent management of the service in the city due to automation it will reduce the time to check the parameter and it has low maintenance and it is prevention of water disease and it provide real time information on the websites

#### IV. BLOCK DAIGRAM

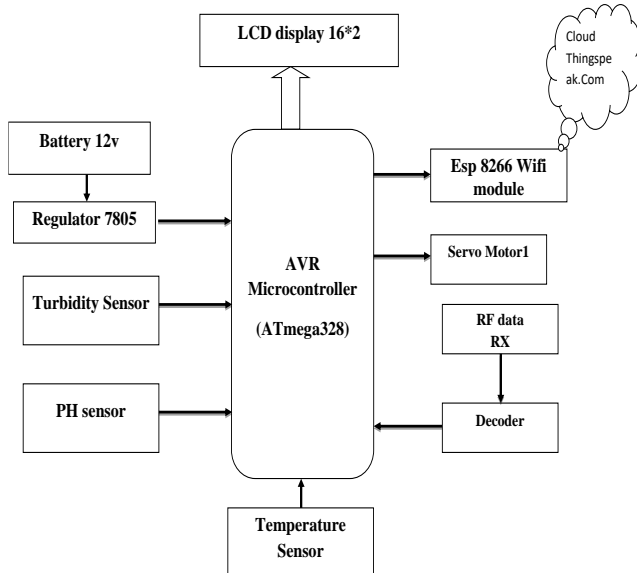


Fig. 1. Block Diagram.

#### V. HARDWARE DESCRIPTION:

##### 1) WATER TURBIDITY SENSOR:-

The TSD-10 module measures the turbidity (amount of suspended particles) of the water source. An optical sensor is a measuring product for a turbid water density or an extraneous matter concentration using the refraction of wavelength between photo transistor and diode.



Fig. 2 Water Turbidity.

The sensor operates on the principle that when light is passed through a sample of water, the amount of light transmitted

through the sample is dependent on the amount of soil in the water.

##### 2) Microcontroller.



Fig. 3. Microcontroller .

ATmega328P is a high performance yet low power consumption 8-bit AVR microcontroller that's able to achieve the most single clock cycle execution of 131 powerful instructions thanks to its advanced RISC architecture. It can commonly be found as a processor in Arduino boards such as Arduino Fio and Arduino Uno.

##### 2) Regulator 7805:-

All voltage sources cannot able to give fixed output due to fluctuations in the circuit. For getting constant and steady output, the voltage regulators are implemented. The integrated circuits which are used for the regulation of voltage are termed as voltage regulator ICs. Here, we can discuss the IC 7805.



Fig. 4. Regulator 7805.

The **voltage regulator IC 7805** is actually a member of the 78xx series of voltage regulator ICs. It is a fixed linear voltage regulator. The xx present in 78xx represents the value of the fixed output voltage that the particular IC provides. For 7805 IC, it is +5V DC regulated power supply..

#### 4) Servo Motor :

A servomotor (or servo motor) is a rotary or linear actuator that allows precise control of angular or linear position, velocity, and acceleration. It consists of a suitable motor coupled to a position feedback sensor. Servo motors are used in applications such as robotics, CNC machinery, or automated manufacturing. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servo motors.



Fig. 5 Servo Motor.



Fig no. 6. ESP 8266 Wifi Module.

#### 6) Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke. The buzzer is a sounding device that can convert audio signals into sound signals. It is a buzzer



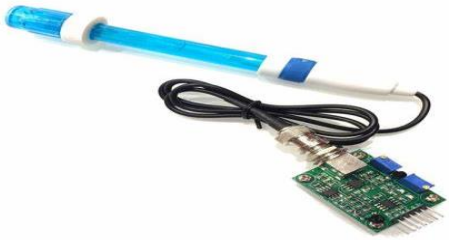
Fig. 7 Buzzer.

#### 5) ESP 8266 Wifi Module.

The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all WiFi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

#### 7) PH Sensor:-

A pH sensor is one of the most essential tools that's typically used for water measurements. This type of sensor is able to measure the amount of alkalinity and acidity in water and other solutions. When used correctly, pH sensors are able to ensure the safety and quality of a product and the processes that occur within a wastewater or manufacturing plant. In most cases, the standard pH scale is represented by a value that can range from 0-14.



#### 8) DS18B20 Temperature Sensor:-



Fig. 9 Temperature Sensor

The DS18B20 is one type of temperature sensor and it supplies 9-bit to 12-bit readings of temperature. These values show the temperature of a particular device. The communication of this sensor can be done through a one-wire bus protocol which uses one data line to communicate with an inner microprocessor. Additionally, this sensor gets the power supply directly from the data line so that the need for an external power supply can be eliminated.

#### 9) RF MODULE RT/TX:-



Fig. 9 RF module RT/TX

This is FS1000A 433MHz Tx RF Radio Module. This RF module comprises an RF Transmitter and an RF Receiver.

The transmitter/receiver (Tx/Rx) pair operates at a frequency of 433 MHz. An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4. The transmission occurs at the rate of 1Kbps – 10Kbps. The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitter.

## VI. PROJECT SOFTWARE DESCRIPTION.

### 1) Arduino Software (IDE):

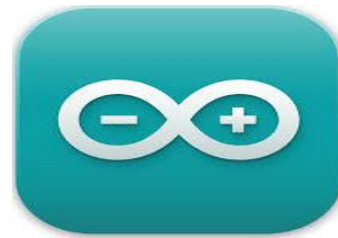


Fig. 8 Arduino Software (IDE).

The Arduino Integrated Development Environment - or Arduino Software (IDE) . It connects to the Arduino hardware to upload programs and communicate with them. Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension .uno. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

### 2) Thing Speak (Cloud Server):

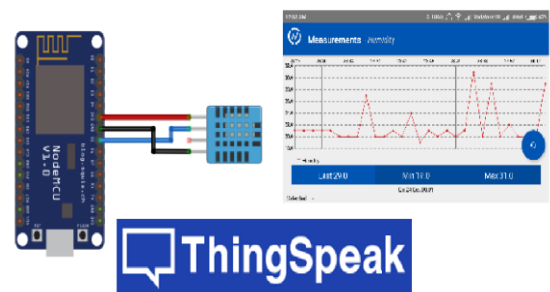


Fig. 9 Thing Speak (Cloud Server).



Thing Speak is a platform providing various services exclusively targeted for building IOT applications. It offers the capabilities of real-time data collection, visualizing the collected data in the form of charts. The core element of Thing Speak is a 'Thing Speak Channel'. A channel stores the data that we send to Thing Speak.

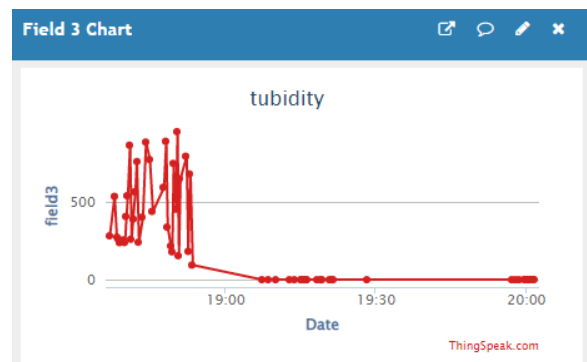
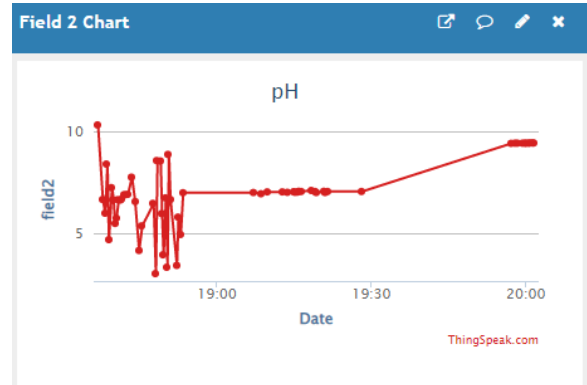
## VII.ADVANTAGES AND APPLICATIONS

### Advantages:

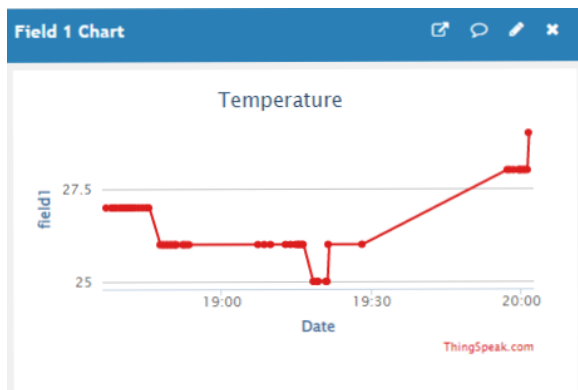
- 1) Improves water quality
- 2) Intelligent management of the services in the city.
- 3) Due to automation it will reduce the time to check the parameters.
- 4) Low maintenance.
- 5) Prevention of water diseases.
- 6) Real time information on the website.

### Applications:

- 1) This system can be used for both commercial and domestic purposes.
- 2) Water supply agencies.  
In health department for identifying the cause



## IX. RESULT.



## VIII. CONCLUSION.

The conclusion of the parameters of water quality monitoring system is verified that the system achieved the reliability and feasibility of using it for the actual monitoring purposes. Monitoring of Turbidity, PH & Temperature of Water makes use of water detection sensor with unique advantage. The sensors are control the project the system can monitor water quality automatically, and it is low in cost and does not required people. Real time system for water quality measuring based on IOT is associate economical system that uses numerous water detection device and IOT network. The system is incredibly versatile and economical. It's real time system that measures numerous parameters present within the water with the assistance of device and send them to the watching centre mechanically. It doesn't need individuals on duty. Its versatile system as a result of simply by replacement the sensors and by creating some changes within the

computer code the system will be created to measure completely different parameters of water. The system is reliable and easy and it will be extended to measure water pollution so on.

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