

IOT Water Pollution Monitoring Using Machine Learning Algorithms

Ravikiran R, Pranesh RR,
Navaneethakrishnan S
Students, Department of ECE,
Bannari Amman Institute of Technology,
Sathyamangalam

Abstract:

Improving technological advancements with the help of modern and effective devices have a great scope. This Project helps the Human beings monitor over the Water pollution in the water bodies like Rivers, Lakes and Reservoirs. As the pollution problems threatening the source of our drinking water such as the river become increasingly worrisome, people lose their confidence in the quality of the drinking water provided by the local water company. In addition, people's anxiety about the quality of their drinking water is further aggravated by the fact that the conditions of the water supplying pipes and reservoirs are often found to be unsatisfactory. Being able to track the real quantity of water contamination is the first step in controlling it. By measuring the pH value and Turbidity value we will be able to measure the Water pollution and give the water quality condition.

Keywords: pH sensor, Turbidity Sensor, Water Quality, RC Boat, RF Transmission

Detailed description of the Invention:

Water Quality Monitoring is important to ensure that it is safe for humans to drink it as well as for wildlife, and marine life. Regarding ports, it is important to measure water quality to understand environmental impacts and to not harm sea life. In our Project we have planned to process our invention in two processes, First process is to design a Radio Controlled Boat with Servo motor and propeller shaft and the Second process is to interface pH sensor, Turbidity sensor, Temperature sensor and the LCD display with the Arduino and also interface the Rf receiver Transmitter to the Arduino. Potential of Hydrogen pH is basically an amount of hydrogen ions concentration in the water. pH value defines how acidic or basic water is, which can specifically influence the survival of amphibian life forms. pH has a 0 to 14 range. Where 0 means very acidic and 14 very basic and 7 being neutral. Drinking water range is from 6.5 to 7.5. Changing in pH can affect the chemical dissolved in water. High acidic water is dangerous for aquatic animals whose pH is less than 4.

Temperature is the degree of hotness and coldness of anything. Temperature is a basic but the most important water quality parameter since it specifically impacts the measure of dissolved oxygen that is accessible to amphibian living beings. By detecting temperature, we can get to know about the particular temperature bearing limit of animals inside the water. All other parameters (TDS, pH, conductivity) are dependent on temperature. Turbidity is a measure of clarity of water. It measures the number of particles in the water. For example, plants, clay, silt, debris. Overabundance turbidity can lessen the

reproduction rates of aquatic life while generating regions and eggs are secured with soil. Unit of turbidity is NTU (Nephelometric Turbidity Units). 1.1.4. Conductivity and Total Dissolved Solids TDS Conductivity is a tendency of water which conducts electricity or electric current. It is an indirect measure of ion particles present in the water. The more particles exhibit, the greater electric current can be conducted by the water. Purity of water can be identified with the minimal conductivity Proceedings 2018, 2, 1279 3 of 5 4 because pure water cannot conduct electricity. The measure of salt and minerals contaminations in the water is called total dissolved solids (TDS). TDS is approximately half of conductivity. Conductivity is measured in $\mu\text{S}/\text{cm}$ (Micro siemens per centimeter). TDS is expressed in PPM (parts per million). Drinking water ought to be under 500 ppm and agriculture water ought to be under 1200 ppm.

A. Designing of RC Boat: The main purpose of our project is to monitor the quality of water such as lakes, reservoirs, rivers etc. We cannot monitor water quality in such big oceanic rivers by using a stationary system because water parameters vary at every single location. To avoid this, we manufactured a boat which can float and move on the water simply by user controller. Our structure is designed as a hull shape which reduces the resistivity of water flow and maintains the stability in the water. We have designed a Radio-Controlled Boat using the Metal sheet for floating purposes. The movement of the RC boat is controlled by RF receiver and Rf

transmitter. We have configured our RC boat in a way that According to the Command given by the Rf Transmitter the Command is Transmitted to the RF receiver attached to the RC boat and then the Signal is forwarded to the servo motor attached to the Boat from that the Direction and Flow movement of the boat takes place. The Servo motor is assisted with the Propeller shaft and Rudder for better Floating movement of the Boat. Initially we designed a 3D diagram of the RC Boat for fabrication. In our RC boat we are using a Two channel RF receiver Transmitter in order to send signal to Two servo motors, we are using two 500 rpm 12V servo motors for both side Direction and forward reverse movement. We have designed a 3D model of the RC boat using CAD software and we have attached the 3D model below,

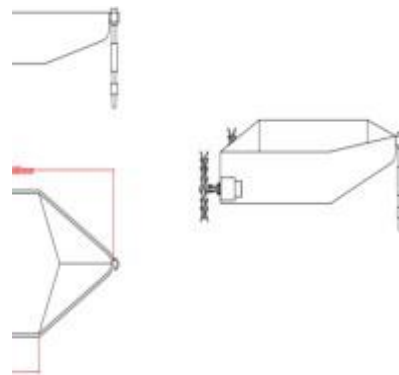


Figure 1. Designing of RC boat



Figure 2. Fabricated model of RC boat

B. Interfacing of water pollution monitoring sensors: For configuring the Water contamination (Pollution) we have chosen to measure two parameters such as pH and Turbidity to measure the Water pollution level. We are using a pH sensor and Turbidity sensor to monitor the pH level and Turbidity level of the water bodies. The Turbidity sensor gives the output in Nephelometric Turbidity Units. pH sensor gives the reading in logarithmic units, if the value is with 0-7 then it comes under Acidic nature whereas if it lies within 7-14 it comes under Basic nature. By measuring those parameters and combining it, we 5 give the Water pollution level and it instantly displays the water pollution level in the LCD display attached in the RC boat. This is configured interfacing the all the Sensors, LCD with the Arduino and giving connection supply from a 12V battery to Arduino. After completion of the two phases of work the Water pollution monitoring system is integrated with the RC boat and the Connection from the RC boat such as DC motor, RF receiver are interfaced to the Arduino and now by combining them we acquire the fully working model of IOT water Pollution Monitoring using RC Boat. Now when the project is placed in the water bodies the movement and Direction of RC

boat is controlled by the RF Transmitter operated by the user and also at the same time the Water pollution monitoring system in the RC boat measures the pH, Turbidity level and Temperature for the first time and after 10 seconds it measures the values again and this process is repeated again.

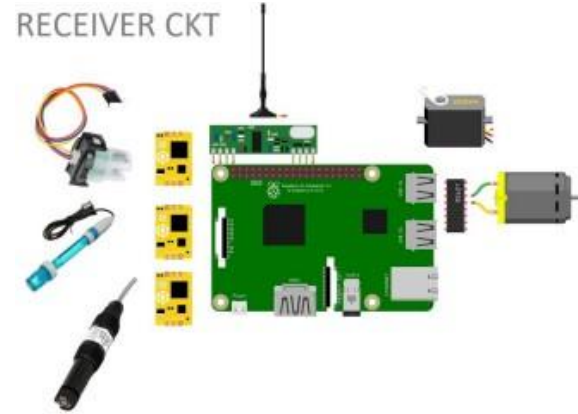


Figure 3. Water quality monitoring sensors interfacing

Working Output:



Conclusion:

From this An IoT-based water quality monitoring application is **beneficial in treating wastewater before it is transferred to freshwater bodies.** Vital parameters such as turbidity, pH, and temperature can be easily studied using the sensors. This is also important for safely carrying out agricultural activities.