IOT Based Water Pollution Monitoring 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. It takes into consideration multiple factors and presents this real-time quality through the display of its electrical conductivity, pH, total dissolved solids TDS, turbidity, as well as temperature of water that is being tested. Additionally, this remote control system is specially designed for lakes, reservoirs, rivers etc. where we cannot monitor water quality in such complicated scale water environments by just 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. This structure is designed as a hull shape which minimizes the resistivity of water flow and this shape also maintains the stability of water. This water quality monitoring boat includes an embedded global positioning system GPS which gives the location of the point wherever water quality is varying and radio frequency module for wireless communication. All the results are generated and displayed with their readings and their graphical analogue meters through the graphical user interface GUI technique, along with water's impurities limitation points and its hazardous level notification. It is proven through various tests conducted in reservoirs, lakes and personal water storage tanks that this project is successfully capable of demonstrating these physicochemical parameters as well as displaying these

Keywords: Remote-Controlled Boat, pH Sensor, Turbidity Sensor, Dissolved Oxygen Sensor, Water Quality Sensors.

I. INTRODUCTION

Water quality plays a very important part in the health of animals and human beings. Lakes and reservoirs, canals are one of the major sources of drinking water. The first step towards water pollution control is to be able to monitor the actual level of water pollution. The problem with water pollution monitoring is the manual effort of taking a boat through a lake or reservoir each time to monitor pollution throughout the water body. So we here design a solution for easy water quality checking of vast water bodies with ease. This RC water pollution monitor boat allows for recording as well as transmitting water quality data to an IOT server online. This will further help us to maintain the water clean. This project is remote-operated and controlled by an RC remote using which it can be maneuverer accordingly, a motorized propeller system to provide the forward propulsion and servo motor arrangement to provide with the steering using a rudder. We have two sensors to determine water quality, we include PH sensors as well as turbidity sensor and a dissolved oxygen sensor. These sensors will detect the presence of suspended particles in the water. We also have a GPS module and micro SD card, which will log the data from sensors as well as GPS locations as well as transmit the same online over IOT at particular intervals. Thus the water quality monitoring rc boat can be used for water quality monitoring on lakes and reservoirs with ease.

II. LITERTURE SURVEY

WATER QUALITY MONITORING SYSTEM USING IOT
By: Dr. Nageswara Rao Moparti Associate Professor in Dept. of CSE. Velagapudi Ramakrishna Siddhartha Engineering College, Vijayawada, Andhra Pradesh, India Ch. Mukesh Assistant Professor in Dept. of CSE. Velagapudi Ramakrishna Siddhartha Engineering College, Vijayawada, Andhra Pradesh, India Dr. P. Vidya Sagar Associate Professor Dept. of Information Techno. Velagapudi Ramakrishna Siddhartha Engineering College, Vijayawada, Andhra Pradesh, India Review: Using an arduino board for finding ph value and fsm module for message technique. REAL TIME WATER QUALITY MONITORING BOAT By, Moez ul Hassan ,Sanjay Kumar ,Hitesh Kumar , Kabir Kumar , Sarmad Hameed and Kiran Fatima. Presented at Environment, Green Technology and Engineering International Conference (EGTEIC 2018), Caceres, Spain, 18–20 June 2018. Review: The implemented system has conductivity, TDS, pH, temperature, turbidity sensors from first principle standards.

WATER POLLUTION MONITORING BOAT USING IOT BY: V. VENKATESH, K. ROJA SHANKAR NAIDU, M. PAVAN KUMAR, S. RAMARAO, B. GANESH. Final Year B. Tech Students, Department of Mechanical Engineering, Sankethika Engineering College. Review: They are using two sensors, namely PH and turbidity sensors which will detect the presence of suspended particles and PH range of the water. The values are viewed on our mobile through Blynk application through mobile hotspot. Thus, the water pollution monitoring boat using IOT can be used for water quality monitoring on lakes and rivers with ease.

III. EXISTING SYSTEM

Automated Water Quality Monitoring IOT System for Small- scale Aquaculture Farms In this method, they used Arduino development board with sensors for cost effectiveness and provides a real time monitoring environment whereby data is collected from certain specified areas of the pond every few hours and sent as an SMS via the GSM module to the farmer's mobile along with a warning in case any of the parameters

IV .PROPOSED SYSTEM

In this proposed system we are using Node MCU with two sensors to determine water quality, we include turbidity sensors as well as a temperature sensor. These sensors will detect the presence of suspended particles in the water and temperature of water. These values will be displayed over an IOT.We includes a buzzer, when pollution level increases it will alarm.
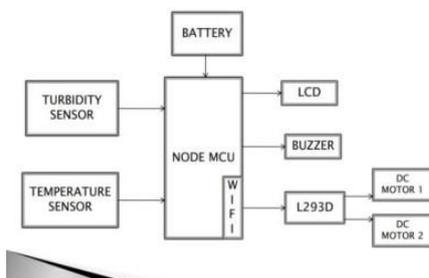
V .BLOCKDIAGRAM

Fig.1: Block diagram of a system

❖ HARDWARE DESCRIPTION

NODE MCU MICROCONTROLLER
Node MCU is an open source LUA based firmware developed for ESP8266 WIFI chip Node MCU firmware comes with ESP8266 Development board/kit i.e Node MCU Development board. Since

Node MCU is open source platform, their hardware design is open for edit/modify/build. ESP8266 is Wi-Fi enabled system on chip (SoC) module developed by Es press if system. It is mostly used for development of IoT (Internet of Things) embedded application.
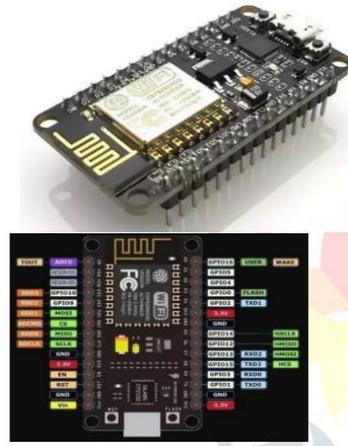
LCD:

A liquid crystal display (LCD) is a thin, flat display device made up of any number of colour or monochrome pixels arrayed in front of a light source or reflector. A program must interact with the outside world using input and output devices that communicate directly with a human being. One of the most common devices attached to an controller is an LCD display.
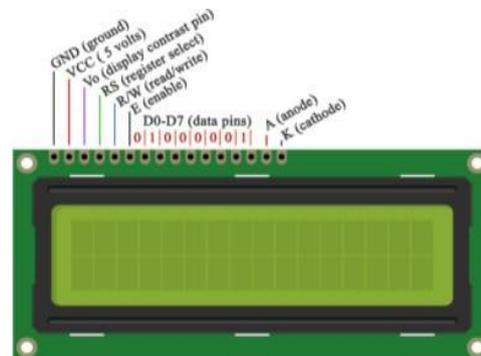

TURBIDITY SENSOR:

Turbidity sensors measure the amount of light that is scattered by suspended solids in a liquid, such as water. When the concentration of total suspended solids (TSS) and total dissolved solids (TDS) in a liquid increase, the turbidity also increases.

Turbidity sensors are used to measure the cloudiness or haziness (turbidity) of a liquid, usually to determine water quality. For samples with high amounts of TSS and TDS, the difference in the light intensity from the transmission beam is measured to obtain the turbidity result, while light scattering is more suitable for samples with low amounts of TSS and TDS. Since turbidity sensors use light to detect a solution's turbidity level, it is important to reduce the amount of external light when using the sensor.

TEMPERATURE SENSOR:
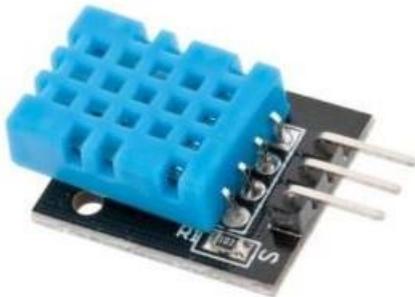
A temperature sensor is an electronic device that measures the temperature of its environment and converts the input data into electronic data to record, monitor, or signal temperature changes. There are many different types of temperature sensors. Some temperature sensors require direct contact with the physical object that is being monitored (contact temperature sensors), while others indirectly measure the temperature of an object (non-contact temperature sensors).

DC MOTOR:

DC motors were the first form of motors widely used, as they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor, a lightweight brushed motor used for portable power tools and appliances can operate on direct current and alternating current. Larger DC motors are currently used in propulsion of electric vehicles, elevator and hoists, and in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

L293D MOTOR DRIVER:

A motor driver is an integrated circuit chip which is usually used to control motors in autonomous robots. Motor driver act as an interface between Arduino and the motors . The most commonly used motor driver IC's are from the L293 series such as L293D, L293NE, etc. These ICs are designed to control 2 DC motors simultaneously. L293D consist of two H-bridge. H-bridge is the simplest circuit for controlling a low current rated motor. We will be referring the motor driver IC as L293D only. L293D has 16 pins.
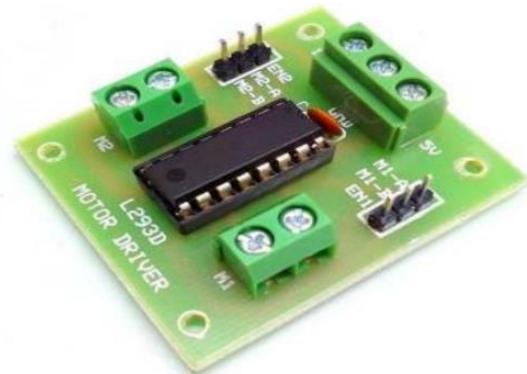
BUZZER:

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows·

KIT DESIGN:

WORKING PRINCIPLE:

In this project we have interfaced Esp-32 microcontroller to different sensors like Ph sensor, temperature sensor, turbidity sensor. The Espwroom32 is used to collect data from the sensors like Ph level, temperature, turbidity percentage and send this data to the mobile phone as well as store the data in google excel sheet.

We have made the remote for the RC boat in such a way that the RC boat can move in left or right direction. There is a speed controller in the remote for maintaining the speed intensity of the boat. The Espwroom32 is a powerful, genetic Wi-Fi+ BT Microcontroller module that targets a wide variety of applications. It has Maximum power of 3.3V, 12- bit SAR ADC that is 4096.

The turbidity sensor provides us percentage of clear water, temperature sensor provides the temperature rate in Celsius. The Ph sensor on the scale of 0-14 gives values according to the type of water.

IV. RESULTS

Type of Water	% of Clean Water
Drinking Water	97.13
Dirty Water	60.17
Type of Water	**Degree C of water**
Hot Water	72.01
Cold Water	2.46
Normal Water	27.15

Type of Water	Ph value
Lemon juice	1.91
Soap water	12.54
Tap water	7.13

VII. FUTURE SCOPE

This next-generation fashion-oriented platform can enhance the user experience, allow for personalized fashion, and also facilitate e-commerce .It could include user-customized fashion ordering, collaborative fashion design, on-demand manufacturing, AI-Assisted fabrication, integration with popular e-commerce platforms, virtual try-ons with real-time updates, and blockchain for ownership and authorship. Users can order their customized designs directly, allowing them to finalize changes and place orders for the exact design. The platform could evolve into a collaborative space where users and fashion designers work together, allowing for professional input or adjustments. On-demand manufacturing could be incorporated, partnering with on-demand manufacturing companies to produce clothing in small quantities or single pieces. AI tools could assist in the design process, suggesting eco-friendly materials, optimal patterns, and cost-efficient production methods. The platform could integrate with major online retailers or independent fashion platforms for accessibility and convenience.

VIII . CONCLUSION

Hence, the conclusion is that our water pollution monitoring RC boat is efficient, low cost and durable. It measures the Ph, turbidity and temperature of the water. It gives accurate readings. Anyone can operate it easily with the help of remote present in mobile. We can get the data on mobile and also store it in the google excel sheet. Monitoring of turbidity, ph & temperature of water makes use of water detection sensor. The system can monitor the temperature, Ph and turbidity automatically with the help of remote control, and it is low in cost. So, the water quality testing is likely to be more economical, convenient and fast. The system has good flexibility. The operation is simple. It has widespread application and extension value.

IX REFFERENCE

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