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AQUA QUALITY SURVEILLANCE BOAT

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Abstract: *The availability of clean, drinkable water is currently under a growing amount of pressure. Due to government inefficiency and the nation's growing population, this issue is particularly prevalent in rural areas. As a result, this particular project's wireless, multi-sensor network seeks to detect and show the water's physicochemical quality in real-time in a way that is far more affordable than the present methods, which include sampling and laboratory tests. It considers a number of variables and displays this real-time quality by showing the electrical conductivity, pH, total dissolved solids (TDS), turbidity, and temperature of the water that is being evaluated. Additionally, this remote-control system was created especially for bodies of water like lakes, reservoirs, rivers, etc. where it is impossible to check the water quality Because water properties vary at every place, it is impossible to operate a fixed system in such complex scale water settings. To prevent this, we created a boat that can float and be controlled by the user to go on the water. This building is shaped like a hull, which reduces the resistance to water flow while maintaining the water's stability. The graphical user interface GUI approach is used to generate and display all of the results, including their readings and graphical analogue meters, as well as the water's impurity limitation points and hazardous level notification. This water quality monitoring boat has a built-in GPS positioning system that indicates the location whenever the water quality changes.. It is shown. These physicochemical properties can be successfully demonstrated by this project, and it is also capable of efficiently showing these readings, according to numerous tests carried out in reservoirs, lakes, and personal water storage tanks.*

Keywords: Remote Control.

I. INTRODUCTION

Water is a resource that all living things require. The main sources of drinking water include lakes, reservoirs, and canals. Water quality has an impact on both human and animal health. The first step in reducing water pollution is having the knowledge of the true extent of watercontamination. This covers methods for conserving and distributing water resources as well as monitoring and managing water quality. Monitoring water pollution is tough since it takes so little time—barely 24 hours—to obtain the results after dragging a boat through a lake orreservoir. Therefore, we developed a method known as AQUA QUALITY SURVEILLANCE BOAT for quickly assessing the water quality system. We will be able to keep the water cleaner as a result. Three sensors are used to assess the quality of the water: turbidity, temperature, TDS sensor, and PH sensors. These sensors will be able to identify the water's temperature, suspended particles, Total dissolved Solids, and pH level. Additionally, we have a GPS module that transmits information from sensors and GPS positions to the internet via the Blynk 2.0 IOT platform.

II. LITERATURE REVIEW

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. OF FIVE YEARS. THE TIME SERIES MONTHLY DATA IS COLLECTED ON STOCK PRICES FOR SAMPLE FIRMSAND RELATIVE MACROECONOMIC VARIABLES FOR THE PERIOD OF 5 YEARS. THE DATA COLLECTION PERIOD IS RANGING FROM JANUARY 2010 TO DEC 2014. MONTHLY PRICES OF KSE -100 INDEX IS TAKEN FROM YAHOO FINANCE.

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.

SMART WATER-QUALITY MONITORING SYSTEM BASED ON ENABLED REAL-TIME INTERNET OF THINGS

By: ALI J. RAMADHAN Department of Computer Techniques Engineering, College of Technical Engineering, University of AlKafeel, Najaf 31001, Iraq Review: The system affords remote- and smart-monitoring capabilities to determine water pH level; temperature; nitrate, chloride, and dissolved oxygen concentration; turbidity; oxidation-reduction potential (ORP); conductivity or total dissolved solids (TDS) and sodium content.

Internet of things enabled real time water quality monitoring system.

By: S. Geetha* and S. Gouthami Department of Electrical and Electronics Engineering, Coimbatore Institute of Technology, Coimbatore 641014, India. Review: The model developed is used for testing water samples and the data uploaded over the Internet are analyzed. The system also provides an alert to a remote user, when there is a deviation of water quality parameters from the pre-defined set of standard values.

Real-Time Water Quality Monitoring System

By: Yashwanth Gowda K.N, Vishali C, Sumalatha S.J and Spoorth G.B 8 th semester, CSE student, Guide: N Ganeshan, Asst. prof Viswesvaraya Technological University, Belagavi, Karnataka, India Review: In this system, three sensors are used to measure the essential water parameters. The most essential water parameters needed to be monitored by the average users are water pH level, water turbidity (cloudiness) and water temperature which is a measurement of the amount of the water in a container.

II. BLOCK DIAGRAM

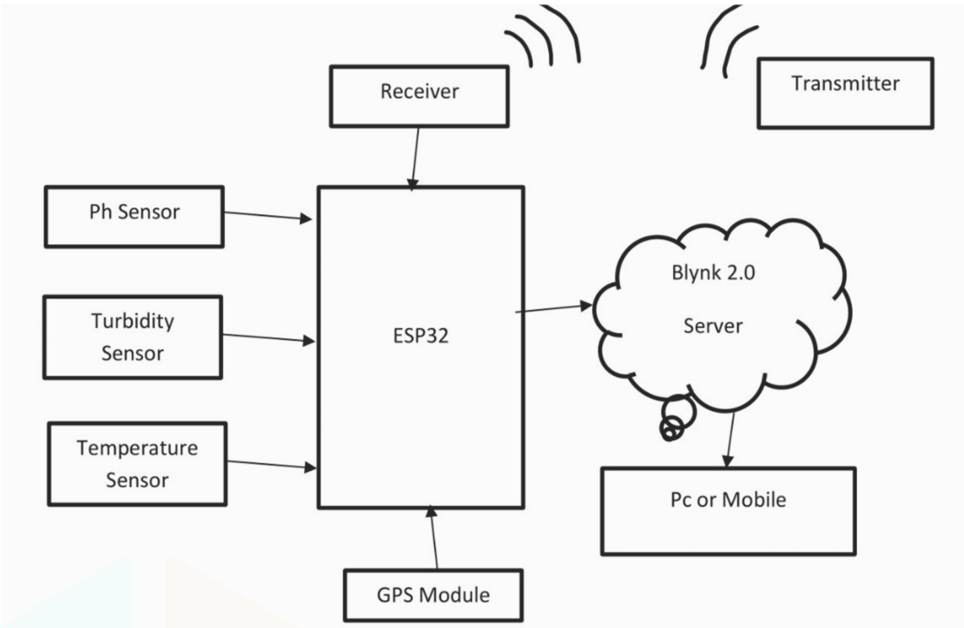


Fig 3.1 Block diagram

III. PROPOSED SYSTEM

The proposed system of Aqua Quality Surveillance boat is designed to monitor water quality in lakes, rivers, and other bodies of water. The boat is remotely controlled by a user, and it can navigate through the water to collect data on water quality parameters such as pH, TDS, temperature, Electrical conductivity and turbidity. The system consists of a boat equipped with various sensors to measure water quality parameters. The boat is controlled remotely by a user through a remote-control interface. The boat is powered by an electric motor, and it can move in any direction with the help of a rudder. The boat is also equipped with a GPS receiver that provides location information to the user. The boat can be programmed to follow a pre-determined path or can be controlled manually by the user.

The data collected by the sensors on the boat is transmitted to the base station, where it can be analyzed and displayed on a computer screen. The data can also be transmitted to a remote server for further analysis and storage. The Aqua Quality Surveillance boat system can be used for a variety of applications, such as monitoring water quality for drinking water supplies, detecting pollution events, and assessing the health of aquatic ecosystems. The system can also be used for research purposes to study the impact of environmental factors on water quality.

ADVANTAGES:

- It is possible to monitor the quality of the water in real time.
- Lessons on the environmental effect of water quality testing.
- A practical means of keeping track of the water quality in huge bodies of water.
- The device is simple to use.

IV. SOFTWARE EXPLANATION

4.1. ARDUINO IDE

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, and Linux) developed in C and C++ functions. It is used to build and upload programs to Arduino compatible boards, as well as other vendor development boards using third-party cores. The IDE's source code is available under the GNU General Public License, version 2. The Arduino IDE supports the programming languages C and C++ by employing unique code organization conventions. The Wiring project's software library, which supports many common input and output operations, is included with the Arduino IDE. User-written code only requires two basic functions, which are compiled and linked with a program stub main () into an executable cyclic executive program with the GNU toolchain, which is also included with the IDE release. The Arduino IDE uses avrdude to convert executable code into a text file in hexadecimal encoding, which is then loaded into the Arduino board by a loader program in the board's firmware. Avrdude is the default uploading tool for flashing user code onto official Arduino boards. 7 The Arduino IDE is a fork of the Processing IDE, but as of version 2.0, the Processing IDE will be replaced by the Eclipse Theia IDE framework based on Visual Studio Code. With the increasing popularity of Arduino as a software platform, other vendors began to create bespoke open source compilers and tools (cores) capable of building and uploading sketches to microcontrollers not supported by Arduino's original range of microcontrollers.

4.2 INTERNET OF THINGS

The internet has transformed everyone's lives during the last decade. The internet of things has been heralded as one of the most significant developments in the internet portfolio of technologies. The Internet of Things (IOT) is concerned with connecting communication things that are put in multiple locations that may be far apart. The Internet of Things is a concept in which network devices may gather and sense data from the outside world and then distribute that data across the internet where it can be used and processed for numerous reasons. The internet of things depicts a vision in which objects are integrated into the internet, with each object being uniquely identified and having access to the network. IoT communication differs significantly from typical human-to-human communication, posing a significant challenge to existing telecommunications and infrastructure. Furthermore, IOT efficiently offers immediate information about physical item access. The Internet of Things concept is extremely beneficial in achieving real-time monitoring of sensor data. The Internet of Things (IoT) is a type of network technology that is based on information sensing equipments such as RFID, infrared sensors, GPS, laser scanners, gas sensors, and so on, and allows anything to connect to the Internet to exchange information using a protocol that provides intelligent identification, location and tracking, monitoring, and management. We propose a system that uses cloud computing approaches to monitor sensor values through the internet. Cloud computing allows users to access apps as utilities via the internet. The characteristics of cloud computing and development methodologies are discussed. Cloud computing is a large-scale processing unit that processes in real time, as well as a very low-cost IP-based technology. IoT applications include building and home automation, smart city initiatives, and so on.

4.3 BLYNK IOT PLATFORM

Blynk is a new platform that lets you easily create interfaces for managing and monitoring your hardware projects from your iOS or Android mobile. You may construct a project dashboard and arrange buttons, sliders, graphs, and other widgets on the screen after downloading the Blynk software. You can use the widgets to toggle pins on and off or to display sensor data. Whatever your idea is, there are probably hundreds of instructions that will make the hardware component very simple, but creating the software interface will be complex. However, with Blynk, the software is even simpler than the hardware. Blynk is ideal for interacting with small projects such as checking the temperature of your fish tank or remotely turning lights on and off.

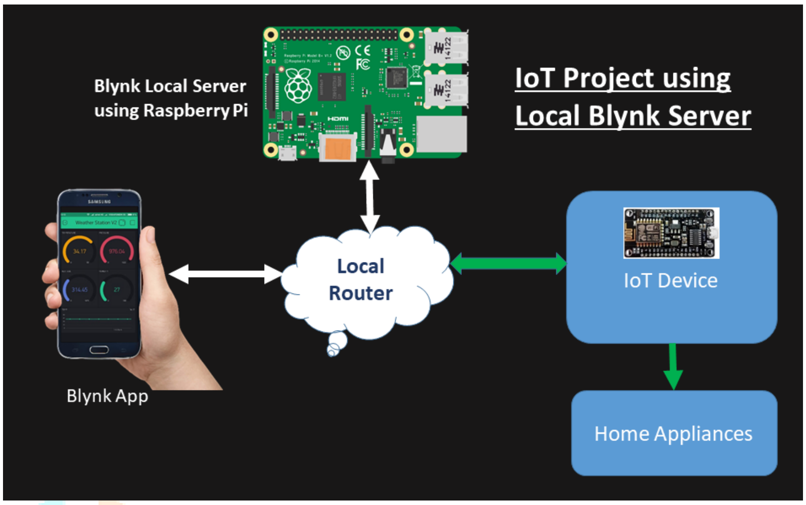
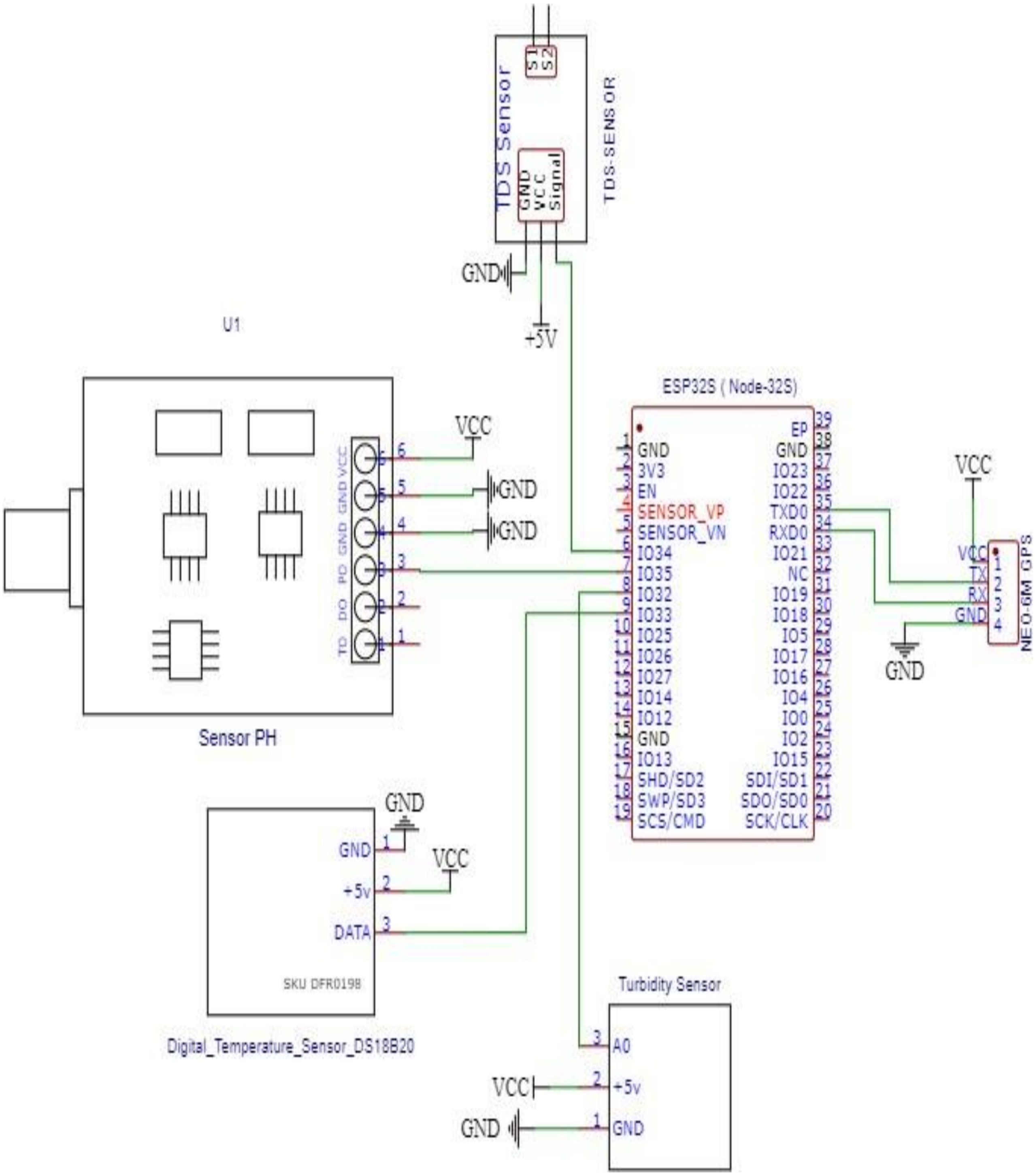


Fig 5.1. Blynk Iot Platform

V. CIRCUIT DIAGRAM



VI. WORKING

The operation is founded on the premise of routinely sampling water from various depths and places to measure the concentrations of various water quality factors like temperature, total dissolved solids, and PH. Sensors for temperature, turbidity, and pH are employed. To monitor temperature, and pH levels in the water, these sensors may also include probes that may be lowered into the water. The readings from the real-time testing of the water samples are sent to the server via the Blynk 2.0 IoT platform.

On the Blynk 2.0 platform, the user can create a GUI interface that displays the data collected by the sensors on the boat. The interface can include graphs, charts, and other visual representations of the data. The user can also set up alerts and notifications based on specific water quality parameters. The boat's operating principle is based on the integration of various sensors, a microcontroller, a transmitter, a remote-control interface, and a Blynk 2.0 platform. These components work together to enable the collection, transmission, and analysis of water quality data in real-time, providing a comprehensive solution for monitoring water quality in aquatic ecosystems.

Since the Ph is inversely proportional to the temperature, the obtained values for accuracy and values will vary from place to place and according to the temperature. This real-time data like th electrical conductivity (EC), Potential of hydrogen (Ph), total dissolved solids (TDS), turbidity, and temperature of the water that is being assessed or displayed.

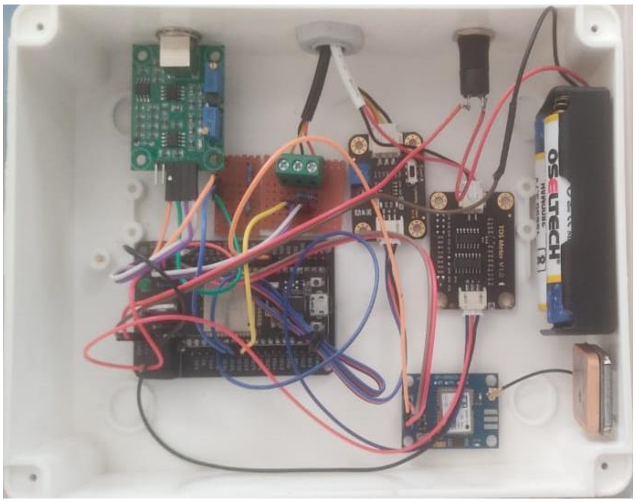
It considers a variety of variables. Additionally, as it is impossible to monitor the water quality in bodies of water like lakes, reservoirs, rivers, etc., this remote-control system was developed specifically for them. Since water characteristics change depending on location, it is not viable to use a permanent system in such intricate water settings. To avoid this, we developed a boat that can float and can be moved on the water by the user. This structure has a hull-like shape, which lessens water flow resistancewhile retaining the stability of the water.

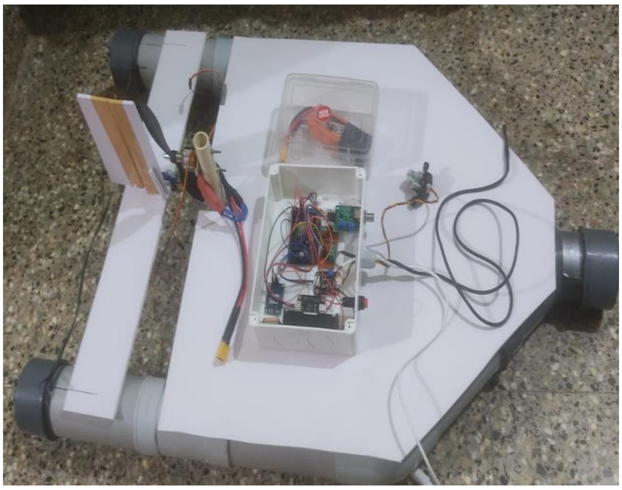
VII. RESULT

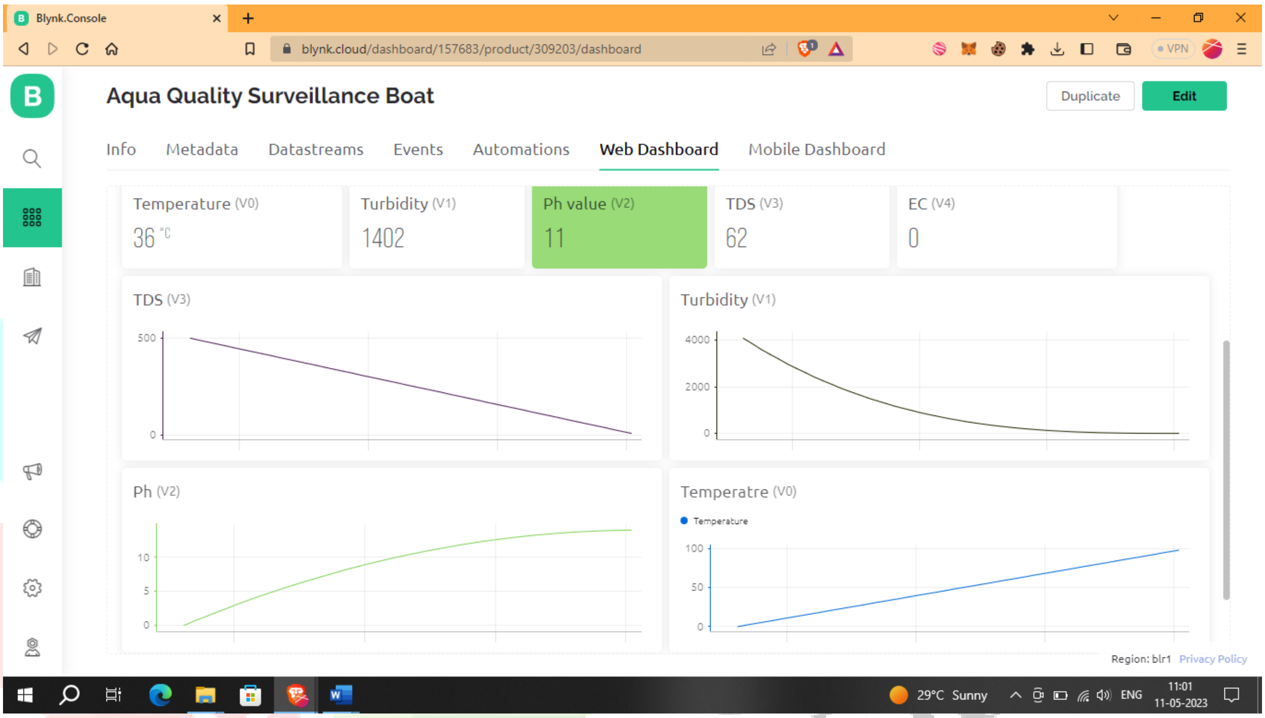
The current approach for testing water quality is to collect a water sample by hand. These samples were sent to laboratories to be tested for quality, which requires additional human effort, expense, and time. Our proposed method will automatically display the qualities of water on screen without any further human effort. We could determine the quality using these properties.

Water turbidity, pH, and conductivity were monitored using appropriate sensors. The technology can automatically monitor water quality, update server webpages at a minimal cost, and does not require employees to be on duty. As a result, water quality monitoring must be more cost-effective, convenient, and quick. By replacing the required sensors and altering the relevant Python routines, the system is highly adaptable. Other water quality measures can be monitored using this device. The procedure is straightforward. The system can be expanded to monitor hydrologic conditions, air pollution, industrial and agricultural output, and other variables. It has a wide range of applications and extension potential.

Visual user interface All of the findings, including their readings and graphical analogue meters, as well as the water's impurity limitation points and dangerous level alerts, are generated and displayed using a GUI method. The output of the model that we obtain from the server is shown in Fig. 2.3. We can observe that the output on the server is clearly distinguishable. A built-in GPS positioning device on this water quality monitoring boat provides the location if the water quality changes. Numerous experiments conducted in reservoirs, lakes, and personal water storage tanks have shown that these physicochemical parameters may be properly proved by this project and that it is also capable of effectively displaying these data.



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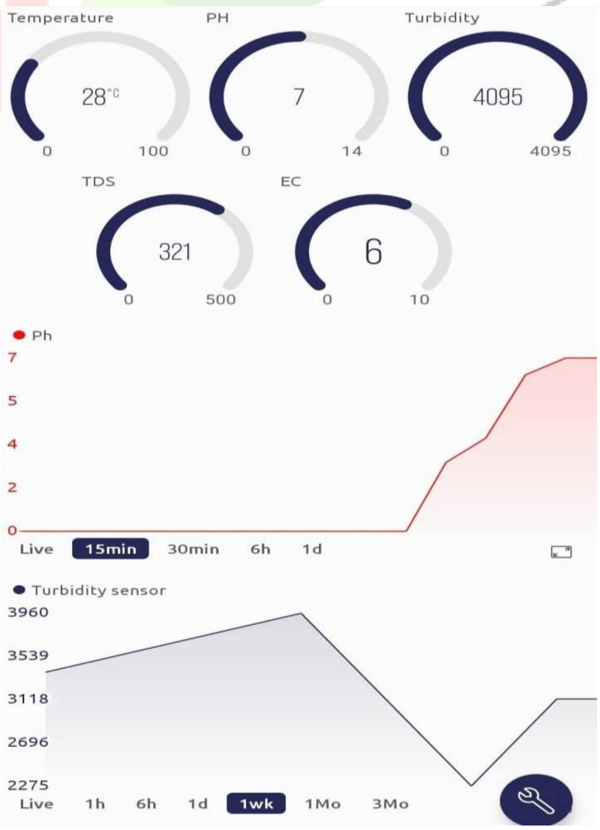
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Turbidity sensor
Live
1h
6h
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1wk
1Mo
3Mo

VIII. CONCLUSION

The present approach for determining water quality is to hand sample the water. These samples were sent to laboratories to be tested for quality, which requires additional human effort, expense, and time. Without any further effort, our proposed technology will display the qualities of the water on the screen. Monitoring of Turbidity, PH, and Temperature of Water with these features makes use of a water detecting sensor with a unique advantage and an existing GSM network. The device can automatically monitor water quality, is low-cost, and does not require someone on duty. As a result, water quality monitoring is likely to be less expensive, more convenient, and faster. The system is highly adaptable. This system can only be used to monitor different water quality metrics by replacing the matching sensors and modifying the required software programs. The procedure is simple. The system can be expanded to monitor hydrologic conditions, air pollution, industrial and agricultural output, and other variables. It has a wide range of applications and extension potential. Keeping embedded devices in the environment for monitoring allows the environment to protect itself (i.e., smart environment). To accomplish this, we must deploy sensor devices in the environment for data collection and analysis. We can bring the environment to life by placing sensor devices in it, allowing it to interact with other objects over the network. The collected data and analysis results will then be made available to the end user via Wi-Fi.