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IOT BASED WATER QUALITY MANAGEMENT SYSTEM

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ABSTRACT: Using a variety of sensors and a mobile device to show the observed value, the monitoring of urban waste water for agricultural use offers a clever way to assess the water quality. The primary goal of this project is to estimate the parameters related to water quality, such as pH, turbidity, and temperature. This will enable the identification of deviations in the parameters and send out alerts when a value deviates from the standard or the predefined threshold set by the ESP32 Controller. These extreme values pointed to potential problems with crop cultivation, soil quality, and water quality anomaly detection setup using a WiFi module. The data is stored in a Blynk cloud and server connected to the Internet of Things (IoT) to send messages to the government, which then provides remedial measures to overcome these issues and assists farmers in improving their sales and business processes.

I. INTRODUCTION

Numerous activities, including as agriculture, travel, and consumption, all of which utilize water and may in turn have an influence on the quality of the water, can degrade water quality. In today's world, many different types of businesses and resources are polluting the water supply. Because of this, determining the quality of the water is one of the most pressing issues facing globalization. In order to effectively address such a significant challenge, regular monitoring of water supplies is required. As a result, monitoring the quality of the water is essential, and this monitoring must include a variety of chemical characteristics. Some of these chemical parameters include pH, turbidity, temperature, BOD, and TDS. The problems that surface water bodies have with providing appropriate water quality are almost often the result of organic matter and nutrients. Polluted water threatens our lives, which is why a compelling water quality observing is a fundamental part of screening an essential part to monitor the water to indicate the presence of any biological wastes in the water that can cause major or even minor issues to the human population as well as to the crop cultivation in agricultural settings. Over ninety percent of the stream bowl the board plants that were surveyed revealed that agribusiness is a major concern in the bowl. This concern includes diffuse or factor source pollutants with the assistance of organic be counted, nutrients, pesticides, and hydro-morphological influences, and it is associated with the installation, maintenance, and adjustment of a larger appropriated cluster of sensors to monitor the level of the aforementioned parameters. It is helpful to gauge the acidity or alkalinity of an answer, and the plan provides the detection of potential of water sample, which refers to the concentration of hydrogen ions in a solution. The pH value ranges from 0 to 14 on a pH scale, and the values below 7 indicate acidity, while the values below 7 indicate alkalinity, and pure water has a pH of 7.

The presence of suspended particles or total suspended solids in the water that are made up of inorganic materials, bacteria, and algae total suspended solids are a significant factor for observing and an optical determination of water clarity TDS is an abbreviation for total dissolved solids, which is directly proportional to the soluble solids that are dissolved in water. The work that has been discussed has to be done on the construction and enhancement of a framework for monitoring the water quality. The primary objective of this work is to alert the user of the value of the parameters that are used to identify the pollutants in the water. These each surface water frames are figuring out the load from agricultural waste water frames are figuring out the load from agricultural waste water frames are figuring out the load from agricultural waste water frames are figuring out the load from waste water treatment, urban wastewater, bore well water, corporation water, and other areas to the water frame that are primarily in homes, factories, industries, and agricultures.

Given that laboratory procedures are too gradual to build an operational response and do not provide a level of public health safety in real time, there is a need to enhance the existing system for monitoring the water bodies. This is because there is a need to improve the current system for monitoring the water bodies.improve and enhance tracking and evaluation tools to ensure a statistically robust and complete picture of the status of agricultural land and cultivational land for the purpose of protecting the environment. This will be accomplished by providing a detailed survey by the tools and techniques in the water quality monitoring system that are proposed by the implementation of the sensor that enables the dates to be provided in an LCD Display that can be viewed by the user, and also the data will be sent to the appropriate location. An ESP8266 equipped with a Wi-Fi module is what is utilized to link the machines and people on land. This system sends an alarm message to the user in the form of an LED or a buzzer sound when it reaches a value that is more than or equal to the threshold value that was previously programmed and set in the controller.The corrective actions that are made for a rise in temperature include monitoring the value and recognizing the existence of moisture content in the soil using a soil moisture detector and automatically switching ON the pump for sprinkling or irrigating the water for cultivating field or garden. These steps are conducted so that the temperature may be brought back down to a more comfortable level. moisture content in the soil by using a soil moisture monitor and automatically turning on the pump to either sprinkle water or irrigate the field or garden that is being cultivated with water.

II. LITERATURE SURVEY

It is the goal of Dunna Naveen Preetham and Shaik Imam's "Automotive Environmental Monitoring System utilizing IoT Technology" to develop a clever system that provides the most accurate monitoring of the environment possible. The sensors provide digital readings of temperature, gas, and humidity to a remote computer, which gets those readings via WI-FI. Through the use of input-output technologies, the remote computer is able to monitor sensor data.

A sensor fence was proposed by Abhinav V. Deshpande and colleagues [2]. The circuit is grounded whenever animals contact this exposed cable, and as a result, we get an input signal that indicates the presence of animals near the fence. After the first signal was supplied, the amplifier circuit began processing the signal. It will be obtained by the microcontroller. When the system is activated, a buzzer sounds, a flash light illuminates throughout the night, and a message is sent to the farmer. The power will come from either solar panels or carefully regulated energy.

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An Android and Internet of Things-based Agriculture System was suggested by Prof. Megha Yaligar, Shaini H. Nagur, Nehaparveen Binkadakatti, Pavitra Gokavi, and Mouneshwari Shinde. The goal of the system is to increase agricultural performance by giving information and finding solutions to issues. The buzzer will sound or the user will be told if the soil is dry. The user is provided with the knowledge that the soil is dry and needs to be watered. All of the data is stored on the cloud. The user is able to get information in a step-by-step fashion here.

In [4], Nirav Rathod and K. J. Somaiya presented their Internet of Things (IoT)-based smart sensor agriculture stick for real-time monitoring of temperature and humidity. It places an emphasis on the use of sensors and drones in conjunction with agricultural practices like as pest control, crop management, and field monitoring. This project utilizes Arduino in conjunction with a number of other components in order to live monitor temperature and moisture.

The Smart Precision Based Agriculture Using Sensors project developed by K. Lakshmisudha et al. creates devices and solutions based on wireless sensor networks in order to manage, display, and notify users. The goal of Solar Energy's IoT-Enabled Pesticide Sprayer with Security System [6] is to improve agricultural efficiency and productivity while also ensuring the safety of farmers. An agricultural field being treated with pesticides by the Agribot, a robot that is controlled by the internet of things.

[7] Chetan Dwarkani M and colleagues suggest a smart farming system that makes use of sensors for the automation of agricultural tasks. This system would combine a smart sensing system with a smart irrigator system via the use of wireless communication.

Optimized Neighbor Discovery in the Internet of Things is discussed in the article [8] by Nasreen Fathima and Ali Ahammed. The article also discusses the architecture of the IoT network and its layer operations. It outlines the architecture of the IoT system as well as the relevance of each layer.

[9] The Internet of Things-based Smart Agricultural Monitoring and Irrigation System known as Swaraj C M is in charge of agricultural monitoring in areas where people are unable to provide enough protection. Each component has IR sensors that can update the parameters via Wi-Fi, including Tilt, Flame, Temperature and Humidity, and Soil moisture. Data may be stored on the cloud. The data from the thing talk cloud is evaluated. The reliability and effectiveness of this farm monitoring system are both excellent.

Bluetooth will switch the drip on and off no matter where we move, as described in [10] Santhiya P, Lakshmitha G, Monisha J, and Akshaya's Smart Irrigation System Using Arduino and Android. Microcontrollers in Android are responsible for system control. The sensor takes in the value of its surroundings and saves it in the controller. If the reading on the controller is lower than the threshold, we may begin the drip by connecting an Android device via Bluetooth and starting the appropriate software.

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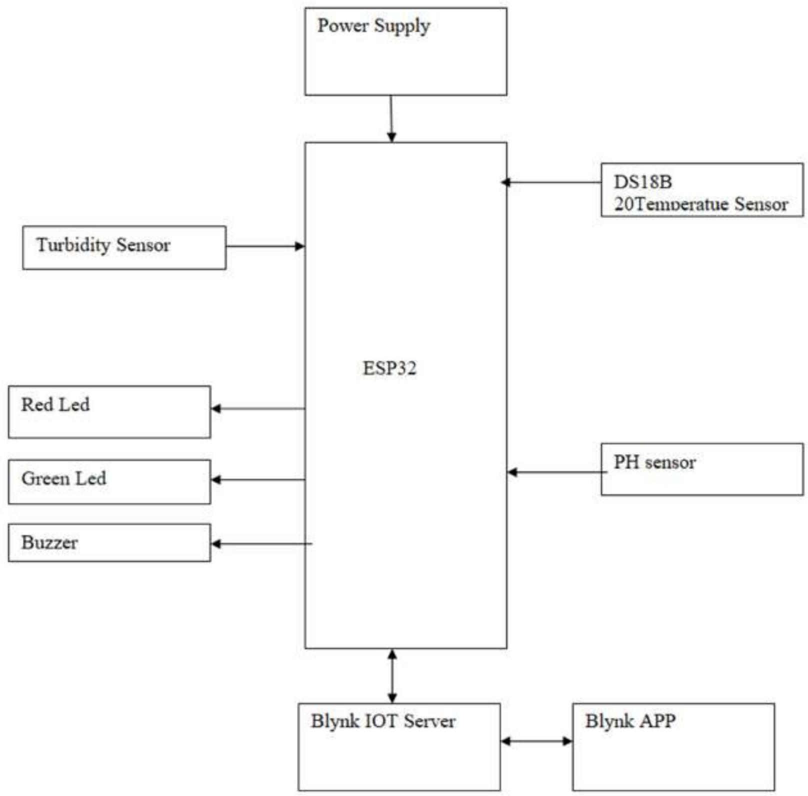
III. BLOCK DIAGRAM



WORKING PRINCIPLE

The proposed framework uses a variety of sensors to collect data that shows the deviation of water unusual characteristics. It also uses the Internet of Things to deliver the measured data to the microcontroller, which then sends an alarm message to farmers or customers to Module and With the help of the WiFi Module, it gathers data in real time about the rise in the parameters in the water utilized by the IOT foundation without any human intervention. The parameters that would be monitored in the suggested framework include temperature, turbidity, and pH. The only notable and IoT-enabled water following framework is a controller. It is found that most IoT builds address usage, which is crucial. A controller that has access to external Wi-Fi and energy production may also detect complex meandering. The ESP32 is a single-chip microcontroller embedded in a Wi-Fi module that may be able to detect the nearest Wi-Fi hotspot for internet access. Sensors are immediately compatible with the controller of the exposed domesticated water system. The sensor's characteristics will be used to determine the water levels, and the procedure for configuring the sensor under different water conditions will be utilized to measure the results. Those parameter measurements have an opportunity to be seen. Finally, exploring the use of portable displays. The vast bulk of sensor data that is sent to the cloud for controller use is produced within the cloud based on the requirements provided by those parties to the World Health Organization (WHO). If the value over the threshold, a message will be sent from the client's portable cloud storage. Using an IoT, a warning message is issued to both the user and the government. Similarly, it offers corrective actions to maintain the measurement parameters' level and prevent nature from claiming water. Both the government's top-notch water monitoring program and users of smart water wonderful tracking devices, as well as creative water sensor interface devices that combine data processing, records storage, and water measurement, may make use of this.

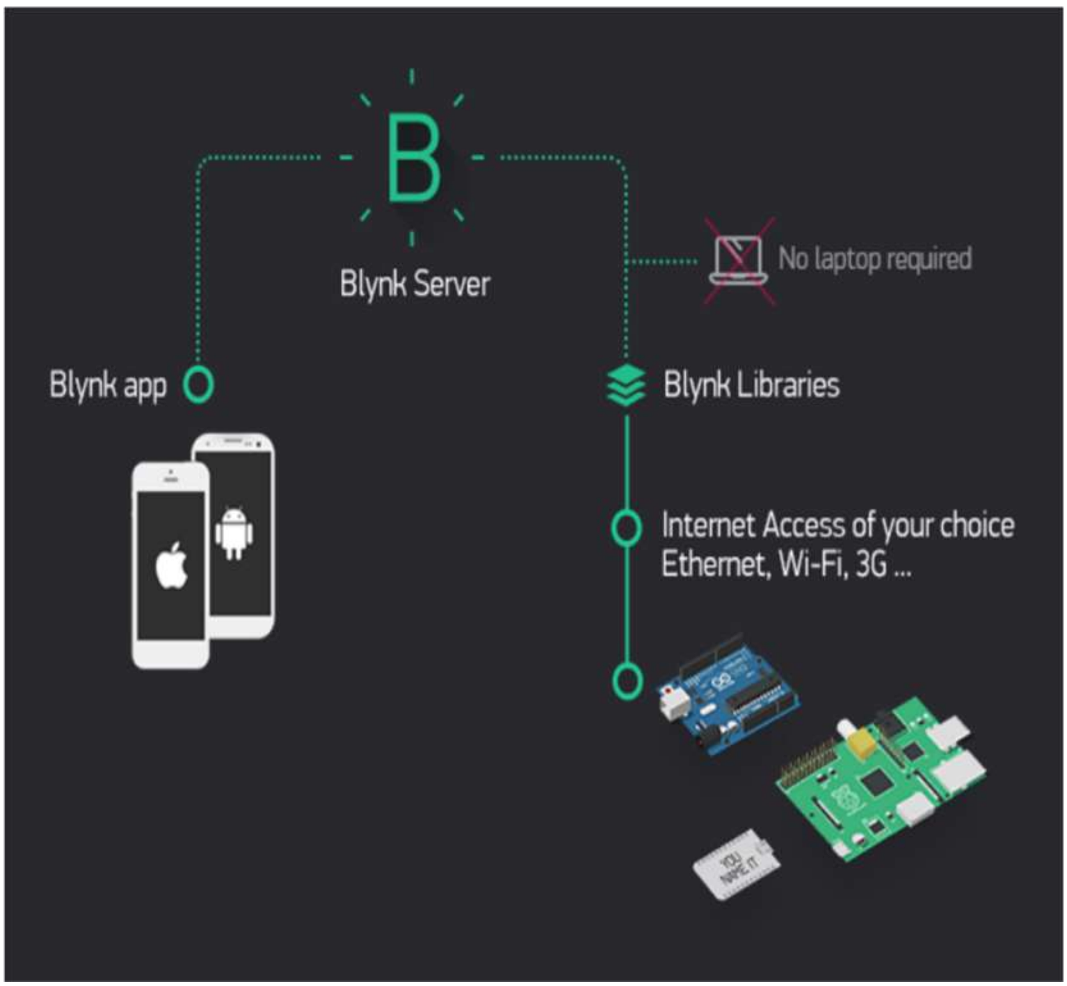
IV. SOFTWARE

BLYNK APP

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, vizualize it and do many other cool things.

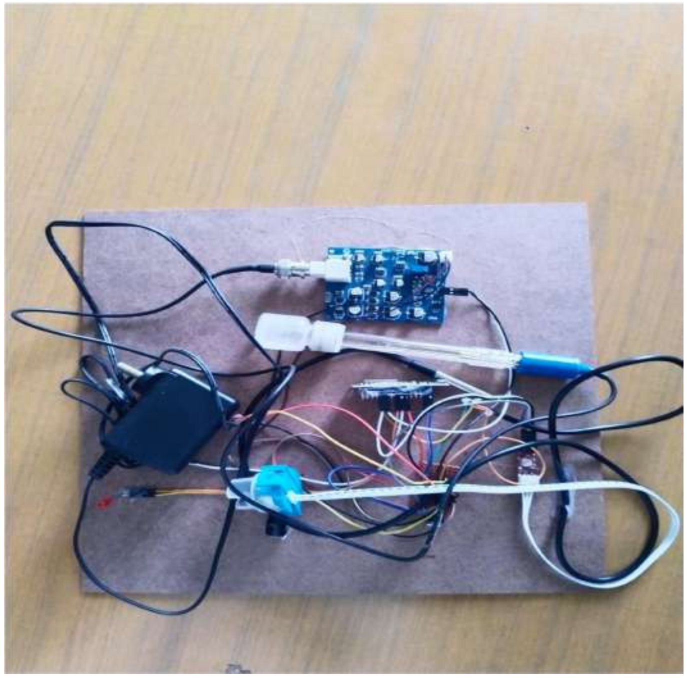
There are three major components in the platform:

- **Blynk App** - allows to you create amazing interfaces for your projects using various widgets we provide.
- **Blynk Server** - responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi.
- **Blynk Libraries** - for all the popular hardware platforms - enable communication with the server and process all the incoming and outcoming commands.



V. RESULTS AND DISCUSSION

This project, including all of the hardware and software, is ready and operating in accordance with the original project requirements and specifications. Due to the project's innovative design and creative character, there are a plethora of opportunities for implementation. Below is a realistic depiction of an experimental board.



VI. CONCLUSION

The ph sensor, turbidity sensor, and temperature sensor that were attached to the ESP32 by utilizing the software Arduino IDE make up the interface of the ESP32. Through the use of the program, the compilation of the code is accomplished. The Arduino Software Integration Environment (IDE) is used to upload code to the ESP32. The findings have been checked for accuracy.

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