UNDERGROUND WATER LEVEL CONTROLLER

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Abstract— Automatic water level controller for both overhead and underground tank is designed to monitor the level of water in a tank. It displays the level of water and when it is at the lowest level; a pump is activated automatically to refill the tank. When the tank is filled to its maximum capacity, the pump is automatically de-energized. Water Underground is a low-cost solution, based on a combination of Internet of Things (IoT) local sensing, Edge computing, Cloud storage, web services and predictive analytics, continuously monitoring the level of underground water and its quality. The Float switch fluid level controller sensors use the principle of a "2-way switch". The motor pump automatically turns ON when the water level is low. The device automatically detects the water level, when it is low, hence triggering the relay which turns on the motor. The system consists of one HC-SR04 Ultrasonic transceivers that generate ultrasonic pulses and determines the depth of the water surface based on the total Time of Flight (TOF) of the reflected wave. The reservoir dynamics is tracked and modeled using Cloud-based predictive analytics. The corresponding Cloud services include long- and short-term detection of periodic trends. We Sent all data to esp web server and monitor our parameters and control motor

.**Keywords:** Analysis, investigation, research (IOT - Internet of things, TOF – Time of Flight).

INTRODUCTION

Water is one of the most useful natural resource in our day today life. The Indian government data says by next 30 years the country's each household will have only about 1.1 million liters of water per year to use, down from 1.8 million liters in 2011.Therefore it becomes a primary duty of every individual to conserve this precious water. Many a times the water gets wasted without our knowledge. There is a scope for saving this unintentional wastage of water via technology, amongst which one can be automatic water level controller which can control water overflow. The conventional automatic water level controller uses conducting wires to detect the water level and wired technology to control on and off the water pump. The use of such conducting wires in water leads to corrosion after few years. The wired technology is also not suitable for water pumping system in agricultural farms because length of the wires becomes a constraint. Hence we undertook this work. The proposed system utilizes an ultrasonic sensor to detect the water level .With the help of wifi technology the wireless analogy is implemented to overcome the constrain of distance between the overhead tank and the pump. The microcontroller ESP32 is used to fetch data from the water level sensor and to automate the pumping system. The microcontroller at the sensor unit generates a unique code depending up on the water level sensed and sends via wifi. The display unit receives the unique code through wifi and turns on and off the pump accordingly with the help of another microcontroller.

I.METHODOLOGY

In this Project we are using ESP32 For Wireless , To Communication Between Server and Device and send Data To Esp to web Server below are the steps .
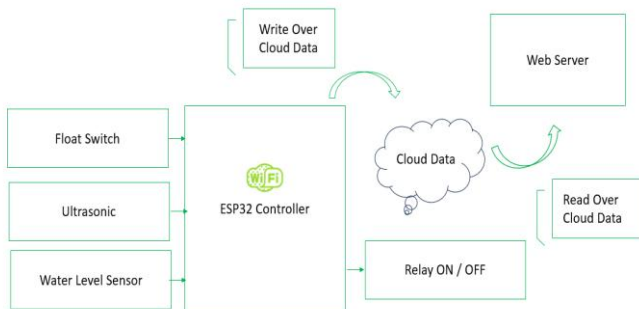

Fig. Block Diagram of Underground water level controller

Block Diagram -

In the Following diagram we are interfacing different sensor like Float Switch , Ultrasonic , Water Level and relay to turn on and off the motor via web server , in web server we can monitor water level , status and turn on and off motor . using web app , Our Low cost project help to automate water tanks , to reduce human effort and monitor water parameters for further processing .

Working Principle-

When data is collected from the sensor attached to esp32 , and collected sensor data it process via processing unit of esp32 , and send the all data to esp32 buffer for temporary , When the float switch is low or high then relay can on and off depend upon water level , the water level is detected using water level detector pump can on and off to supply water .

Data controlling : ESP32 Controller Collected data and motor status then send to esp32 buffer . and client ping to esp32 ip using wen browser and request the data when it display the data and ON / OFF motor button when toggle the button and set the motor status.

III. RESULTS

Here we implemented Esp web server and controlling the motor on and off and monitor the water status.
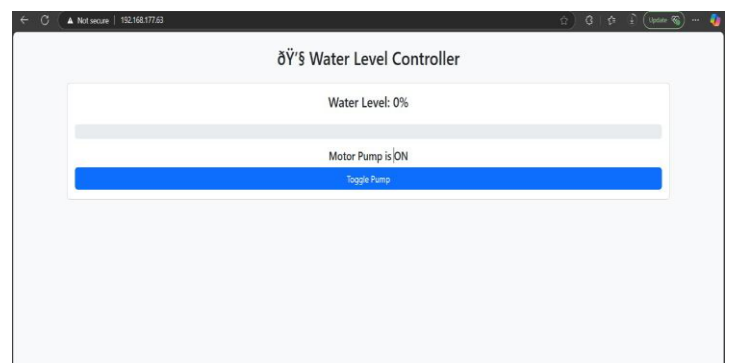

Figure 2 :Web Server

In the above Diagram we are Implemented the Esp 32 web server , we are configure HTML And Bootstrap page To Display the data , the model is like request and response like that so esp32 send the data to buffer and client application request the data and buffer can send to request data as shown in above diagram, and another function is too add new credentials When ESP32 Set to AP mode.

IV. FUTURE SCOPE

The underground water level controller using ESP32 holds significant future potential in the field of smart automation and water resource management. With the integration of IoT platforms, this system can be enhanced to provide real-time monitoring, automatic control of water pumps, and instant alerts through

mobile applications or messaging services. It can be powered by solar energy, making it suitable for deployment in remote or rural areas with limited electricity access. The system's capabilities can be further extended by incorporating cloud-based data logging, enabling historical data analysis and predictive insights through artificial intelligence. This will help detect anomalies such as leakages or declining water levels, aiding in preventive maintenance and water conservation efforts. Additionally, integration with weather APIs and voice assistants like Alexa or Google Assistant can make the system more intelligent and user-friendly. The scalability of the project allows for multi-sensor support and community-level applications, making it ideal for agricultural fields, residential societies, and industries. With continuous advancements, the underground water level controller can play a vital role in addressing water scarcity and promoting sustainable usage practices.

V . CONCLUSION

Our Low cost Budget Project help to control and monitor the water in which we can implement the IOT based Smart Underground Water level Controller , to reduce the human effort , and smartly monitor the Water levels. Using Esp32 and Web Server Where Web server is inbuilt implemented . in agricultural and multistoried building applications .The results shows that automatic water level controller proposed in this paper is superior with respect to wired one. Implementation of this water level controller helps in preserving water to maximum extent which can indirectly help in reducing the scarcity of water.

VI. ACKNOWLEDGMENT

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