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SMART WATER TANK MONITORING SYSTEM USING NODEMCU WITH ANDROID APPLICATION

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Abstract: Everyone on the planet requires water to live. Humans aren't the only creature on Earth that needs water to live. Fresh water is currently in short supply. Only 0.03 percent of the water on our planet is fresh water. As the world's population grows, the amount of water available decreases. In order to conserve water for the future generation of water. In this work, a smart water tank monitoring system is suggested that uses a Node MCU and an Android application to monitor the real-time water amount in the tank. This is a new method to IOT (Internet of Things) based water quantity monitoring. This system is made up of sensors that measure the quantity of water in the form of water level. The measured values from the sensors are processed by Node MCU, and the processed data are sent through IOT protocol to the main controller, Node MCU. Finally, take use of cloud computing. Our project also included an android application that used IoT to monitor and regulate water quantity.

Key words: Water level monitoring, real time, Node MCU, IOT

1. INTRODUCTION

In human life, water is the most crucial natural resource. Humans use water for practically every aspect of their everyday lives, including washing, cleaning, bathing, irrigation, and industrial demands. Water is an essential component of life. Water is mostly utilised for everyday activities such as drinking, bathing, cooking, and cleaning. There is enough water, especially in the city and in the village. Water requirements are currently increasing, both in the city and in the hamlet, as the population grows. Increasing water demands, of course, necessitates an expanding system of clean water supply, which must be maintained in order to fulfil the needs of individuals who require clean water on a daily basis. Especially in densely populated areas where the nee Water tanks are an important equipment that practically every community, government, and private organization today has as a clean water storage container for everyday usage. As is well known, the availability of clean water is a crucial component of customer happiness and productivity, as is safety, comfort, and energy efficiency. The water tank on the roof top/tower requires a pump for water filling and in its distribution uses gravitational energy to drain water to numerous points of usage, hence the water tank above is preferred to prevent problems like power outages.d for clean water is high. "Toren" equipment, pumps, pipe systems, and other supporting equipment are necessary in water distribution operations from one area to another. Because the "toren" used to hold a water bath is normally managed manually, the water level is frequently unknown, causing the pump to ignite and spill water when someone forgets to switch off the pump machine. This will result in wasted electrical energy use, as well as damage to the walls due to the moisture, which can lead to the growth of moss. As a result, an automatic tool that can conduct remote control to monitor the water level is required, so that the water pump may be shut off as soon as the water level reaches the tank's maximum capacity. Water level sensing systems have been developed in the past, particularly in reservoirs with several uses to support human water demands, such as irrigation, hydropower, and recreational amenities.

2. LITERATURE SURVEY

According to a literature review of water management systems, it has already been applied and tested in a number of studies. Distribution, monitoring, and measuring the amount of water in the tank, as well as bill creation, are all included in the suggested model. Data may be transmitted to the user and admin for invoicing for individual residences, water flow monitoring, water level monitoring, and pipe leakage monitoring using the current IoT platform The focus of this article was on laser sensors for control and real-time monitoring. The pulses from all channels are counted when the user switches on the gadget. The quantity of water consumed by all users is monitored and managed by a controller. The amount of water in the main tank is monitored using water level sensors.

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3. EXISTING WORK

This existing system presents a wireless based Water Level monitoring and control system using Arduino UNO and Bluetooth Modules, which allows the user to receive an SMS alert about the water level in the tank and also switches the pump on and off automatically when the water level in the tank reaches a certain threshold level. Arduino is popular because the code and connections are straight forward. A constant water level measurement is also provided by the system.

4. PROBLEM FORMULATION

Water is a finite resource that is required for agriculture, industry, and the survival of all living things on the planet, including humans. Many individuals are unaware of the necessity of water on a daily basis. Many unregulated ways waste more water. This issue stems from inefficient water consumption, a lack of appropriate water, and a lack of integrated water management. As a result, water efficiency and monitoring are possible bottlenecks for residential water management systems.

5. PROPOSED SYSTEM

Water now plays an important part in the lives of all living things. In recent years, Internet of Things (IOT) technology has become increasingly significant in the development of projects. In this research, we present an IoT-based water level monitoring system that can measure the water level in a water tank in real time. Because water is so important in rural regions. As a result, we created these applications. In this system, an Android application (Ubidots) serves as the system's front end. The sensors are controlled by the Node MCU through the Internet. The real-time implementation of a water level monitoring mobile application system is described in this study. The current system may be controlled manually, which means that the user can walk to the water pump and turn it on and off. However, the suggested approach can address this issue. All of these operations may be carried out utilizing the Internet in the proposed system. Using the Node MCU, the controller can identify a WI-FI connection. The water pump will automatically start and stop based on the sensor data. The water level monitoring app employs a laser sensor to measure the current water level, according to this article. This suggested system would produce an Android application that will allow users to see the current water level. This application will be simple to use. Proposed system used the IOT platform to build this system because it is incredibly secure and allows for easy connection between hardware and software. The suggested system uses a laser sensor TOF10120 to design and construct an IoT-based real-time water level monitoring system specifically for household applications. When the water level in the tank reaches the reserve point, a relay-based embedded system is developed to activate the DC motor that is immersed in the sump to fill the tank. The suggested system examines the interpretation data in order to obtain helpful information on the system's implementation. The internet is connected to the Node MCU board. Sensors that detect the tank's water level are sent to an Android app through a Node MCU that is already linked to the internet. The suggested system's main purpose is to assist in the monitoring of the amount of water contained in the tank.

5.1 Schematic Diagram:

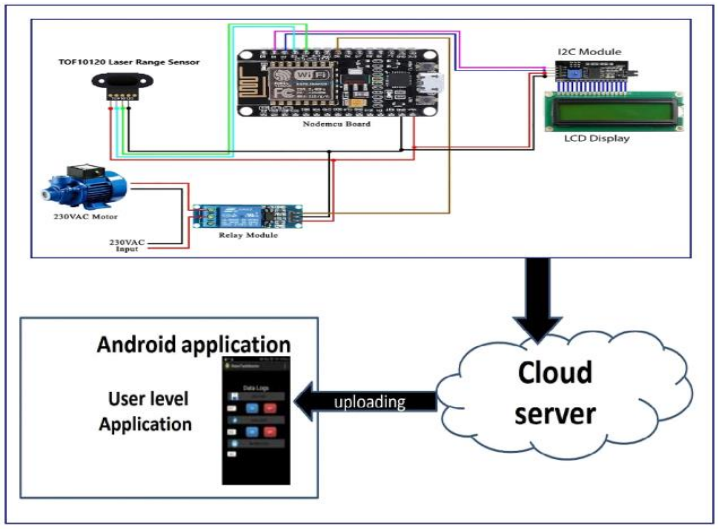

Fig 1. Schematic Diagram Of Smart Water Tank Monitoring System Using Node MCU With Android Application

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6. MEDHODOLOGY

6.1 Material Used

Node MCU, TOF10120 Laser sensor, 16 2 LCD screen, printed circuit board (PCB), LED light and water pump, numerous connecting connections including male to male and male to female cable, and plastic box assembly to cover equipment will be given to execute this system. The Node MCU will receive analogue data translated from laser signals recorded by the TOF10120 Laser sensor. The processor will interpret the analogue data as a specific distance, which will show on the LCD screen in real time, as well as the LED light indicating the state of the water tank. At that point, the data will be sent to a relay module, which will regulate whether the water pump is on or off. TOF10120 uses a laser sensor to determine distance without having to contact the surface.

6.2 Internet of Things

The Internet of Things (IoT) is a system that allows devices to communicate with one another without the need for human intervention and over long distances. The Internet is the link between the two interactions of the machine in order to achieve the way the IoT works, while the user just acts as the regulator and supervisor of the tool's operation directly. The concept of IoT itself has the advantage of making work easier, quicker, and more efficient. Ubidots is an iOS and Android platform that may be used to operate Node MCU modules.

6.3 Research Design

The design of fluid flow rate control systems is covered in this research, which includes hardware and software design (showing architectural diagrams) as well as software from the system design.

6.4 Block Diagram :

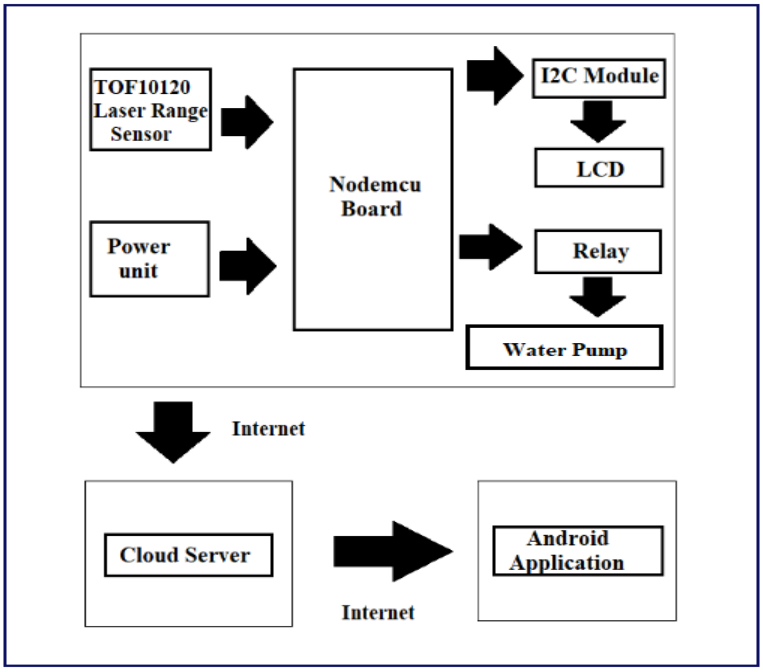

Fig 2. Block Diagram of smart water tank monitoring system using Node MCU with android application

6.5 Software Design

Node MCU programming, which serves as an interface, is used in the development of software in this study. System testing determines if a software can detect processes from sensors and then depict those processes on computers with precision, accuracy, and linear values.

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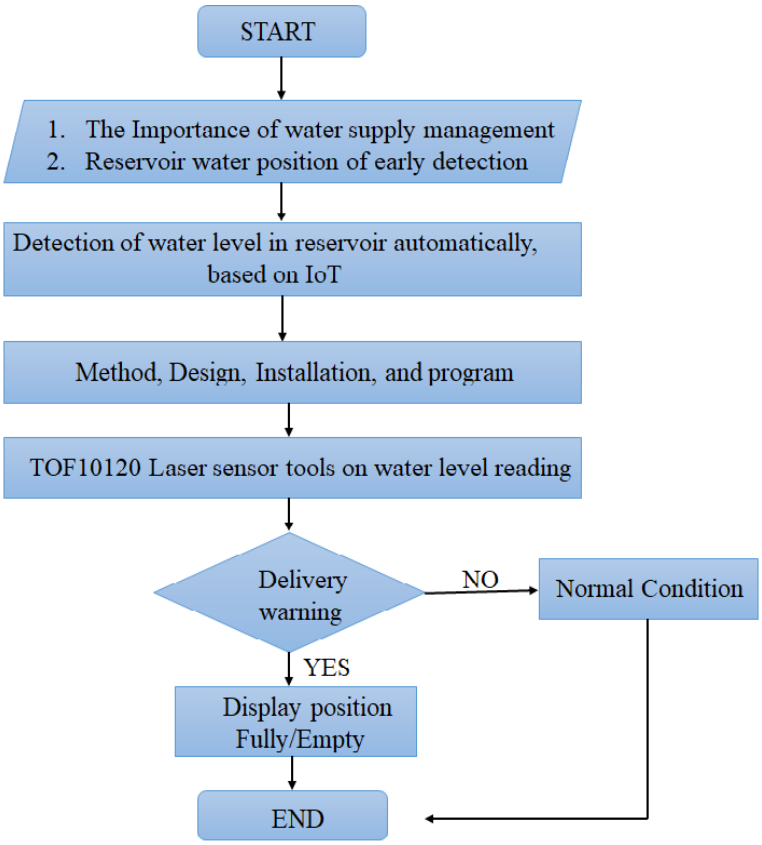

Fig 3. Flow chart of smart water tank monitoring system using Node MCU with android application

7. EXPERIMENTAL RESULTS

After establishing a functional mesh network, sensor nodes in various locations begin detecting and transmitting data to the base station. Sensor nodes and other nodes can be installed in above tanks as part of the hardware system.

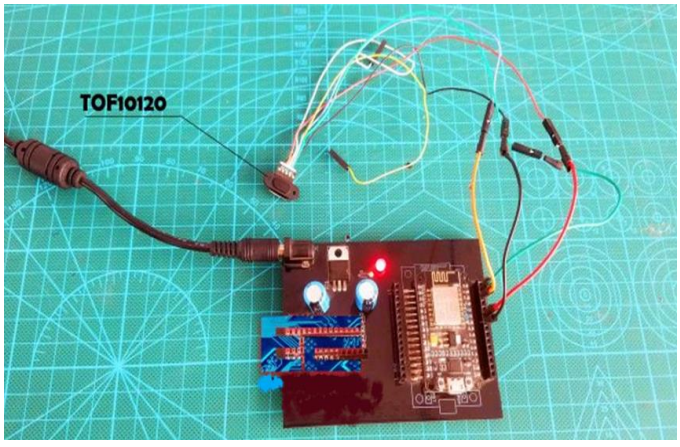

Fig 4. Hardware result of smart water tank monitoring system using Node MCU with android application

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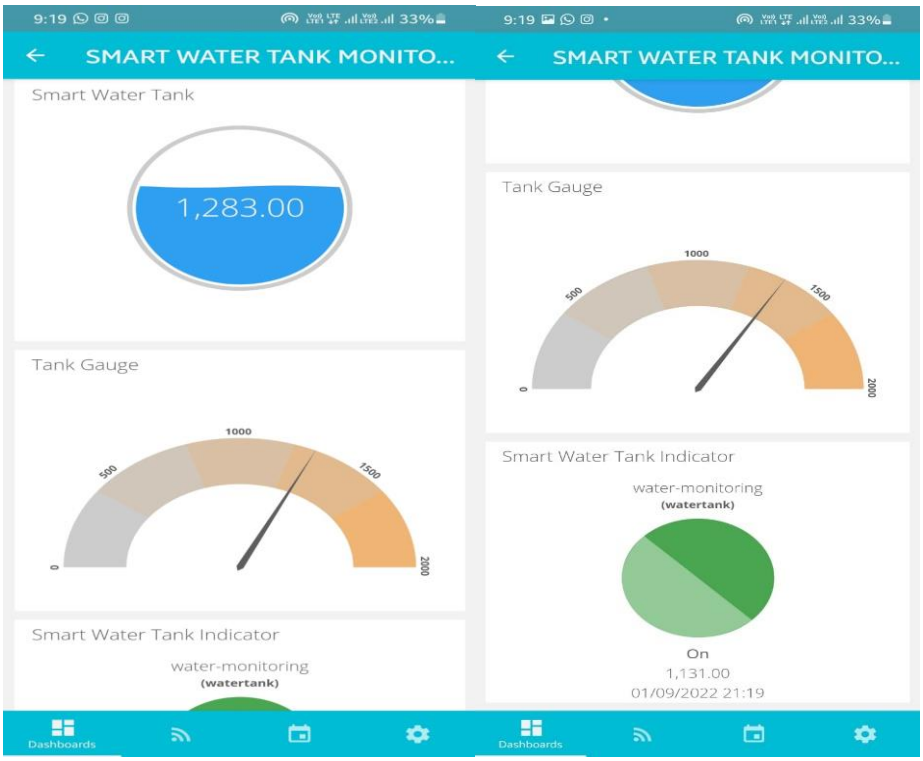

Fig 5 & Fig 6. Software result of smart water tank monitoring system

CONCLUSION

The project allows us to monitor the amount of water from afar, as well as track and safeguard it from overflowing, allowing the user to verify that no further water is utilised or lost. Industries and houses are the primary sources of water waste. As a result, implementing the suggested method will significantly reduce water loss. The user may also see the current water level in the water tank. The user has the ability to reduce water loss to some amount by keeping the water at a sustainable height, i.e. between 30-70 percent of the original tank's height to avoid overflowing. This suggested method does not necessitate the use of a dedicated tank and may be integrated into an existing water tank system.

FUTURE SCOPE

This suggested system has a wide range of applications in the industrial and residential sectors; for example, a level control loop may guarantee that the water level does not exceed a specified limit, and a pump can ensure that a minimum height is always attained. These days, with our hectic lives, we need reminder messages on our phones or laptops that are linked to the internet, and this system may send alerts about the water level to the user at any time. It will also aid in the creation of a smart city focusing on water conservation.

It can be installed in the following areas:

1. Private houses or bungalows
2. Housing societies
3. Apartments
4. Institutions like schools and colleges, hostels
5. Hospitals
6. Offices
7. Municipal overhead tanks (with slight changes in hardware)

It can be implemented for a wide range of different sizes of water tanks making it a completely reliable solution.

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