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SMART WATER METER USING IOT

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ABSTRACT

The expanded living spaces requires more quality water distribution administration framework due to the increased living spaces in rural and urban areas. In order to achieve rise to amount of water conveyance to all of the natural surrounds, it is thus essential to design a planned water supply framework. Internet of things, another idea is the envisaged framework for controlled water circulation and defect identification. The key idea of this study is to provide a cost effective framework to achieve better water supply by routinely monitoring and furthermore controlling it from a central server to avoid issues with the water supply to the habitats. The suggested design makes use of solenoid valve, water flow sensor, water level sensor (Ultrasonic Sensor). The valve controlled by an NodeMCU board from IoT platform like BLYNK app. The water flow sensor reads the flow of water in terms of lt/hr and display it on IoT platform. Water level sensor continuously monitors main tank water level and update the data to IoT platform. With level of water in tank, user can switch ON solenoid valve to flow water to house. The flow sensor reads the flow of water and update IoT Platform. The proposed design addresses the issues of overflow, overuse, water acquisition, and distribution in an acceptable manner.

INTRODUCTION

The smart water meter project introduces a cost-effective framework for monitoring and controlling water distribution, particularly in expanding living spaces in rural and urban areas. Leveraging Internet of Things (IoT) technology, the system utilizes components such as a solenoid valve, water flow sensor, and water level sensor (specifically an Ultrasonic Sensor) to enable remote monitoring and control of water flow. Data collected from sensors are transmitted to an IoT platform, such as the BLYNK app, where users can access real-time

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information on water flow and tank levels. By providing users with the ability to manage water flow to their households and identify defects or irregularities in water distribution, the proposed design aims to enhance water distribution efficiency and address common issues such as overflow and overuse.

The smart water meter project responds to the increasing demand for efficient water distribution management in both rural and urban areas. By employing a carefully designed framework that integrates Internet of Things (IoT) technology, the system offers a cost-effective solution for monitoring and controlling water flow. Key components, including a solenoid valve, water flow sensor, and water level sensor (specifically an Ultrasonic Sensor), facilitate real-time data collection and transmission to an IoT platform such as the BLYNK app. This platform empowers users to remotely monitor water flow rates and tank levels, enabling proactive adjustments to ensure optimized water distribution. Additionally, the system's defect identification capabilities help mitigate issues like overflow and overuse, contributing to enhanced water distribution efficiency and sustainability in diverse environments.

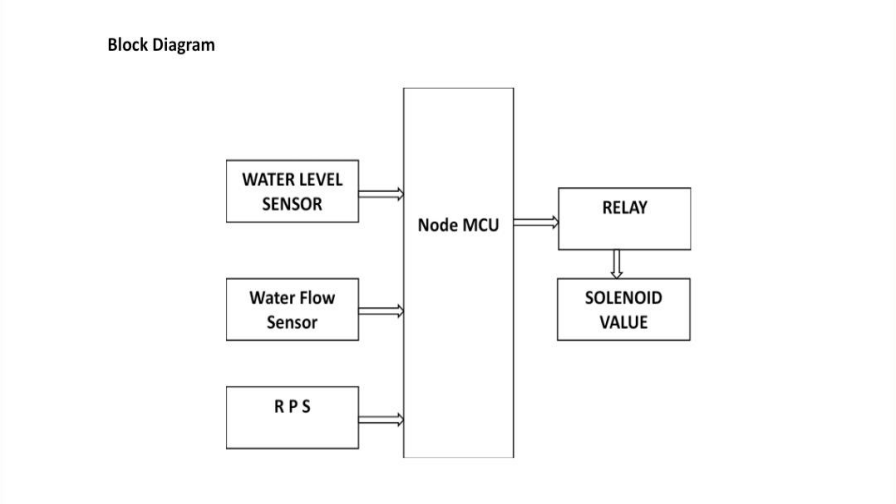

Figure.1 Block diagram

LITERATURE SURVEY

Introduction to IoT in Water Management:

Begin with an understanding of the role of IoT in water management and its potential to improve efficiency and sustainability.

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Explore literature that introduces the concept of smart water meters and their importance in modern water distribution systems.

Design and Architecture of Smart Water Meters:

Investigate research papers and articles that discuss the design principles and architecture of smart water meters using IoT technology.

Look for studies that describe the integration of sensors, communication modules, and data processing capabilities to enable real-time monitoring and management of water usage.

Remote Monitoring and Data Collection:

Review literature on how smart water meters enable remote monitoring and data collection of water usage.

Explore studies that discuss the deployment of IoT sensors in water distribution networks to track flow rates, pressure levels, and other relevant parameters.

Leak Detection and Water Conservation:

Examine research papers and articles that explore how smart water meters facilitate leak detection and water conservation efforts.

Look for studies that discuss the use of anomaly detection algorithms and data analytics techniques to identify and alert stakeholders about leaks or abnormal water usage patterns.

Real-Time Analytics and Decision Support:

Investigate literature on how data collected from smart water meters is analyzed in real-time to support decision-making by water utilities and consumers.

Explore studies that discuss the development of dashboards, visualization tools, and predictive analytics models for better understanding and managing water usage.

PROPOSED SYSTEM

The smart water meter project responds to the increasing demand for efficient water distribution management in both rural and urban areas. By employing a carefully designed framework that integrates Internet of Things (IoT) technology, the system offers a cost-

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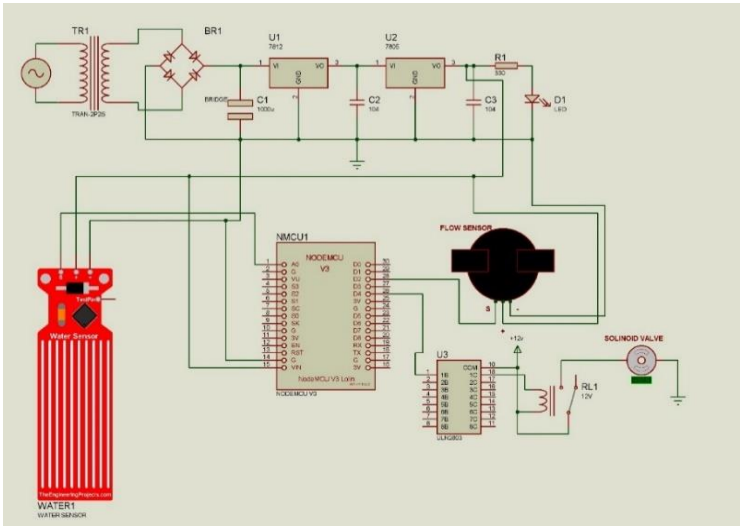

Figure.2 Schematic Diagram

RESULTS

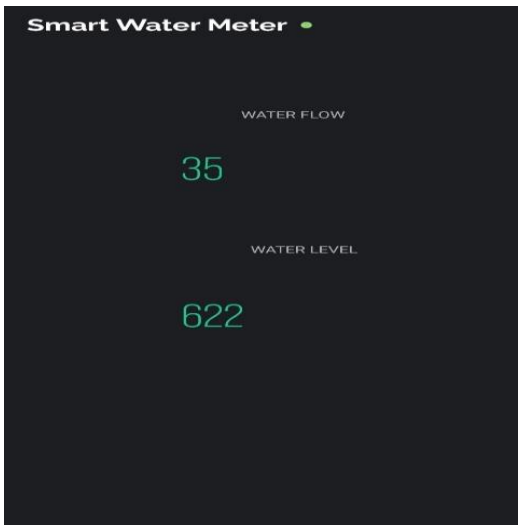

Figure.3 Values in the IoT

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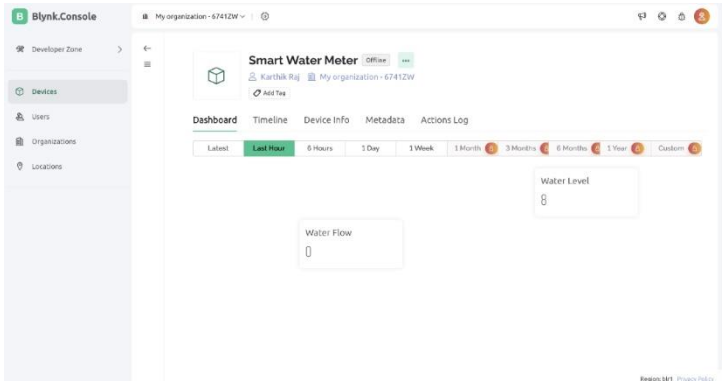

Figure4. Blynk Output

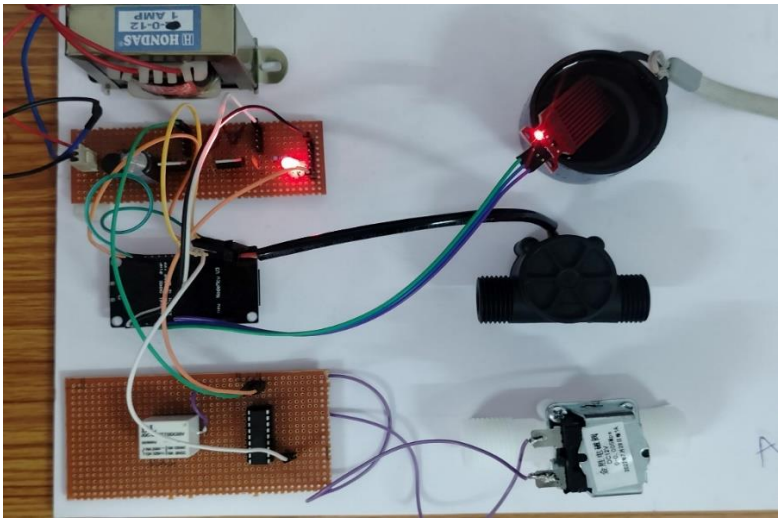

Figure.5 Working kit

APPLICATIONS

Residential Water Management:

Enable homeowners to monitor their water usage in real-time and identify opportunities for conservation. Provide alerts for leaks or abnormal usage patterns, helping to prevent water wastage and reduce utility bills.

Commercial and Industrial Facilities:

Implement water metering solutions in commercial and industrial settings to track water usage across different departments or processes. Optimize water distribution and usage to improve operational efficiency and reduce costs.

Agricultural Irrigation Systems:

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Integrate smart water meters into agricultural irrigation systems to monitor soil moisture levels and optimize irrigation schedules. Ensure efficient water usage and maximize crop yields while conserving water resources.

Municipal Water Management:

Deploy smart water metering infrastructure in municipal water supply networks to monitor usage patterns and detect leaks or pipe bursts. Enable authorities to proactively manage water distribution and reduce non-revenue water loss.

Environmental Monitoring:

Use smart water meters to monitor water quality in natural water bodies, such as rivers, lakes, and reservoirs. Collect data on parameters like pH, temperature, and dissolved oxygen to assess water health and identify potential pollution sources.

ADVANTAGES

Real-Time Monitoring: IoT-enabled smart water meters provide real-time monitoring of water usage, allowing users to track consumption patterns and identify areas for conservation.

Data-Driven Insights: By collecting and analyzing data on water usage, smart water meters offer valuable insights into consumption trends, helping users make informed decisions about water conservation and management.

Leak Detection and Prevention: Smart water meters can detect leaks and abnormal usage patterns, enabling prompt identification and mitigation of water leaks to prevent water wastage and reduce utility costs.

Remote Control and Automation: IoT technology allows users to remotely control water flow and access usage data from anywhere using a mobile app or web interface, providing convenience and flexibility in managing water resources.

CONCLUSION

The implementation of the “Smart Water Meter Using IoT” project represents a significant step towards addressing the challenges associated with water distribution and management. By leveraging IoT technology, we have developed a cost-effective and efficient solution that offers

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real-time monitoring and control of water flow, ensuring optimal usage and preventing issues such as overflow and overuse.

Through the integration of hardware components such as solenoid valves, water flow sensors, and water level sensors, coupled with software components like the IoT platform (e.g., BLYNK app), we have created a robust system capable of accurately measuring water usage, detecting abnormalities, and adjusting water flow accordingly.

FUTURE SCOPE

Enhanced Sensor Capabilities: Explore the integration of advanced sensors, such as water quality sensors, to provide more comprehensive monitoring of water parameters. This could enable early detection of contaminants and ensure the delivery of high-quality water to consumers.

Machine Learning for Predictive Analytics: Implement machine learning algorithms to analyze historical data and predict future water usage patterns. By leveraging predictive analytics, the system can anticipate demand fluctuations and optimize water distribution accordingly, leading to improved resource allocation and cost savings.

Integration with Smart Grids: Investigate the integration of the smart water meter system with smart grids to enable seamless communication and coordination between water and energy infrastructures. This holistic approach can facilitate better resource management and enhance overall system efficiency.

Remote Diagnostics and Maintenance: Develop remote diagnostic tools to monitor the health and performance of system components in real-time. This proactive approach can help identify potential issues early on and facilitate timely maintenance and repairs, reducing downtime and enhancing system reliability.

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