Water Level Monitoring System Using IoT

[1]Vinit Sharma, [2]Archit Padale, [3]Yash Bhosale, [4]Yashraj Jangid, [5]Krishna Patel, [6]Nita Pawar

[1,2,3,4,5]Student, Department of Computer Engineering, Ajeenkya DY Patil School of Engineering, Pune, Maharashtra, India
[6]Professor, Department of Computer Engineering, Ajeenkya DY Patil School of Engineering, Pune, Maharashtra, India

Abstract - **The Water Level Monitoring System is an innovative IoT-based solution designed to optimize water usage and minimize wastage. Utilizing key components such as the NodeMCU ESP8266 microcontroller, ultrasonic sensors, and the Blynk application, this system enables real-time monitoring and efficient management of water resources. By capturing water level data and transmitting it to a cloud platform, users can track water availability remotely and receive instant notifications when predefined thresholds are crossed. This approach ensures sustainable water consumption, making it highly applicable for residential, industrial, and agricultural settings.**

Keywords: IoT, Ultrasonic Sensor, NodeMCU, Blynk, Water Level Monitoring, Automation.

I. INTRODUCTION

Water scarcity is an increasing global concern, necessitating smart solutions for efficient water management. Traditional methods often fail to provide real-time updates, leading to excessive wastage and inefficient distribution. To address this challenge, we propose an IoT-driven water level monitoring system that enables users to track and control water levels remotely. By integrating IoT with cloud-based services, the system enhances decision-making and optimizes water utilization.

II. SYSTEM ARCHITECTURE

The system consists of three primary components:

1. NodeMCU ESP8266 – Serves as the main microcontroller for data processing and communication.

2. Ultrasonic Sensors – Measure water levels with high accuracy.

3. Blynk Application – Provides a user-friendly interface for real-time monitoring and alerts.

The sensors continuously capture water level data, which is processed by the NodeMCU and transmitted to the cloud. Users can access this data via the Blynk app and receive alerts when water levels reach critical points, allowing them to take timely actions.
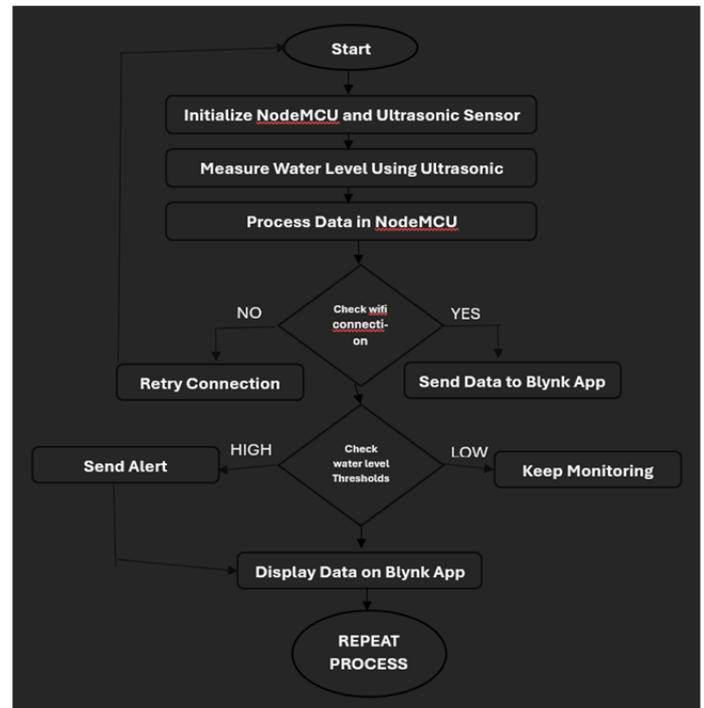

Chart 1: System Architecture (Overall Working)

III. IMPLEMENTATION AND WORKING

1. Sensor Placement: Ultrasonic sensors are strategically placed inside the water tank to measure water levels.

2. Data Transmission: The sensors send data to the NodeMCU, which processes and transmits it to the cloud.

3. User Interface: The Blynk app displays real-time water levels and triggers notifications when levels exceed set limits.

4. Automation (Optional): Users can integrate automated pumps to maintain optimal water levels.

IV. ADVANTAGES

1. Real-Time Monitoring: Instant access to water level data via the Blynk app.

2. Automation Support: Can be integrated with pumps for automatic water control.

3. Cost-Effective: Uses affordable and easily available components.

4. Eco-Friendly: Helps in reducing water wastage and promotes sustainability.

V. APPLICATIONS

1. Residential Areas: Prevents water overflow and ensures optimal usage.

2. Industrial Use: Assists in managing water reservoirs in factories.

3. Agriculture: Helps farmers monitor and maintain water levels in irrigation systems.

VI. RESULTS AND DISCUSSION

The implemented system demonstrates high accuracy and reliability in water level monitoring. Key results include:

- Real-Time Monitoring: Users receive instant updates on water levels through the Blynk app.
- Automation: Notifications and automated control of pumps reduce manual intervention.
- Cost-Effectiveness: The use of affordable components ensures economic feasibility.

Applications of the system span across various domains, including:

- Residential Water Tanks: Prevents overflow and ensures optimal water usage.
- Industrial Reservoirs: Assists in maintaining water levels for manufacturing processes.
- Agricultural Irrigation: Helps farmers monitor and control water distribution.
- Municipal Water Management: Aids in efficient city-wide water supply monitoring.

However, the system has some limitations, including dependency on internet connectivity and potential sensor calibration issues. These can be mitigated through regular maintenance and using backup connectivity solutions for uninterrupted operation.

Chart 2: Final Module

VII. CONCLUSIONS

The proposed IoT-based water level monitoring system provides an efficient, cost-effective, and reliable solution for real-time water management. By leveraging IoT technology, it enhances resource optimization and contributes to sustainable water conservation efforts. Future improvements may include AI-driven analytics for predictive maintenance and enhanced automation features.

REFERENCES

[1] P. Dietz, W. Yerazunis, D. Leigh, "Very Low -Cost Sensing and Communication Using Bidirectional LEDs", *UbiComp 2011: Proceedings,* vol. 2864, pp. 175`-191, 2003.

[2] M. Javanmard, K.A. Abbas and F.Arvin, "A Microcontroller Based Monitoring System for Batch TeaDryer", *CCSE Journal of Agricultural Science,* Vol. 1, No. 2, December 2012.

[3] Hicks, F., Tyler, G.; & Edwards, T.W., "Pump Application Engineering" - *McGraw-Hill Book Company, New York*.

[4] Microcontroller Based Automated Water Level Sensing and Controlling: *Design and Implementation Issue Proceedings of the World Congress on Engineering and Computer Science*, pp 220-225.

AUTHORS BIOGRAPHY

Vinit Sharma, Student, Diploma in Computer Engineering, Ajeenkya D Y Patil School of Engineering, Pune, Maharashtra, India.

Yash Bhosale, Student, Diploma in Computer Engineering, Ajeenkya D Y Patil School of Engineering, Pune, Maharashtra, India.

Krishna Patel, Student, Diploma in Computer Engineering, Ajeenkya D Y Patil School of Engineering, Pune, Maharashtra, India.

Yashraj Jangid, Student, Diploma in Computer Engineering, Ajeenkya D Y Patil School of Engineering, Pune, Maharashtra, India.

Archit Padale, Student, Diploma in Computer Engineering, Ajeenkya D Y Patil School of Engineering, Pune, Maharashtra, India.

Nita Pawar, Professor, Computer Engineering Diploma, Ajeenkya D Y Patil School of Engineering, Pune, Maharashtra, India.

****