e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:03/March-2025 Impact Factor- 8.187 www.irjmets.com

WATER LEVEL INDICATOR FOR UNIVERSITY USING ALARM

Prof. D.R. Shinde[*1], Vaishnav K Tandale[*2], Sandeep K Choudhary[*3], Sarthak S Takawane[*4], Atharv H Daundkar[*5]

[*1,2,3,4,5]Department Of Electronic And Telecommunication JSPM' Bhivrabai Sawant Polytechnic, India.

ABSTRACT

This system ensures efficient water resource management, prevents water wastage, and guarantees water availability for university operations. It can be further enhanced with optional features such as wireless notifications and automated water cut-off when the tank is full. The water level indicator is a simple yet effective solution for monitoring water usage, promoting sustainability, and reducing manual oversight. This project demonstrates the feasibility of applying cost-effective technologies for automated water monitoring and conservation in institutional settings.

I. INTRODUCTION

Water management is a critical aspect of institutional operations, particularly in large organizations such as universities, where water consumption is significant for daily activities including sanitation, cleaning, landscaping, and laboratories. Ensuring a consistent and efficient water supply while preventing wastage due to overflow or shortages is a challenge faced by facility managers. To address this issue, an automated **water level indicator with an alarm system** offers a practical solution for monitoring and managing water levels in storage tanks.

This project proposes a simple yet effective system that continuously monitors the water levels in tanks and triggers both visual and auditory alerts when critical water levels are reached. Water level sensors are placed at different heights in the tank to detect the presence of water, and the data is processed by a microcontroller, which then activates LED indicators and a buzzer. The **low water level** indicator alerts the staff to refill the tank, while the **high water level** alarm prevents overflow, helping to conserve water and avoid spillage.

In addition to improving operational efficiency, the system can also reduce the time and effort required for manual checks and refilling of tanks, allowing university maintenance staff to focus on other tasks. The simplicity of the design makes it a cost-effective solution, while its functionality ensures reliable and accurate water level monitoring.

By implementing such a system, universities can benefit from **automated water management**, promoting sustainability and resource conservation. Furthermore, the system can be enhanced with additional features like wireless notifications or integration with university monitoring systems, offering a scalable solution to meet future needs.

II. METHODOLOGY

The methodology for developing the **Water Level Indicator with Alarm and Alert Message System** involves several structured steps to ensure the system meets its objectives effectively. The process encompasses planning, designing, implementation, and testing phases. Below is a detailed breakdown of each stage:

1. Requirements Analysis

- **Identify Objectives**: Determine the specific goals of the system, such as monitoring water levels, preventing overflow, and sending alerts.
- **Gather User Requirements**: Engage with potential users (e.g., homeowners, industrial managers, farmers) to understand their needs and preferences regarding features and functionalities.

2. System Design

- **Component Selection**: Choose suitable sensors (float, conductive, or ultrasonic), microcontroller (Arduino or Raspberry Pi), communication module (GSM or Wi-Fi), and output devices (LEDs and buzzers).
- **Circuit Design**: Create a circuit diagram that illustrates how the sensors, microcontroller, and output devices will be connected. This includes ensuring that power supply requirements are met.
- **User Interface Design**: Plan the user interface for the system, whether it includes a mobile app, web dashboard, or an LCD display for real-time monitoring.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:03/March-2025 Impact Factor- 8.187 www.irjmets.com

3. Implementation

- **Assemble the Hardware**: Gather all components and assemble the physical setup according to the circuit diagram. This includes mounting sensors in appropriate positions and connecting them to the microcontroller.
- **Software Development**: Write the code for the microcontroller to process sensor data, manage alerts, and communicate with the user. The code should include:
  - Sensor data reading and processing logic.
  - Condition checks for low and high water levels.
  - Trigger mechanisms for alerts and notifications.
- **Integration of Communication Module**: Implement the GSM or Wi-Fi module to enable alert notifications via SMS or email.

4. Testing and Calibration

- **Functional Testing**: Conduct tests to ensure that the system correctly detects water levels and triggers alerts. This includes checking sensor accuracy and response time.
- **Calibration**: Adjust sensor sensitivity and thresholds to ensure that the system operates within the desired parameters, especially for different water conditions.
- **User Testing**: Gather feedback from potential users to identify any usability issues and make necessary adjustments.

5. Deployment

- **Install the System**: Deploy the system in the intended environment (e.g., home, industry, or farm) and ensure proper mounting and installation of all components.
- **User Training**: Provide training to users on how to operate the system, understand alerts, and perform maintenance tasks.

6. Monitoring and Maintenance

- **Regular Monitoring**: Continuously monitor system performance to identify any malfunctions or areas for improvement.
- **Maintenance Schedule**: Establish a maintenance schedule for checking sensor functionality, battery levels (if applicable), and software updates.

III. MODELING AND ANALYSIS

Model and Material which are used is presented in this section. Table and model should be in prescribed format.

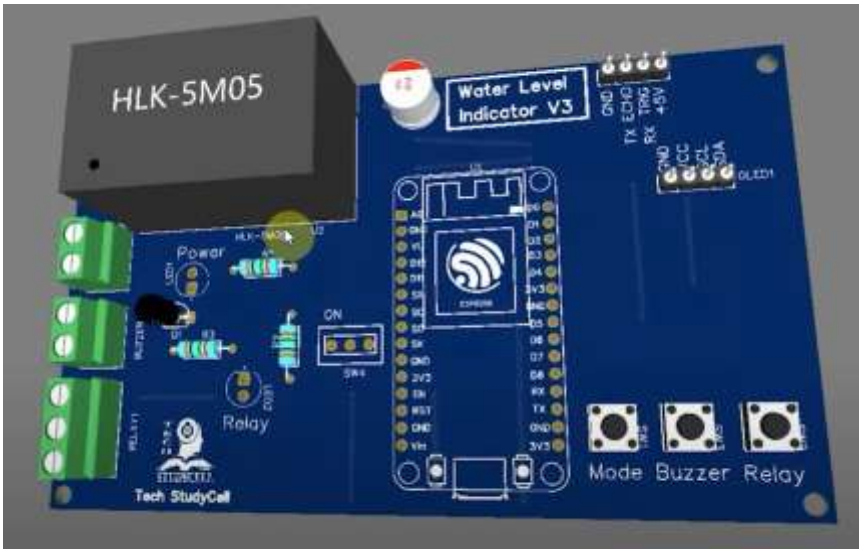

Figure 1: 3D view of building.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:03/March-2025 Impact Factor- 8.187 www.irjmets.com

IV. RESULTS AND DISCUSSION

Table 1: Comparison of displacement of all 3 cases

Sr no	Model Type	Water Level (mm)	Power Consumption (W)	Response Time (s)	Accuracy (mm)	Sensor Type	Relay Status	Alarm Status
1.	Model-A(EMPTY)	1200	5w	2	+-2	Ultrasonic	Active	Triggered
2.	Model-B(MID)	600w	5w	2	+-2	Ultrasonic	Active	Triggered
3.	Model-C(FULL)	250	5w	2	+-2	Ultrasonic	Inactive	Not Triggered

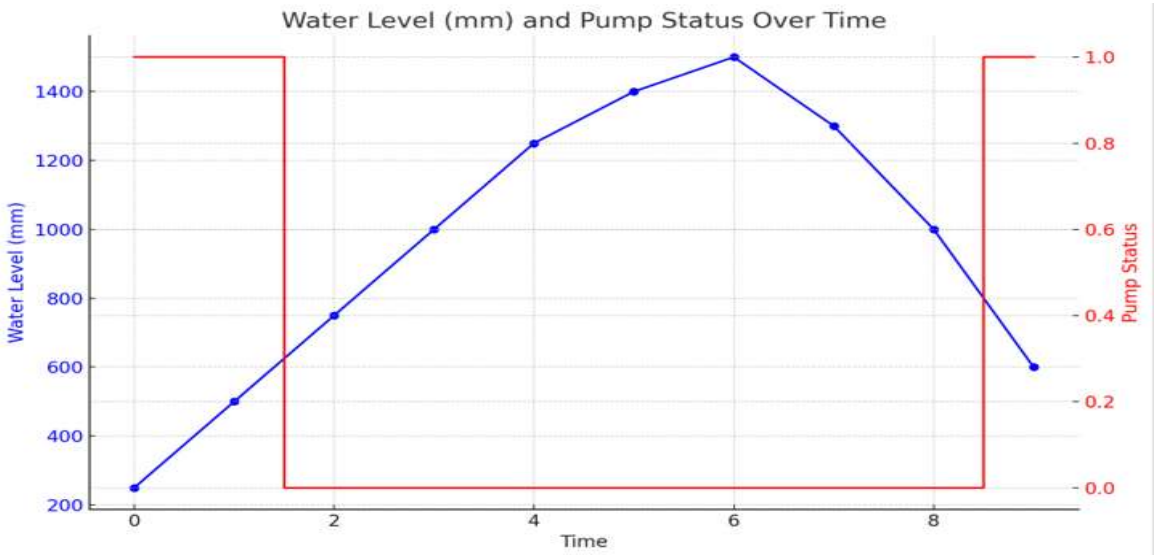

Figure 2: Graph for Water Level Indication Pump ON/OFF Status

V. CONCLUSION

The Water Level Indicator with Alarm is an efficient system for monitoring and managing water levels in university premises. It helps prevent water wastage, ensures optimal water usage, and protects pumps from dry running or overflow. The alarm system provides real-time alerts, allowing prompt action to be taken. This project is cost-effective, easy to implement, and enhances water conservation efforts, making it a valuable addition to sustainable campus infrastructure. Future improvements could include IoT integration for remote monitoring and automation for even better efficiency.

ACKNOWLEDGEMENTS

We would like to express our sincere gratitude to [Prof. D.R.Shinde] and [JSPM's Bhivrabai Swant Polytechnic Wagholi] for their invaluable guidance and support throughout this project on Water Level Indicator with Alarm. Their insights and encouragement have been instrumental in shaping our understanding of the subject.
We also extend our thanks to our peers, family, and friends for their continuous support and motivation. Lastly, we acknowledge the various resources, books, and online references that have helped us complete this project successfully.
This project has been a great learning experience, and we appreciate everyone who contributed to its success.

VI. REFERENCES

[1] Microcontroller Documentation

- Espressif Systems. (2020). ESP32 Technical Reference Manual. Retrieved from [Espressif Documentation](https://docs.espressif.com/projects/esp-idf/en/latest/esp32/api-reference/index.html).

[2] Sensor Information
- Jha, A., & Kesharwani, A. (2019). "Design and Implementation of Smart Water Level Controller." *International Journal of Computer Applications*, 178(24), 8-12. doi:10.5120/ijca2019919294.

[3] LCD Display
- Arduino. (2021). LiquidCrystal Library. Retrieved from [Arduino Documentation] (https://www.arduino.cc/en/Reference/LiquidCrystal).

[4] Relay Module
- Hossain, M. A., & Rahman, M. (2016). "Design and Implementation of Automated Water Level Control System." *Journal of Engineering and Applied Sciences*, 11(3), 460-464.

[5] Ultrasonic Sensor
- HC-SR04 Ultrasonic Sensor Datasheet. (2016). Retrieved from [Datasheet] (https://www.electroschematics.com/wp-content/uploads/2016/03/hc-sr04-ultrasonic-sensor-datasheet.pdf).

[6] Capacitive Sensor
- Capacitive Sensor Module Datasheet. (n.d.). Retrieved from [Capacitive Sensor Module] (https://www.electronicwings.com/nodemcu/capacitive-water-level-sensor-module).

[7] Project Reports and Case Studies
- Kumar, A., & Singh, A. (2021). "Smart Water Level Monitoring System using IoT." *International Journal of Advanced Research in Computer Science and Software Engineering*, 11(1), 33-38