SMART WATER METER

Project Report submitted in partial fulfilment of the requirements for the Degree of

BACHELOR OF TECHNOLOGY

In

ELECTRONICS AND COMMUNICATION ENGINEERING

By

Vaibhav Sinha (34200320004)

Shaunak Biswas (34200320006)

Somali Sikdar (34200320012)

Mrinmoy Ghosh (34200321001)

Department of **ELECTRONICS AND COMMUNICATION ENGINEERING**

FUTURE INSTITUTE OF TECHNOLOGY

2023

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

FUTURE INSTITUTE OF TECHNOLOGY

KOLKATA – 700154

2023

CERTIFICATE

This is to certify that the project work entitled "**SMART WATER METER"** submitted by **Vaibhav Sinha (34200320004), Shaunak Biswas (34200320006), Somali Sikdar (34200320012), Mrinmoy Ghosh(34200321001)** in the partial fulfillment for the award of the degree of Bachelor of Technology in **Electronics and Communication Engineering** at Future Institute of Technology, is a Bonafide work done by them.

The matter presented in this thesis has not been submitted for the award of any other degree of this or any other Institute/University.

I wish them all success in life.

Date: 1.12.2023

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Mr. Amit Kumar Majumder

Assistant Professor and H.O.D

Dept. of Electronics and Communication Engineering

Future Institute of Technology

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DATE: *01.12.2023*

PLACE: *Garia, Kolkata*

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Vaibhav Sinha (34200320004) Shaunak Biswas (34200320006)

…….. ……..

Somali Sikdar (34200320012) Mrinmoy Ghosh (34200321001)

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CHAPTER I:

ABSTRACT

This project presents an IoT-driven water monitoring system designed to address water scarcity and inefficiencies in consumption. Leveraging sensors and data analytics, it enables real-time tracking of water usage and tank levels. By implementing calibrated sensors, the system ensures accurate measurement of flow rates and remote monitoring of tank levels. Future plans include automated alerts for threshold exceedance and cloud-based storage for historical data analysis. This project aims to promote efficient water management and user awareness of sustainable conservation practices.

CHAPTER II:

INTRODUCTION

Water scarcity remains a pressing global concern, necessitating innovative approaches to monitor and manage consumption effectively. In response to this challenge, this project endeavors to develop an Internet of Things (IoT) based solution, offering real-time monitoring and management of water resources.

The project addresses critical issues such as inaccurate water usage tracking and limited tank level monitoring by integrating sensor technologies. Through precise calibration and deployment of sensors, it enables accurate measurement of water flow rates and remote monitoring of tank levels, facilitating prompt actions for conservation or replenishment.

Looking ahead, the project aims to expand its capabilities with automated alert systems for threshold exceedance and cloud-based storage for comprehensive historical data analysis. Moreover, the project seeks to empower users through intuitive interfaces, fostering awareness and encouraging responsible water consumption practices.

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CHAPTER III:

LITERATURE REVIEW

Below are few of the papers we have studied for our work on the same field.

Serial No.	Journal/Paper	Author	Publishing Year	Comment
1.	IoT BASED WATER FLOW MONITORING AND CONTROLLING SYSTEM	Shirish Satpute, Dipali Khadap , Shanta Khairate , Prof. Dr. Anagha Kunte	2019	Utilizing IoT to address water wastage, enhancing monitoring, control, and efficiency in water resource management.
2.	Design and Development of Water Flow Network using IoT	Rajashree., Shankari N.	2019	facilitates equitable water distribution via IoT, minimizing wastage and ensuring efficient consumption tailored to individual needs in densely populated urban settings.
3.	IoT based Water Monitoring and Alerting System	D. Ram Pralad[1], B. Harinath Reddy[2], G. Naveen Varma[3], V. Sai Kiran4 , Shobharani D.A5	2020	Enables real-time monitoring and precise billing, promoting efficient water usage and conservation.

CHAPTER IV:

PROBLEM STATEMENT

Here are some problem statements, on which we will be working throughout our project.

i) **Problem 1:** Lack of effective means to monitor and manage water consumption in real time.

ii) **Problem 2:** The absence of a reliable method to measure water usage, leads to inefficiencies and potential wastage.

iii) **Problem 3:** Limited Tank Level Monitoring

iv) **Problem 4:** Automated Alerting for Threshold Exceedance

v) **Problem 5:** Lack of access to historical water usage data for analysis and decision-making.

vi) **Problem 6:** Absence of immediate alerts or notifications for users in case of critical water usage events or emergencies.

CHAPTER V:

PROPOSED SOLUTION

Here we are showing the work list in detail that needs to be done to solve the problem statements.

i) **Proposed Solution 1:** Implemented an IoT-based system utilizing sensors to track water flow rates and transmit real-time data to a central database for analysis, aiding in efficient water management.

ii) **Proposed Solution 2:** Integra visuals calibrated sensors to accurately measure and record water flow rates, enabling precise monitoring and identification of consumption patterns.

iii) **Proposed Solution 3:** Utilized ultrasonic sensors to measure tank levels and relay this data wirelessly, enabling remote monitoring and ensuring timely actions for refilling or conservation efforts.

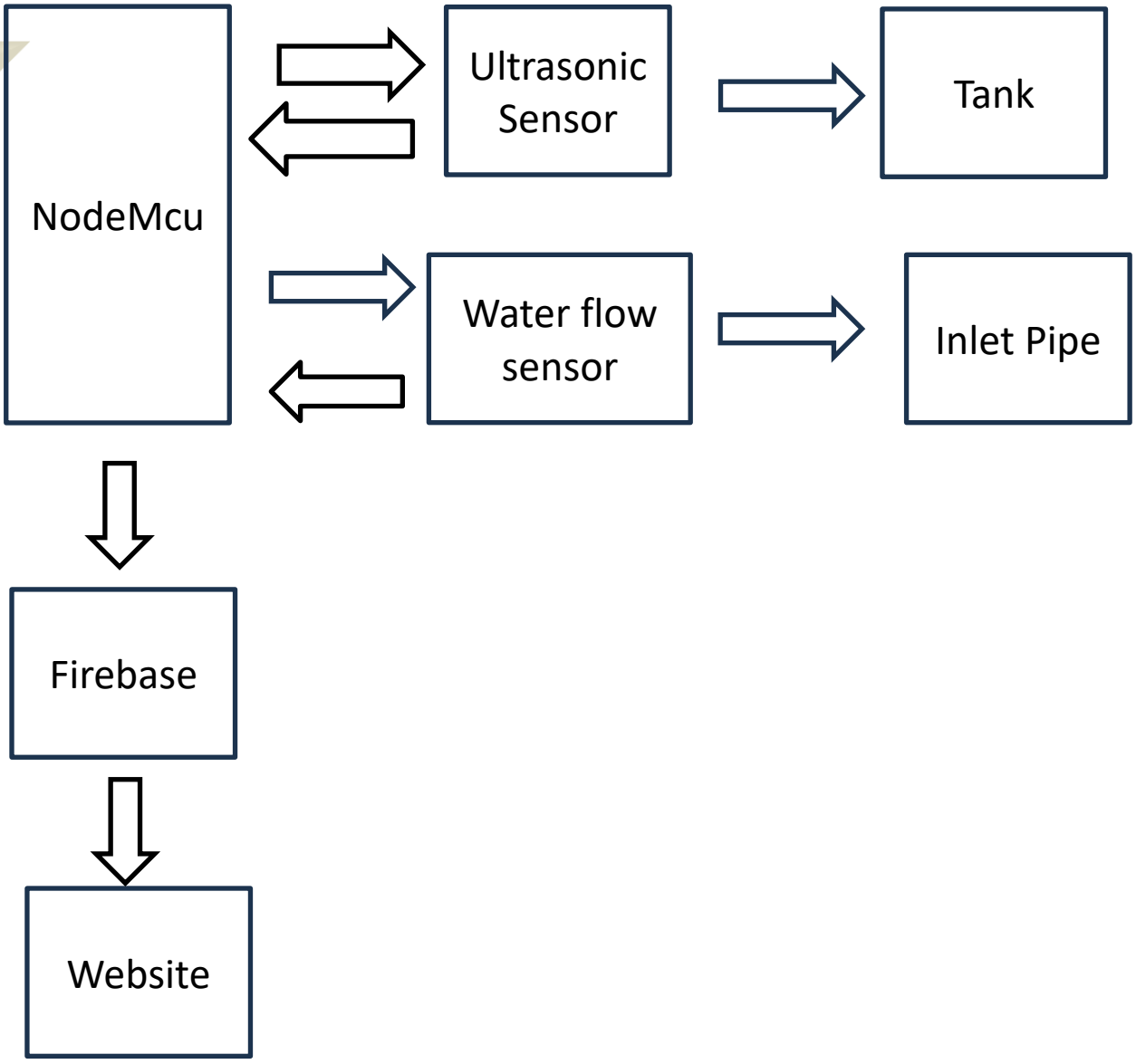
iv) **Proposed Solution 4:** An alert system triggering notifications when daily water usage surpasses set thresholds, enabling proactive measures to control consumption.

v) **Proposed Solution 5:** Cloud-based storage for historical water consumption data.

vi) **Proposed Solution 6:** SMS notification system integrated into the water monitoring platform.

CHAPTER VI:

PROPOSED BLOCK DIAGRAM



CHAPTER VII:

COMPONENTS

The following are the components of our project:

1. **NodeMcu:**

   The NodeMCU with ESP8266 facilitated real-time data transmission, enabling Wi-Fi connectivity for seamless monitoring of water flow and consumption in the project.

   The NodeMCU with ESP8266 boasts 128 KB memory, 4 MB disk space, and USB-powered 5V input, supporting IoT applications with its onboard Wi-Fi capabilities for data transmission.

2. **Ultrasonic Sensor:**

   In this project, the ultrasonic sensor can also be employed to gauge the water level in tanks, providing additional functionality for efficient monitoring and management of water resources.

   The specifications include an operating frequency of around 40 kHz, a detection range of up to several meters, and a voltage supply ranging from 5V to 12V. Accuracy can vary based on the specific model and application.

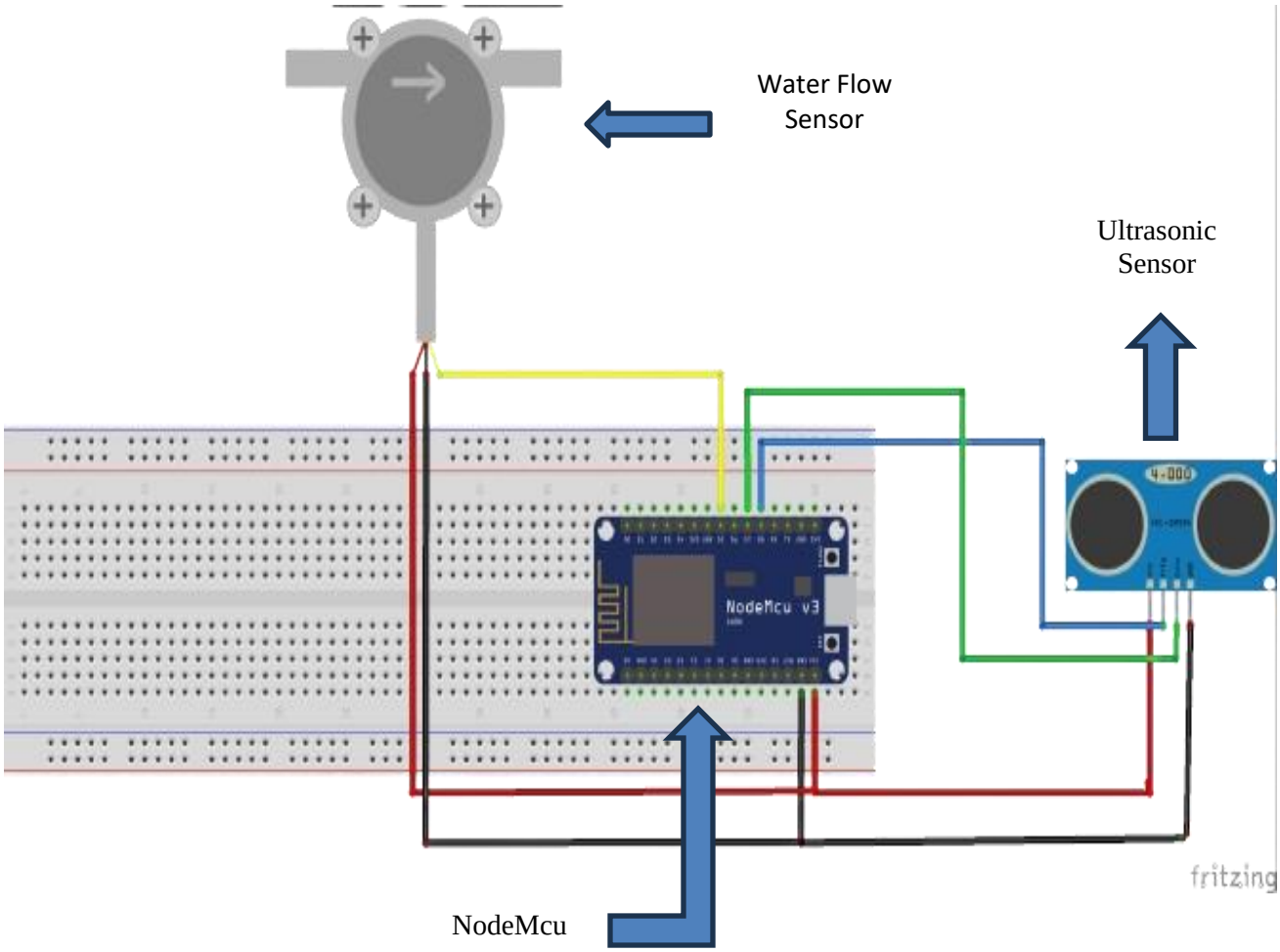
3. **Water Flow Sensor:**

   The YFS201 water flow sensor is integrated to measure flow rates accurately, featuring a compact design and compatibility with various liquids, ensuring precise water consumption tracking in the project.

   The YFS201 water flow sensor, operating on 5V DC, measures flow rates from 1 to 30 litres per minute with an accuracy of approximately ±3%.

CHAPTER VIII:

PROPOSED CIRCUIT



CHAPTER IX:

CONCLUSION

The project embarks on a transformative journey toward revolutionizing water management practices. By addressing existing challenges such as inadequate alert systems and insufficient user engagement, it sets a course for a future that embraces innovation.

The envisioned integration with smart devices for SMS notifications and the implementation of an SMS alert system signifies a pivotal shift toward real-time user engagement, empowering individuals to make informed decisions about their water usage. The prospect of predictive analytics and community-driven initiatives embodies a proactive approach, ensuring not just immediate responses but fostering a culture of collective awareness and action.

With a focus on scalability, adaptability, and the integration of emerging technologies, this project envisions a versatile framework capable of accommodating diverse infrastructures while leveraging cutting-edge solutions like machine learning for enhanced anomaly detection.

Ultimately, this project's future trajectory aims not only to solve immediate problems but to lay the foundation for a holistic and sustainable water management paradigm, fostering a community-driven, tech-enabled approach to address the global challenge of water conservation.

CHAPTER X:

REFERENCE

1. Satpute, S., Khadap, D., Khairate, S., & Kunte, A. (2019-20). IoT Based Water Flow Monitoring and Controlling System. *International Journal of Advance Scientific Research and Engineering Trends*, 4(Special Issue 12), 1-5. ISSN: 2456-0774.
2. Rajashree., & Shankari, N. (2019). Design and Development of Water Flow Network using IoT. International Journal of Recent Technology and Engineering (IJRTE), 8(3), 81. ISSN: 2277-3878.
3. D. Ram Pralad, B. Harinath Reddy, G. Naveen Varma, V. Sai Kiran, Shobharani D.A. "IoT based Water Monitoring and Alerting System." *International Journal of Advanced Trends in Computer Science and Engineering,* vol. 9, no. 2, March - April 2020, pp. 1762–1766.