

Sri Lanka Institute of Information Technology



IT1040 - Fundamentals of Computing
Year 1, Semester 1- 2024

Intelligence Water Tank Monitoring System

Progress Report
Group ID – P5 10

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1. Introduction

Known as the Granary of the East in the distant past, our motherland was a land inhabited by people who made their living with agriculture as their main livelihood. Today, agriculture can be introduced as a major source of livelihood in Sri Lanka. Based on that, we were motivated to create this intelligent water tank monitoring system by providing a solution to the water problem faced by all the farmers at home and abroad. This project is presented as a Hydration Intelligent water tank monitoring system.

Here, this system was designed to target the inefficient irrigation system and water scarcity and the challenges caused by water shortage faced by the farmer modern sensor technologies, sensing protocols, data analyzers, etc. technologies were used to manage more water intelligently, prevent water wastage, and distribute water. It fulfills the objectives of optimization etc.



HYDRATION

The Intelligent Water Tank Monitoring System

2. System Architecture

Our water tank system sounds sophisticated and well-integrated with NodeMCU ESP32 and the Blynk app. Let's break down the functionality and components to ensure we have a clear implementation plan.

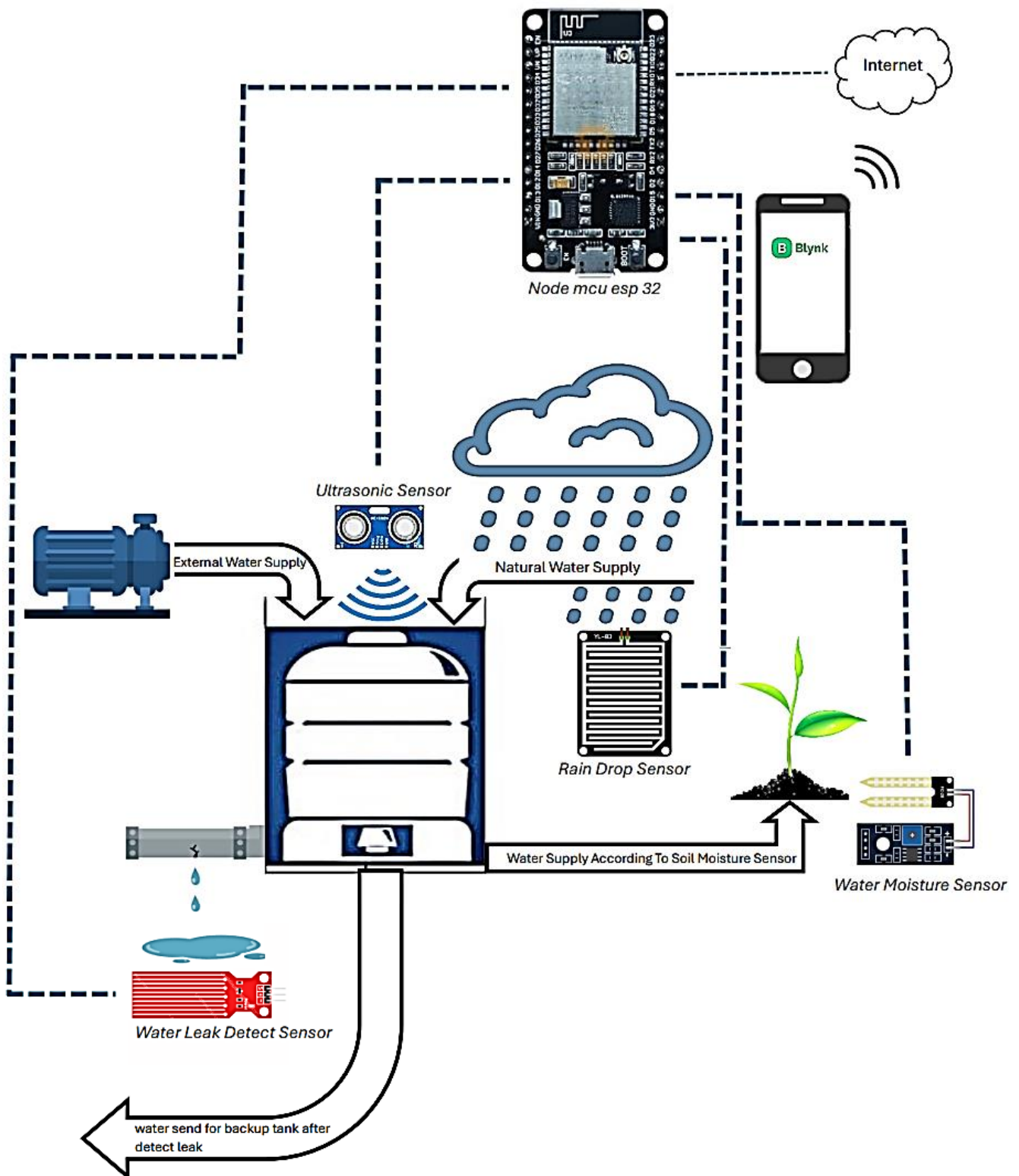
Components

1. **NodeMCU ESP32** : Acts as the central controller for the system.
2. **Rain Sensor** : Detects rainfall and provides input to stop the primary pump.
3. **Water Level Sensors** : Measures the water level in the tank to control the primary and secondary pumps.
4. **Water Leak Detection Sensor** : Detects leaks and sends alerts.
5. **Moisture Sensor** : Monitors soil moisture to control the irrigation pump.
6. **Pumps:**
 - **Primary Pump** : For water supply.
 - **Secondary Pump** : For transferring excess water to the backup tank.
 - **Third Pump** : For watering plants.

System Overview

1. **Rain Detection** : Stops the primary pump when it rains.
2. **Water Level Management:**
 - **Primary Pump** : Manages water supply based on the rain sensor and tank water level.
 - **Secondary Pump** : Transfers excess water to a backup tank.
3. **Water Leak Detection:**
 - Stops the primary pump and starts the secondary pump to manage leaks.
 - Sends a persistent notification through the Blynk app until the leak resolves.
4. **Watering Plants:**
 - Uses a moisture sensor to determine when to water plants.
 - Controlled by a third pump that can be adjusted via the Blynk app.

System Diagram



	Event / Condition	Action
1. Rain Detection	i. Rain detected	Stop the primary pump; Notify via the Blynk app
	ii. No rain	Resume primary pump
2. Water Level Management	i. Low water level	Start primary pump
	ii. High water level	Activate secondary pump to back tank
3. Water Leak Detection	i. Water leak	Stop the primary pump, start the secondary pump, transfer water to a backup tank, and notify via the Blynk app
	ii. No leak	Resume normal operation
4. Plant Watering	i. Moisture low	Start the third pump to water plants
	ii. Moisture adequate	Stop the third pump

Blynk App Integration

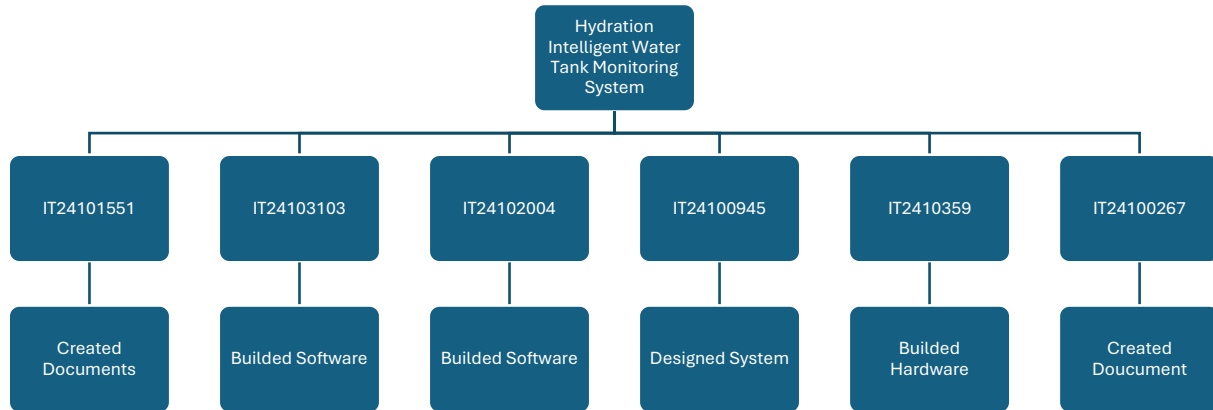
1. Dashboard Widgets:

- **Rain Sensor Status:** Displays current rain detection status.
- **Water Level:** Shows tank water levels with adjustable thresholds.
- **Leak Alerts:** Persistent notifications for water leaks.
- **Moisture Settings:** Set desired moisture levels for plant watering.
- **Pump Control:** Manual override for pump operations.

2. Notifications:

- **Rain Alerts** : Notifications when rain is detected.
- **Leak Alerts** : Persistent until the issue is resolved.
- **Water Level Alerts** : Notifications for high or low water levels

3.Wrk Breakdown Structure



Main Activity	ID Number	Activity parts done
1. Created Document	IT24101551	<ul style="list-style-type: none"> • Prepare the Project Charter • Develop the Project Plan • Create Final Project Report • Create Final Presentation
	IT24100267	<ul style="list-style-type: none"> • Create Functional Requirements • Create Non-Functional • Create Final Project Report • Create Final Presentation
2. Builded Software	IT24103103	<ul style="list-style-type: none"> • Develop and code for NodeMCU ESP32 • Integrate sensor data display (rain sensor)
	IT24102004	<ul style="list-style-type: none"> • Integrate sensor data display (water levels, moisture levels) • Conduct unit testing of software components
3. Builded Hardware	IT24103059	<ul style="list-style-type: none"> • Assemble NodeMCU ESP32 with all necessary components • Check power supply and connections for stability • Validate system responses to different scenarios
4. Designed System	IT24100945	<ul style="list-style-type: none"> • Design overall system architecture • Define data flow and communication protocols

4. Proof of Work

<include photograph of the circuit diagram of the project/ any evidence to show the product>