E3 – 257: ESD
Integrated Smart Water Management System with Real-Time Monitoring and Automated Control

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I INTRODUCTION:

Water scarcity and inefficient water management practices pose significant challenges worldwide. In response to these issues, there is a growing need for advanced solutions that can monitor, control, and optimize water resources effectively. This report explores the development of an integrated smart water management system aimed at addressing these challenges through real-time monitoring and automated control.

II BLOCK DIAGRAM:

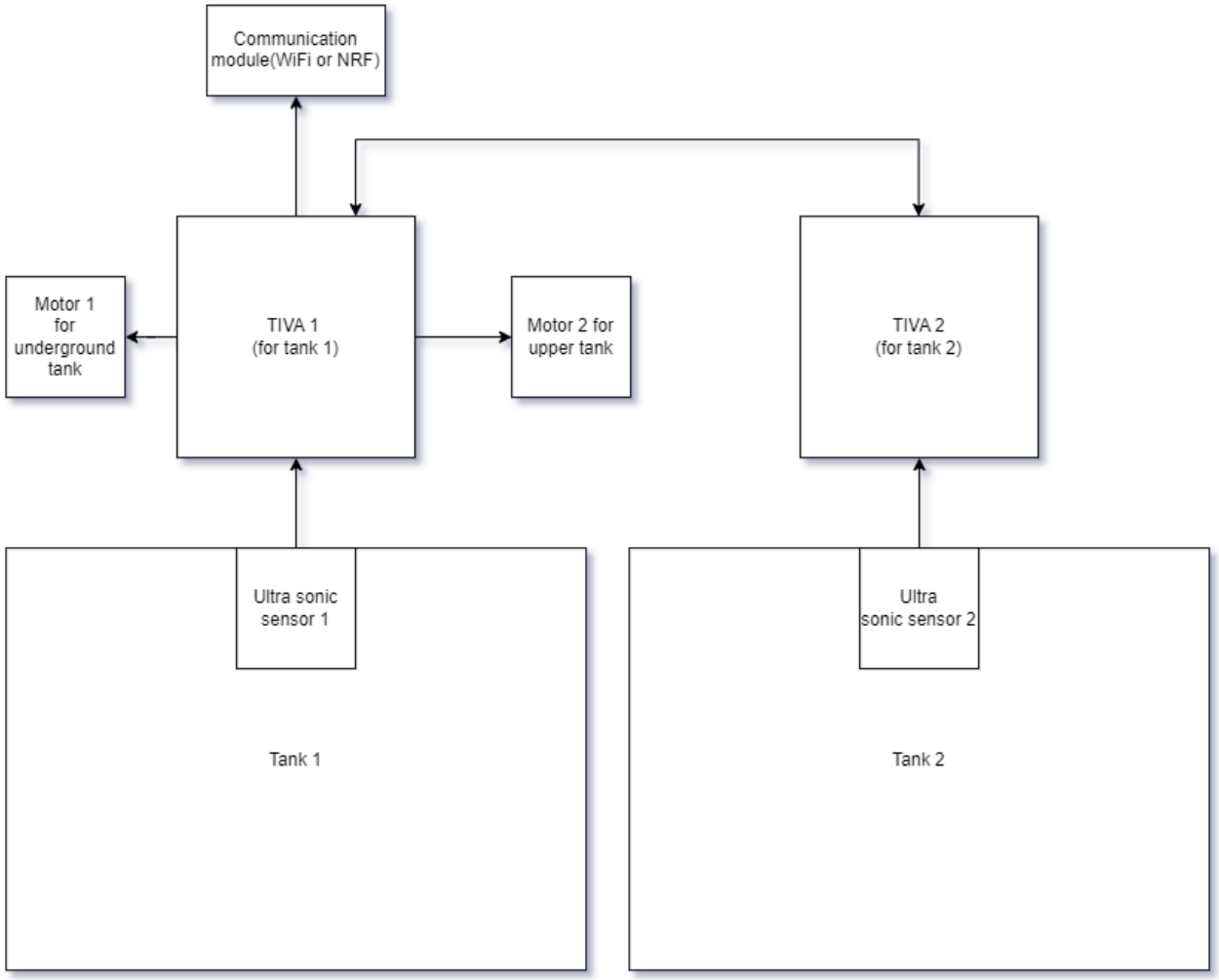

Figure 1: Block diagram

III DESCRIPTION:

1. Continuous Monitoring:
    - Continuously monitor water levels.
2. Automated Control:
    - Automatically control systems based on sensor readings and predefined criteria.
    - Sensor data will be collected by the central control unit, which will process the data and make decisions based on predefined algorithms.
    - The control unit will communicate with actuators to regulate water flow and manage water resources efficiently.
    - Real-time data will be stored in a centralized database and visualized through a user-friendly interface for monitoring and analysis.
3. Remote Access:
    - Enable remote monitoring and control via web dashboard.
4. Alerts and Notifications:
    - Send alerts and notifications to users in case of overflows.
5. Scalability:
    - Design the system to be scalable and adaptable to different settings and requirements, allowing for expansion and customization as needed.

IV IMPLEMENTATION STEPS:

1. **System Architecture Design:**
    - Defining sensor placement, communication protocols, and data processing algorithms.
2. **Component Procurement:**
    - Selecting and acquiring sensors, actuators, communication modules, and other necessary hardware components.
3. **Software Development:**
    - Developing firmware and software for data acquisition, processing, control logic, and user interfaces.
4. **System Setup and Deployment:**
    - Configuring the central control unit, deploying sensors and actuators, and integrating wireless communication modules.

V COMPONENTS:

1. **Tiva-boards:** two
2. **Motors:**two
3. **Ultrasonic sensor:**Two
4. **Wi-Fi module:**One
5. **Tanks/Buckets:**Two