MRC River Monitoring Technology Competition

Topic: Water Quality Monitoring System

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1. Introduction

Water Quality Monitoring System could collect and send real-time telemetry data from any water source. Using different types of sensors, the system can monitor the following data, such as:

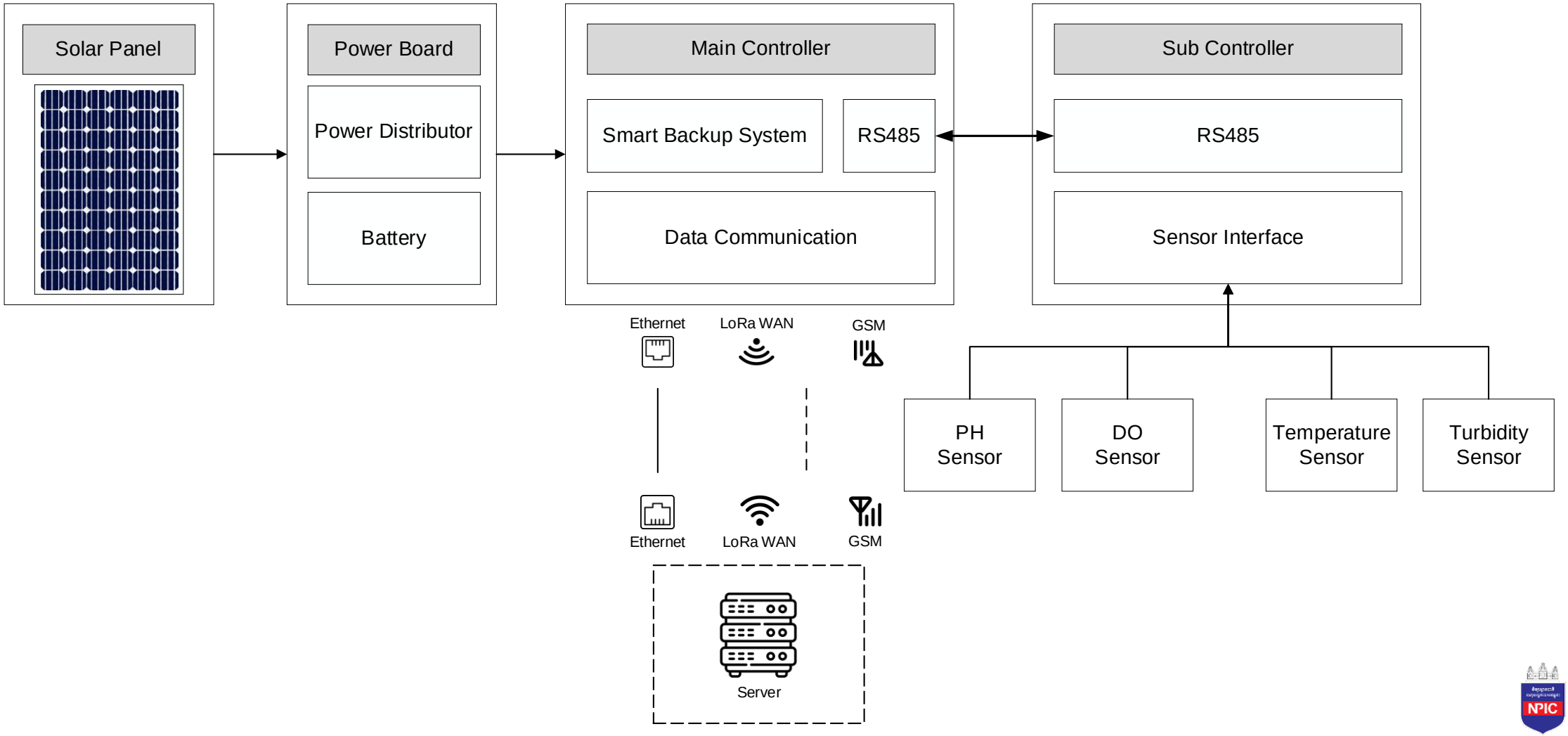
1. Turbidity
2. PH (Potential of Hydrogen)
3. Dissolved Oxygen
4. Water Temperature

2. Methodology

Design Concept

- A Solar Powered Monitoring System
- Send Data from Measurement to the Server in Real-Time
- Support Wired and Wireless Communication (Ethernet, GSM, LoRa)
- Automatic Data Backup
- Durable to Harsh Weather Conditions

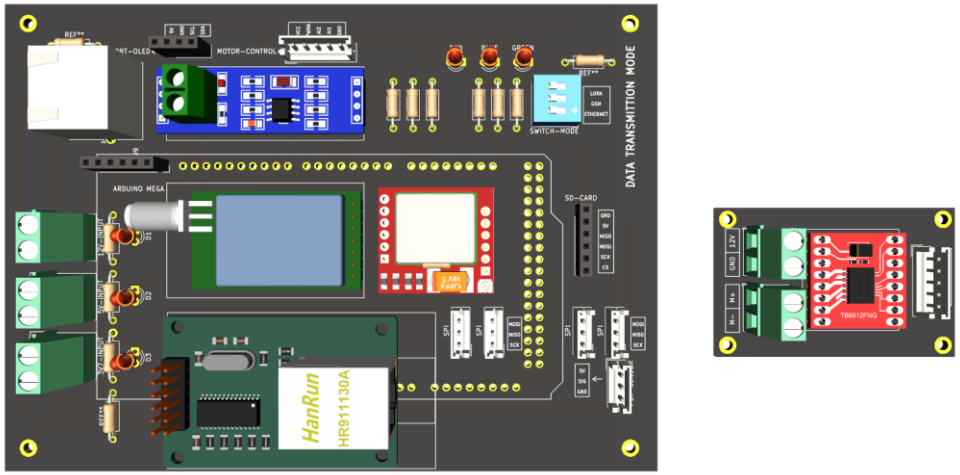
2. Methodology



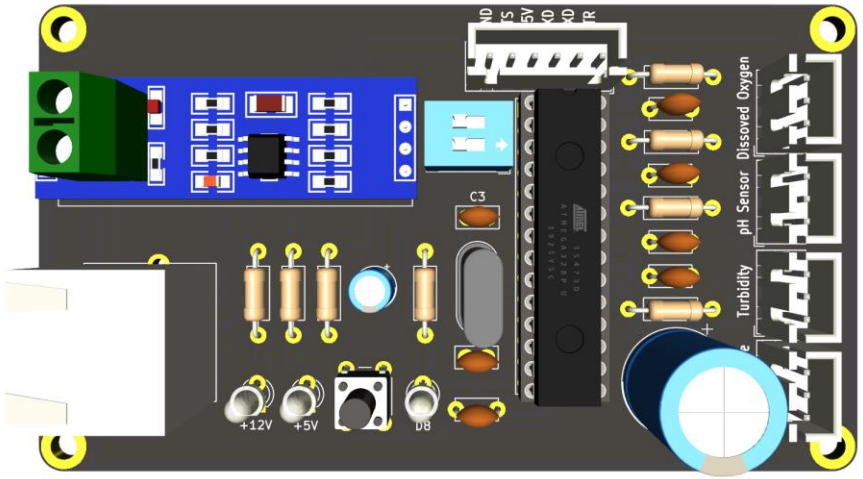
2.1 System Block Diagram

3. Design and Implementation

Hardware Design



(a) Main System Hardware

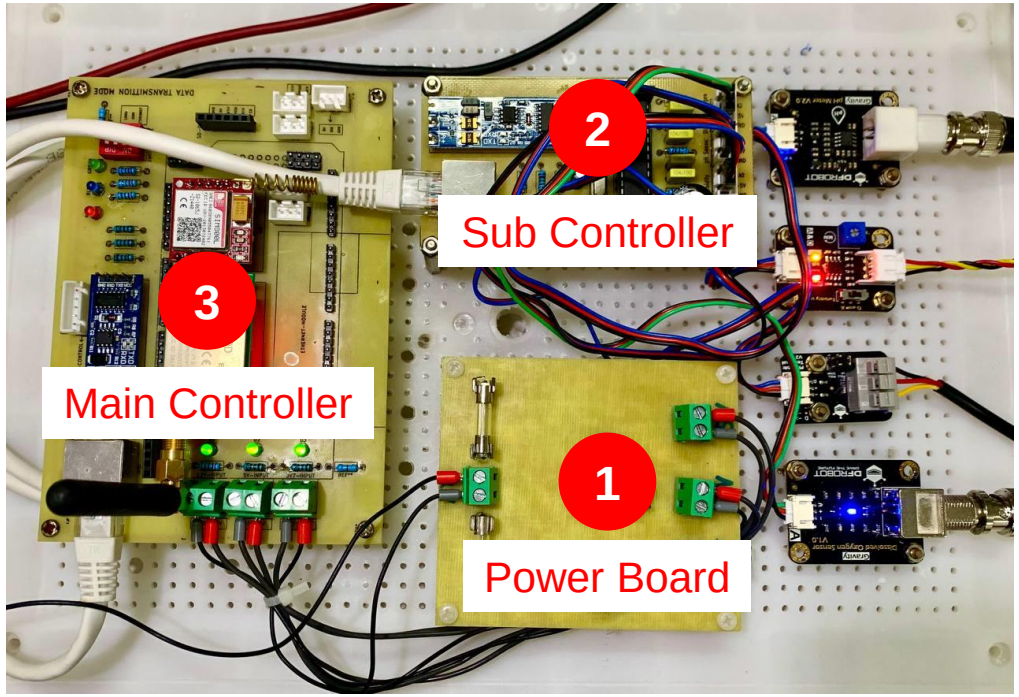


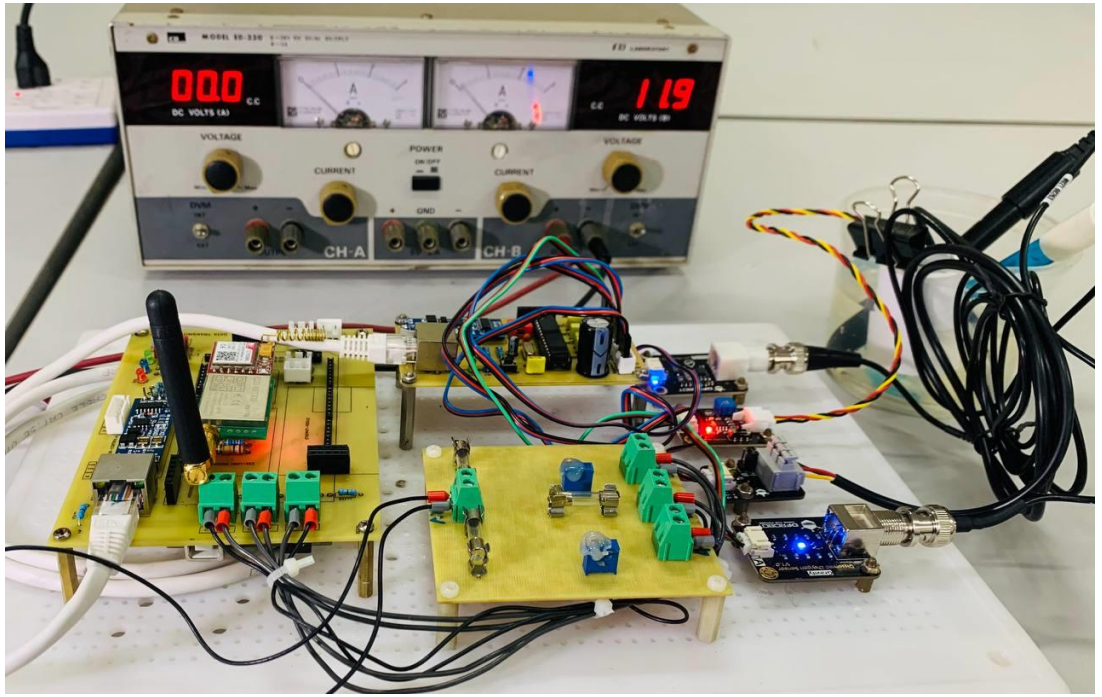
(b) Sub System Hardware

3.1 PCB Hardware Design

3. Design and Implementation

Hardware Design

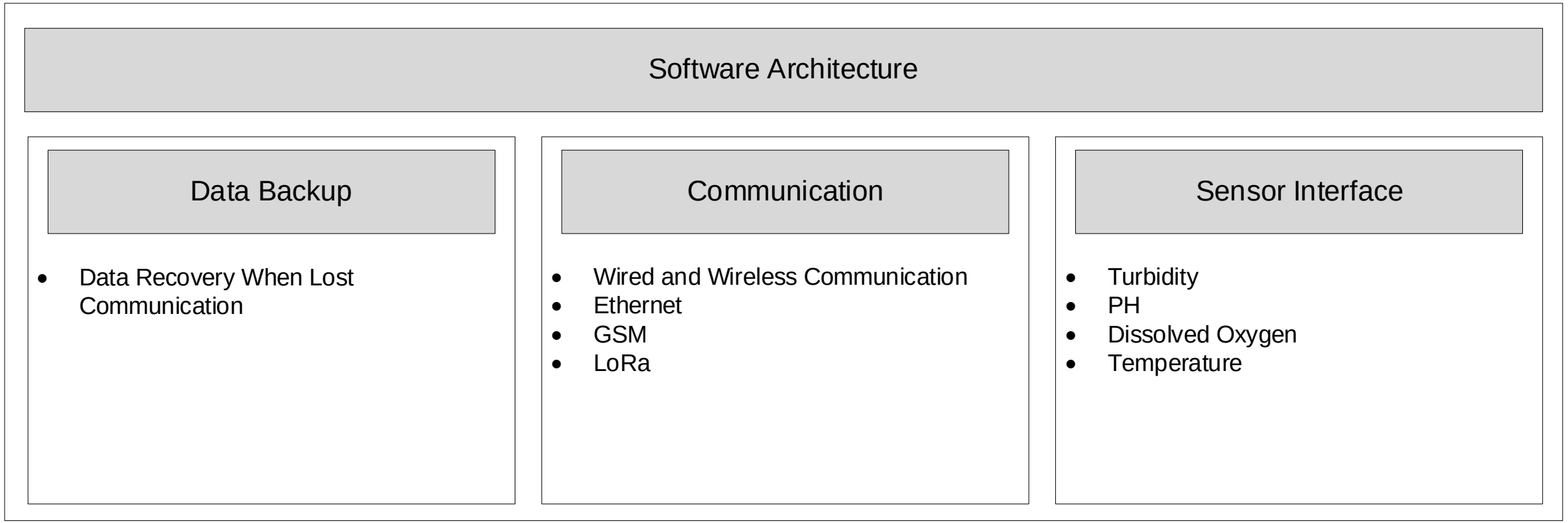




3.2 Main Hardware Implementation

3. Design and Implementation

Software Design



3.3 Software Architecture Diagram

3. Design and Implementation

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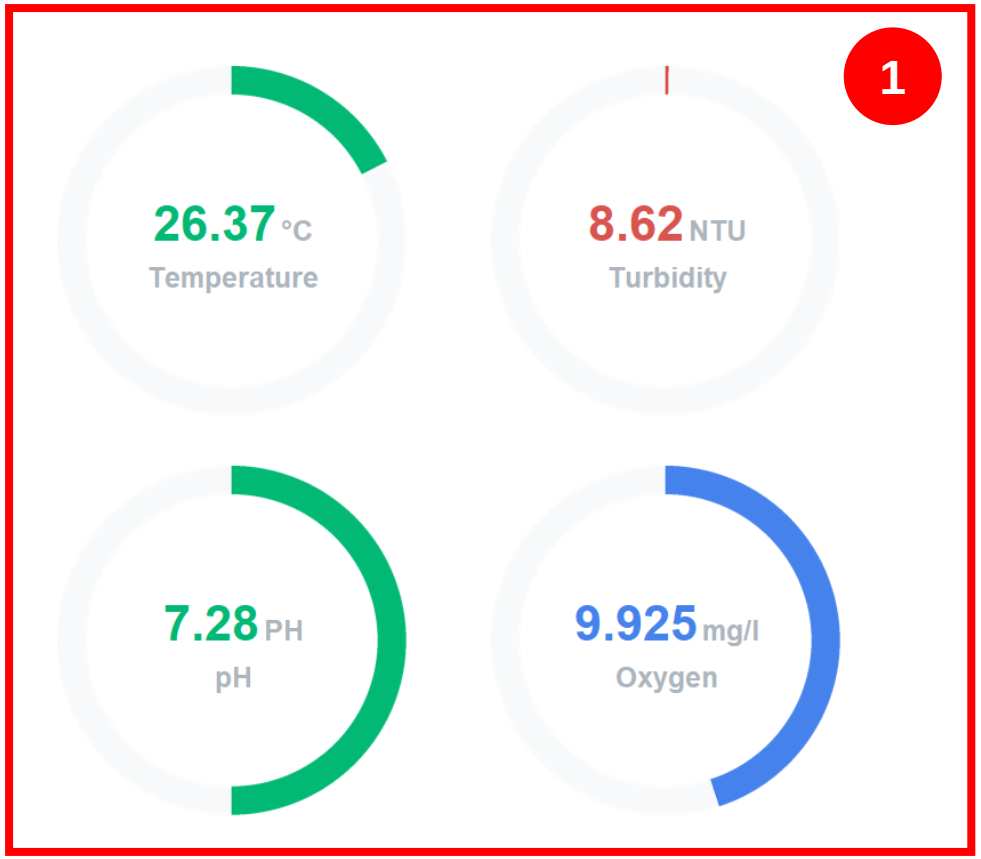


Table 2-4: Parameters used for calculating the rating score of the Water Quality Index for the Protection of Aquatic Life, together with their target values

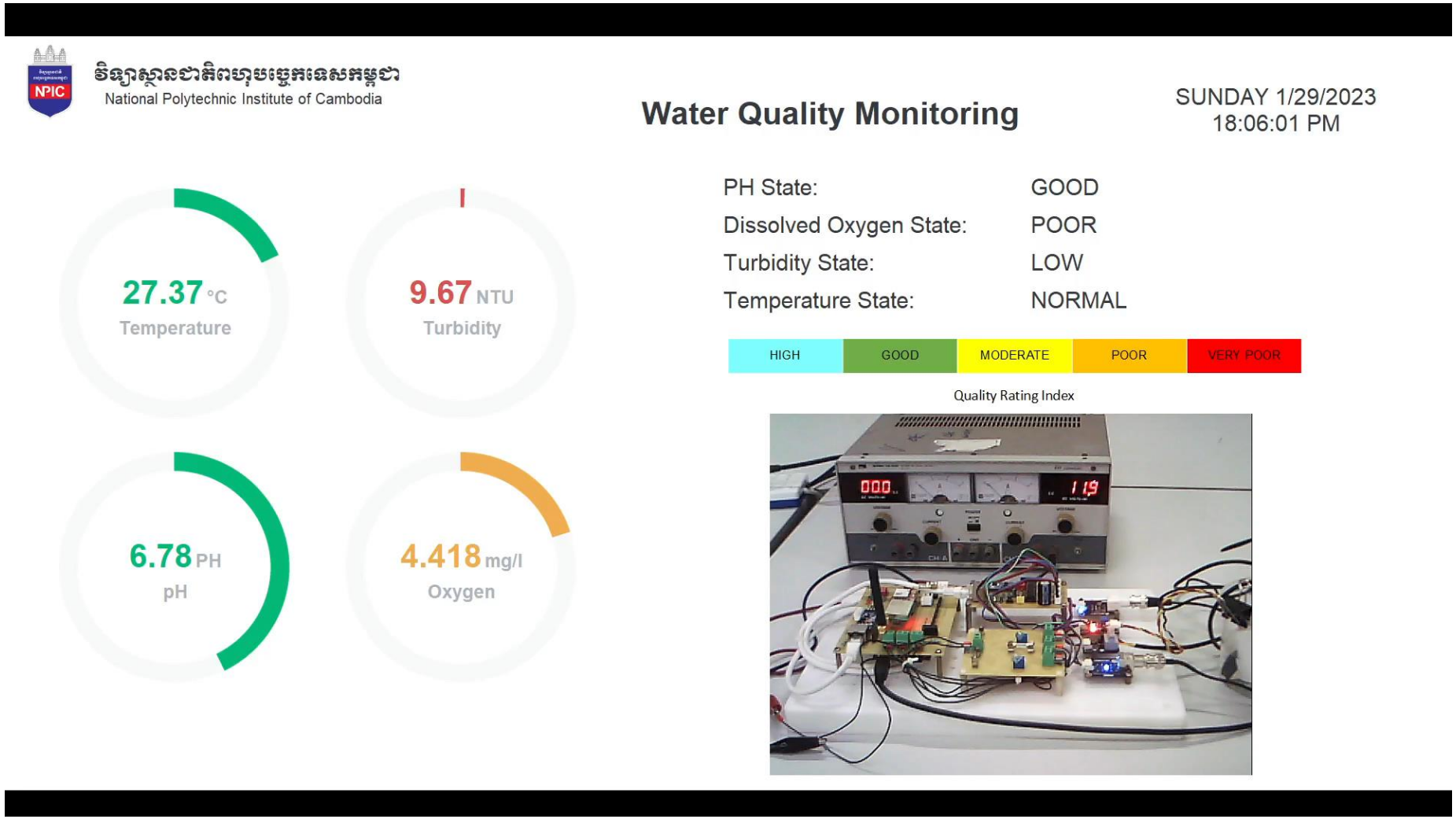
Parameters	Target Values
pH	6 – 9
EC (mS/m)	< 150
NH_3 (mg/L)	0.1
DO (mg/L)	> 5
NO_{2-3} – N (mg/L)	0.5
T-P (mg/L)	0.13

Table 2 5: Rating systems for the Water Quality Index for the Protection of Aquatic Life

Rating Score	Class
9.5 ≤ WQI ≤10	A: High Quality
8 ≤ WQI < 9.5	B: Good Quality
6.5 ≤ WQI < 8	C: Moderate Quality
4.5 ≤ WQI < 6.5	D: Poor Quality
WQI < 4.5	E: Very Poor Quality

3.3 UI Monitoring Design

4. Prototype Testing



4.1 Prototype Testing Video with UI Design

5. Conclusion

In conclusion, the system could collect data and display the value in real-time on the computer. However, some sensors took up to three minutes for each sampling, which could lead to some measurement delays.

Future Work Includes

- Solar Tracker
- Wired and Wireless Communication
- Automatic Data Backup

Reference

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Thank You

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