Aquatic Monitoring System

GROUP 14:

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INTRODUCTION

- Aquariums and aquatic environments provide captivating ecosystems teeming with life. Maintaining the health and well-being of aquatic creatures within these habitats is a complex task.
- Aquariums demand precise water parameter monitoring to ensure the health of aquatic life.
- Variations in water temperature, pH levels, and water quality can have a profound impact on the overall vitality of the ecosystem.

AGENDA

- Problem statement
- Overview
- Objective and scope
- Project architecture
- Hardware and software requirements
- Schedule

PROBLEM STATEMENT

- Existing water parameter monitoring solutions lack automation, accuracy, and real-time alerting capabilities.
- Users face challenges in ensuring precise measurements, timely detection of issues, and historical data analysis.
- The absence of user-friendly interfaces hinders effective interaction with monitoring systems.

PROJECT OVERVIEW

This project aims to develop an advanced and automated water parameter monitoring system utilizing BeagleBone technology. The system will continuously assess and record critical water parameters, including temperature and pH levels, in aquatic environments. The collected data will be logged for historical analysis, providing users with valuable insights into the health of their aquatic ecosystems. Additionally, the system will be equipped with alerting capabilities to promptly notify users of any deviations from predefined parameter ranges.

OBJECTIVE AND SCOPE

- Develop a user-friendly interface for real-time data visualization.
- Implement accurate data collection from temperature and pH sensors.
- Create a robust data logging system for historical analysis.
- Design an alerting mechanism for immediate user notifications.
- Ensure system reliability and stability through Ubuntu OS.
- Provide insights into aquatic ecosystem health through data analysis.

PROJECT ARCHITECTURE

01	**Parameter Monitoring**	• pH levels • Temperature
02	**Data Logging**	• Enables long term analysis • Provides information about ecosystem health trends
03	**Alert Mechanism**	• Real time Alerts • Early warnings when something is not right

HARDWARE REQUIREMENTS

- **BeagleBone Board**
- **Sensors:**

  Temperature Sensor: DS18B20, for accurate temperature measurements

  pH Sensor: DFRobot gravity analog pH sensor

- **Display and User Interface**:

  LCD Display: A small LCD screen to display real-time data and system status

  LEDs: To display system status

SOFTWARE REQUIREMENTS

- **Operating System:** Ubuntu for robust and reliable operation
- **Programming Language:** C
- **Sensor Interface:** Appropriate libraries and interfaces to communicate with and collect data from the sensors
- **Data Logging:** MYSQL for data storage
- **Alert System:** Continuously monitor sensor data and trigger notifications via email when parameters fall outside predefined ranges

SCHEDULE

Week 1-2: Planning and Setup

- Project initiation, defining objectives, and scope.
- Outline the initial project plan.
- Procure necessary hardware components.

Week 3-4: Hardware Setup

- Set up the development environment.
- Begin hardware assembly.

Week 5-8: Software Development

- Intensive software development phase.
- Implement data collection from sensors.

Week 9-12: Sensor Integration and Data Collection

- Integrate data storage and retrieval.
- Commence user interface development.
- Conduct rigorous hardware and software testing.

Week 13: Conclusion

- Optimize code for improved performance.
- Perform initial system validation.
- Complete project documentation.

THANK YOU