Software Design Document (SDD) - Machine Learning Platform for Intelligent Water Systsems Management - Final Project

Robert Castro
Calvin Chau
Yvan Michel Kemsseu Yobeu
Laila Velasquez
Kassandra Vera

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Contents

Revision History

Name	Date	Reason For Changes	Version
Laila Velasquez	5/5	1.0-2.5	1.0
Laila Velasquez	5/7	3.0-4.0	1.1

1 Introduction

1.1 Purpose

The purpose of this Software Design Document (SDD) is to provide a detailed architecture and design overview of the Intelligent Water Systems Management Platform. This platform is designed to optimize water usage, monitor real-time water consumption, and predict maintenance needs through integrated sensor networks and data analytics.

1.2 Intended Audience

This document is intended for:

- Software developers implementing the platform
- Project managers overseeing development
- Stakeholders evaluating project progress
- Quality assurance teams for testing and validation

1.3 Overview

The Intelligent Water Systems Management Platform leverages real-time data from water sensors to track consumption, detect leaks, and optimize usage patterns. It is designed for municipalities, industrial complexes, and residential areas to achieve efficient water management.

2 System Architecture

2.1 Workflow

- Data Collection → Sensor Data Stream
- Data Processing → Real-time Monitoring & Alerts
- Data Storage → Secure Cloud Database
- Data Visualization → Web Application Dashboard

2.2 Site Breakdown

- **Home Dashboard** - Overview of current water usage, alerts, and predictions.
- **Analytics Page** - Visualization of consumption trends and historical data.
- **Settings** - Configuration options for sensors and user preferences.
- **Reports** - Generation of monthly, weekly, and daily reports for users.

3 User Interface

3.1 How to Use

Users log in to the dashboard to view real-time data, configure settings, and download usage reports. Alerts are displayed prominently for immediate action.

3.2 Database Explanation

Data from sensors is stored in a cloud-based SQL database, allowing for efficient querying and analysis. The structure follows normalized principles for fast data access and integrity.

4 Glossary

- **Sensor Network** - A collection of interconnected sensors that track water usage.
- **Dashboard** - The user interface for monitoring and managing water data.
- **SQL Database** - A structured database for storing sensor data securely.
- **Real-time Monitoring** - The capability to view water consumption as it happens.

5 References

- Project Source: [`https://ascent.cysun.org/project/project/view/216`
- Development Tools: Docker, Flask, SQL, HTML/CSS
- Documentation Standards: IEEE 1016-2009