SUP'COM
Higher School of Communication of Tunis

Design Document:

SMART FIRE DETECTION SYSTEM

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1 General Overview

Ensuring safety in our living environments is a fundamental responsibility, especially when it comes to fire hazards. The increasing prevalence of wildfires and indoor fire incidents poses a significant threat to both property and lives. Traditional smoke detection systems often lack real-time monitoring capabilities and can be limited in their responsiveness, leading to delays in emergency responses. As a result, there is a pressing need for advanced solutions that can enhance safety and provide timely alerts.

This project proposes the development of an IoT-based smoke detection system that leverages modern technology to monitor air quality and detect smoke in real time. By utilizing a network of sensors and cloud technologies, the system aims to provide a comprehensive solution that not only alerts users to potential fires but also enhances overall situational awareness. The key functionalities of this project include:

- **Real-time smoke and gas detection**: Continuously monitor smoke and gas levels in the environment and detect anomalies immediately.
- **Threshold-based alerts**: Send instant notifications to users when smoke levels exceed a predefined threshold, enabling rapid response to potential fire hazards.
- **Location tracking via LBS**: Utilize LBS to pinpoint the exact location of detected smoke, allowing emergency responders or users to quickly locate and address the potential fire source.
- **Data logging and historical analysis**: Store detected events, environmental conditions, and location data for later analysis, which can help improve safety protocols and system effectiveness.
- **Automatic emergency call**: If users do not respond to a notification within 1 minute, the system automatically contacts emergency services, ensuring swift assistance in case of fire or gas-related incidents.

2 Use case Diagram

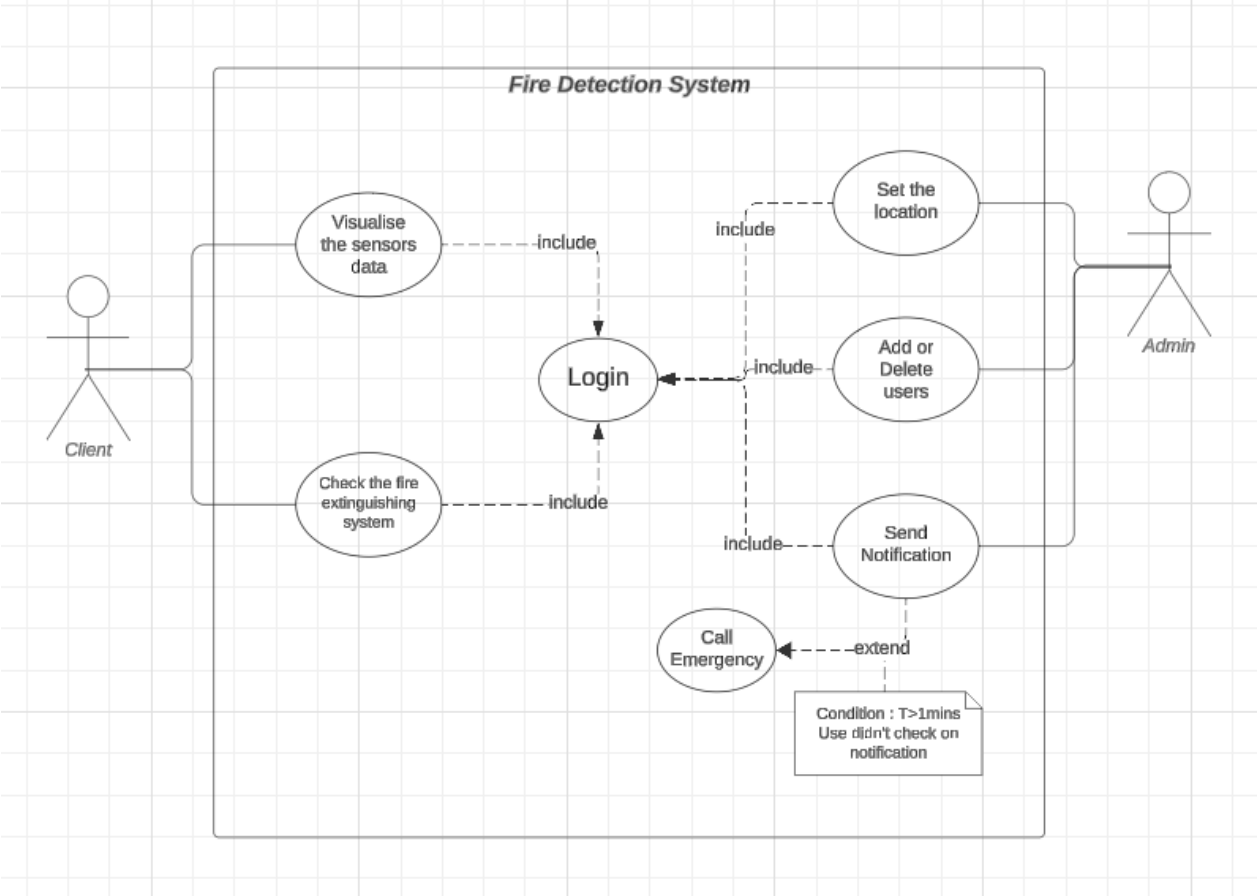

Figure 1: Use case Diagram

3 Class Diagram

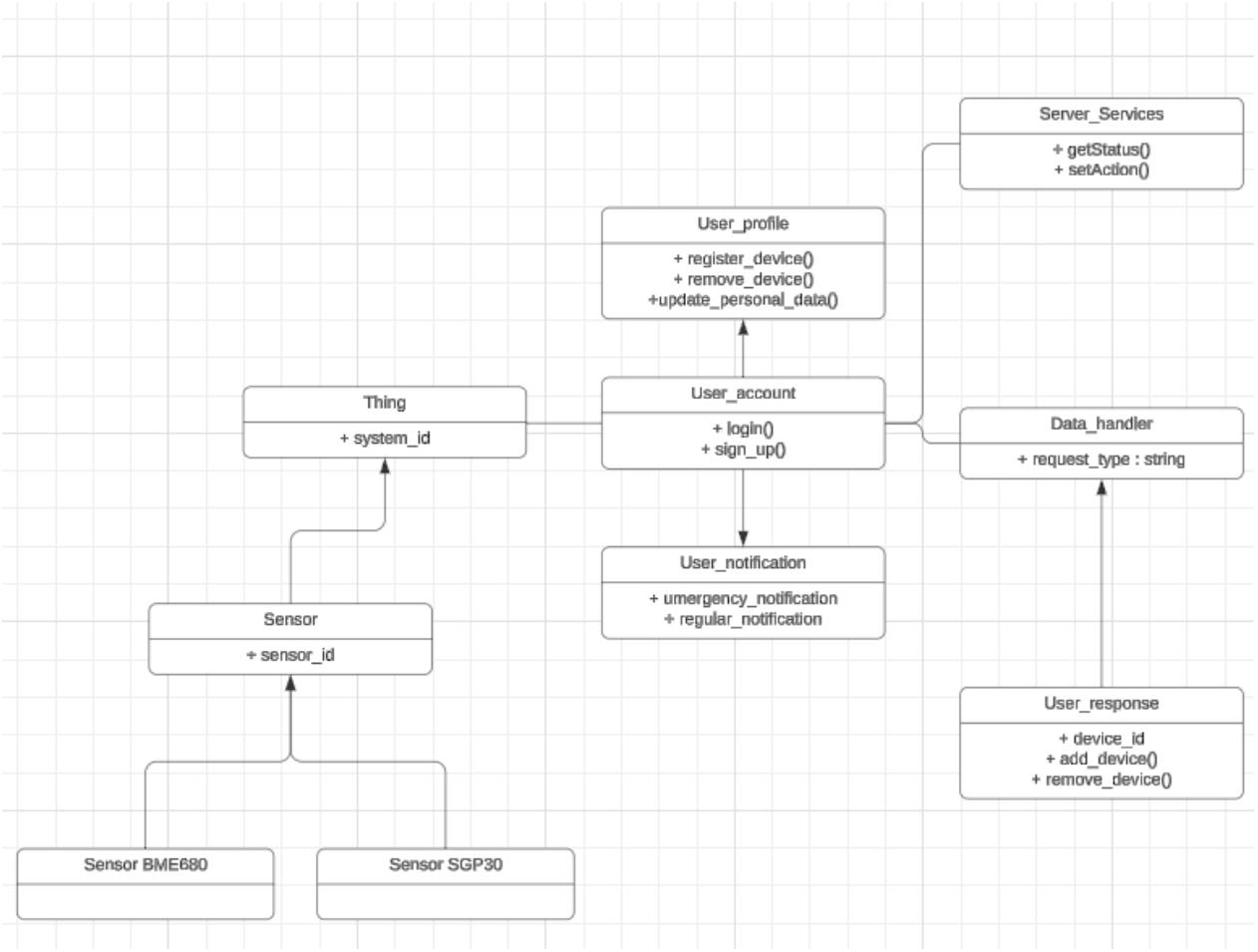

Figure 2: Class Diagram

4 Deployment Diagram

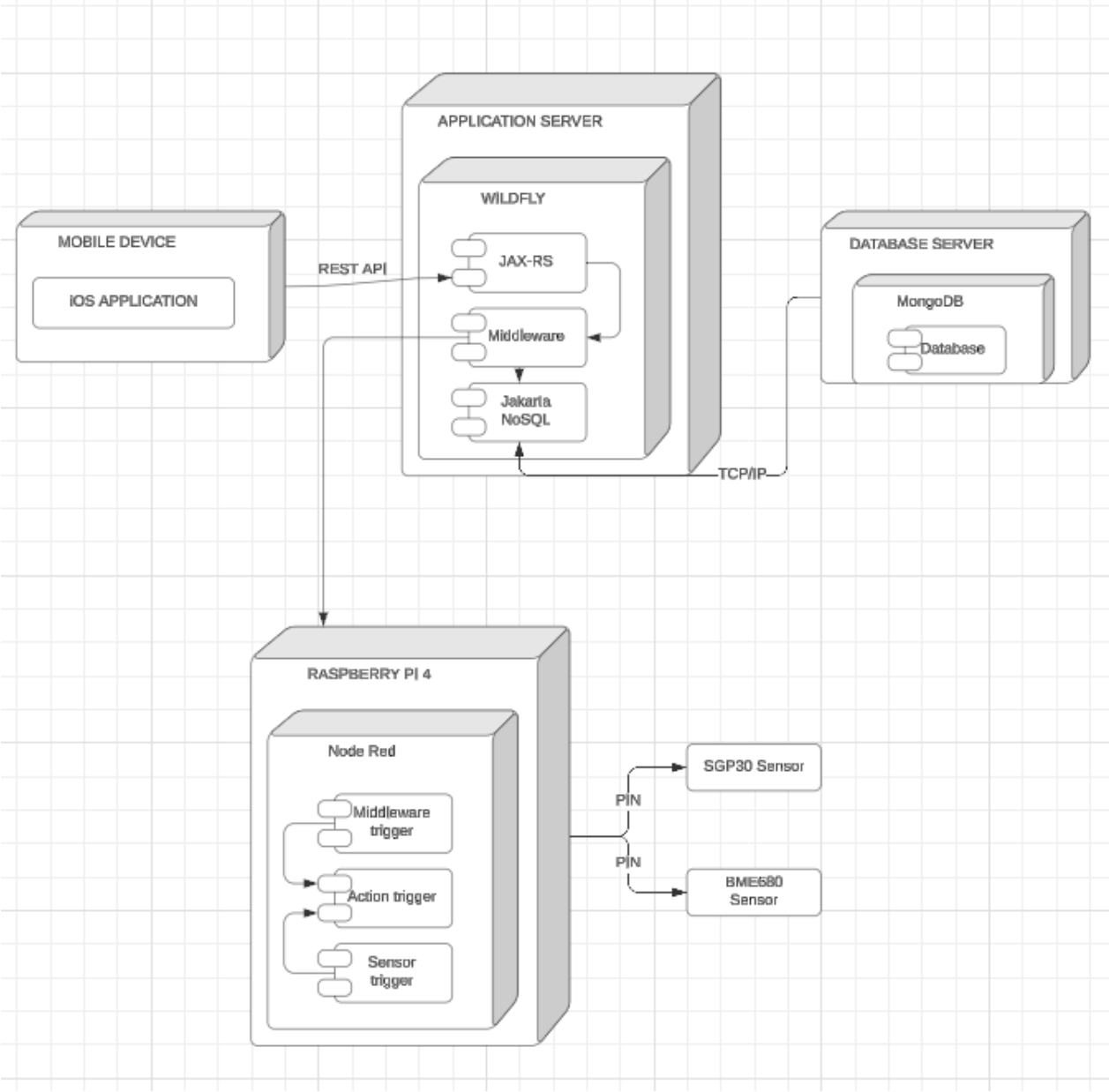

Figure 3: Deployment Diagram