DASS Project Concept v1.0

Team 51

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Overview

Project number	50
Project Title	Framework to access and Validate sensor data
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Description

The Smart City Living Lab has recently deployed over 100 data collection nodes across the campus. These track various metrics such as air and water quality, temperature, and so on. Thus, a large amount of data is being generated.

The natural extension of this hardware framework is to build a robust software setup to ensure accuracy and consistency in sensor readings. Factors such as hardware malfunctions, network failures, or cyber-attacks affect data quality and result in inaccurate data generation.

Therefore, our role is to develop a framework to integrate with the existing oneM2M-based setup, and implement features such as uniform data quality validation, outlier detection, and hardware malfunction indication.

User Profiles

The main end users of the framework are the **researchers at the Smart City Living Lab.**
In essence, they require minimal abstraction and maximum control. They should be able to granularly edit the existing setup of nodes, and be able to conveniently monitor the (predicted) data collection status of each deployed node.
Mentioning the developers of the front-end dashboard as users also makes sense, but since their project is being developed concurrently to ours, it is unclear how much cooperation/integration would be possible/recommended.

Feature Highlights

The core functionality of the project is to pull data from the oneM2M server that the sensors are transmitting to in real-time and then to perform operations which can be categorised under the following feature-set:
- ➔ Constructing the custom-tailored framework for each oneM2M vertical deployed, which involves:
    - Understanding the data model
    - Formulating requirements clearly so as to avoid the inherent risks of making assumptions
    - Figuring out the oneM2M setup which is presumably huge and complex given the sheer number of sensors
    - Learning to use Postman/making different kinds of requests
    - Understanding the API, and then finally using it
- ➔ Real time Data Analysis and Data validation, which involves:
    - Gaining knowledge about the relevant algorithms so as to perform the required tasks with a high computational efficiency
    - Deciding on a reliable framework/stack
    - Prototyping, implementation and debugging sprints
- ➔ Node status monitoring: Working/Not Working, coupled with sending appropriate email notifications and alerts