CSE5ITP Project Proposal

Waste Management – Bin Monitoring System

We are coming under waste attack – waste (home, community, industrial, amongst other sources) is becoming alarmingly difficult to keep track of and growing at an exponential rate. This proposal looks at Waste Management in the context of a Town Council. In a town, various publicly accessible bins will be setup with an array of sensors. These sensors are periodically read (multiple times an hour) and relevant data (how full/empty they are, in centimetres of depth distance left in a bin) to the cloud/server.

Aim:

Build a system around the sensor data collected that does the following:

- Displays a map of the town council area (zoomable)
- Displays clusters of bins (and their percentage average capacity)
    - Zooming on clusters will show sub-clusters (and their percentage average capacity)
    - Further zooming will show individual bins (and their percentage capacity)
        - Additional flags needed with bin full or bin has reached user set threshold (SEE POINT A)
- Allows a group of users to set a threshold value for a bin capacity (A)
    - This means a value for a bin capacity
    - When this value is met (say 90% full), a notification is set (SEE POINT B)
- Notifies a group of users when a bin has reached (B)
    - The set threshold value (example 90% full, SEE POINT A)
    - 100% full, filled, leaking…

How:

The overall System comprises of

- A Single Page Application (SPA) to deliver the web views
- A Server-side Application (implemented as a RESTful API) to
    - Read real-time data from sensor data source
    - Serve sensor data to the Single Page Application
    - Manage the requirements listed above
        - Including managing all user notifications
    - Saves relevant data to your data source

Implementation Specifics:

Sensor data source:

- The bin sensor data source will be provided to you as a Firebase database as a read-only end-point

Single Page Application:

- Angular 6 (https://angular.io/)
    - Latest LTS version
- Leaflet (https://leafletjs.com/)
    - Latest production version

Server-side Application:

- Node.js 8 (https://nodejs.org/en/)
    - Latest LTS version
- Express 4 (https://expressjs.com/)
    - Latest production version
- Database/Data Source – you can choose strictly between
    - MongoDB 4 (https://www.mongodb.com/)
        - Latest production version
    - Or Firebase (https://firebase.google.com/)