CS-C2130 Project Proposal:

Machine learning powered asset tracking visualization tool
1. Introduction

Wizense Oy is IoT device engineering and end to end solution company, founded in 2016 and based in Technopolis Vantaa. The company is developing Fieldsight connectivity product series including a wearable device focusing on industrial safety and productivity. Now the company is further exploring the capability beyond connected products to offer E2E field safety solution.

The solution would include positioning of industrial employees and assets on a 2/3D visualisation tool, as well as automatic predictions of future events based on the collected data. Solution would help avoiding potential accidents in work sites, and thus save lives and properties.

This project scope aims at developing a visualization tool for tracking employees and asset locations. The tool also includes a cloud-based machine learning module that determines events occurring at factory sites, and trigger alerts to personnel for avoiding any accidents. Data is collected in cloud, and occurrence of accidents is predicted based on previously recorded and current data. Data collection points include Bluetooth beacons, wearable, gateway, machines, environment sensors around the deployment.
2. Project goals

**Goal A:**
1. Develop web-based visualization tool for location plotting people and moving assets on the maps (map data can be imported as jpg, png, svg) including no-go zones.
2. Implement backend algorithm to locate assets on the map, calculate estimated position and display routes as heatmap
3. Implement Location API for 3rd parties

**Goal B:**
1. Integrate map to existing Mobile application (Prio 1: Android, Prio 2: iOS)
2. Add machine learning module to make estimates for people movements and identify possible danger zones

**Goal C (Stretch goal):**
1. Develop visualization tool showing assets on the 3D map. Any 3D engine could be used.
3. Technologies

Project is based on the following technology stack:

- **Cloud**: Java / Node.js / JavaScript / Serverless – cloud service available
- **Sensor**: Embedded C (optional)
- **Web / Mobile**: React
- **Radios**: Bluetooth LE, NB-IOT, 2G/3G
- **Devices**: Wearables, Beacons and Gateways
- **Documentation and requirement management**: Wiki & Jira
- **Builds**: Jenkins
- **Source repository**: git
- **Tools**: MatLab, Python

4. Requirements for the students

- Interest in IoT and connected gadgets
- Initial understanding of serverless cloud infrastructures and IoT cloud pipeline
- Understanding of visualization tools to build 2D or 3D maps
- Java / JavaScript programming skills
- Optional: Interest in algorithm development and machine learning models

5. Legal Issues

- Wizense gets all rights to the results
- Signing an NDA is required
6. Client

6.1 Introduction of the client organization

Wizense is agile startup company and has lean working culture. The office is based in Technopolis Vantaa, Finland.

6.2 Who are the representatives of the client and what is their level of expertise in the project domain and technologies?

- Main technical contact: Palash Sarkar, palash.sarkar@wizense.com – Cloud and algorithm development / 045 155 9420
- Secondary contact: Jussi Heiskanen, jussi@wizense.com – Product owner / 040 803 1910

6.3 How much time are they prepared to spend guiding the team?

The project is high priority for the company. Resources will be available to reasonable amount to help out development group to achieve set goals. The team is prepared to held coaching sessions and hands-on support at the Wizense office.

6.4 Does the client offer the team any resources, cloud server, computers and software?

The company provides cloud service, development tools such as wiki, Jira, Git, Jenkins and sensors for testing. Optional for team to work at the company office. Special software may not be needed.

7. Additional Information

All product documentation and implementation will be done in English.