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From: BEST (Beacon-based Evacuation System and Technology)

Bacon Beacon

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Summary

For the Algorithm part, we implemented the Q-Learning technique successfully. However, the Indoor localization part messed up, so we redesigned the map, and we have to adapt it to Q-Learning again. Needs extra work next week.

What “BEST” completed this week

- Recaptured data of K-SW building
 - Currently, we added too much areas to gather the data, which makes its accuracy untrusted
 - We divided the map again, and captured the data again
- SQLite adopted to Sever
 - SQLite was built in Google Cloud Platform
 - Successfully adopt ORM model made by our team member, makes it easy to upload the data
 - Extra work needed to implement many classes
- Q-learning successfully ported to our project
 - Q-learning finally ended. Need to cooperate with mobile team, to make document to communicate with mobile devices

Things to do by next week

- Communication via Socket implementation
 - Mobile devices should communicate with server via socket, and it needs to be designed before sending data for handling that
- Machine Learning training for localization (advanced)
 - Neural Network for localization data should be collected in real situation
 - Place beacons over human, and needs to be collect data from that for accuracy
- Augmented Reality(AR) study
 - As background data is successfully developed, we should work on AR.
 - It should be hard, but there are many models, so we can get hints from them.

Problems or challenges:

- Data collection of experimental situations does not fit again
 - It works well when a beacon is placed at normal smartphone height, but when put over height of human, It does not work well even when calculating height [2]
 - implementation of Machine Learning succeeded. Need to make tables for accuracy diffences between other techniques
- Replacing the Blueprint of K-SW building by measuring it ourselves.
 - Due to the fact that the blueprint is essential to indoor localization and path finding, we had to measure it out by a ruler which is not very precise.
- Q-learning algorithm does not works well as thought
 - Epsilon was fixed, so server calculates in wrong way
 - Needs to be flexible epsilon data for quick calculation

References

- [1] A. Kumar, “building-evacuation-q-learning,” *GitHub*, Jun. 07, 2022.
<https://github.com/KumarUniverse/building-evacuation-q-learning> (accessed Jun. 10, 2022).
- [2] Longquan Jiang, Bo Zhang, Qin Ni, Xuan Sun, and Pingping Dong, “ Prediction of SNP sequences via Gini impurity based gradient boosting method,” *IEEE ACCESS*, vol. 7, pp. 12647-12657, 2019.