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To: ematson@purdue.edu, ahsmith@purdue.edu, lhiday@purdue.edu and lee3450@purdue.edu
From: BEST (Beacon-based Evacuation System and Technology)
Bacon Beacon

- Hwawon Lee (andylhw12@soongsil.ac.kr)
- Yoonha Bahng (tlol91@cau.ac.kr)
- Dohyun Chung (sosvast@cau.ac.kr)
- Jiwon Lim (senta2006@kw.ac.kr)
- Suhyun Park (2061013@pcu.ac.kr)
- Seongmin Kim (aliveksm@kangwon.ac.kr)
- Myoung Oh (oh278@purdue.edu)

Summary

At the Algorithm part, Q-learning method was researched and an outline of our code was designed. Our server and Raspberry pi are connected by HTTP connection. Localization experiments were completed.

What "BEST" completed this week

- Tensorflow successfully ported on iOS and Android Device
  - Now, distance easily estimated by Neural Network
  - 91% of accuracy
- Raspberry Pi code refactored
  - Before refactoring, it just send the raw data of sensor
  - Now, It sends the data based on raw data, and send missing beacon ID to server for evacuation algorithm
- Server now works by Multiple processes
  - Process 1 works at handling HTTP request for Raspberry Pi
  - Process 2 works at handling Socket communication with mobile devices
- Google Cloud Platform (GCP) was used for server
  - Ported code made by Hwawon Lee
  - Server runs smoothly

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
- Merge path-finding algorithm to server
  - Path-finding algorithm will be finished by next week. It will be run by server and deal with multi-thread environments[1]
- 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

Problems or challenges:

- Data collection of experimental situation does not fit
  - It works well when beacon was placed at normal smartphone height, but when put over height of human, It does not work well even when calculating height [2]

- 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.