Report Date: 02/10/2023

To: ematson@purdue.edu, ahsmith@purdue.edu, lhiday@purdue.edu, lee3450@purude.edu

From:

- Soonchan Kwon (182575@jnu.ac.kr)
- Gihwan Kim (201701981@o.cnu.ac.kr)
- Nahyeong Kim (nhkim5697@o.cnu.ac.kr)
- Nawon Kim (201600@jnu.ac.kr)

Summary

- Finalized the project.
- Researched the technologies that will be used for the project.
- Requested the required parts order.

What BTT completed this week

- Soonchan Kwon
  - Implemented the code to record and save log in the flesh memort of ESP32 .
  - Conducted the field test to know the effect of Fresnel zone between ground node and UAV node.
  - Refactored the timer code in mesh network to optimize the performance.
  - Implemented the code to switch the operation mode for ESP32 from field test.
  - Modified whole comments in mesh network, due to last refactoring.
  - Wrote the explanation of LoRa in methodology section of paper.
  - Wrote the explanation of ESP32 in methodology section of paper.

- Gihwan Kim
  - Researched on papers for detection model
  - Researched on reference papers
  - Implemented data preprocessing code for object detection
  - Implemented code for training pretrained model.
  - Collected labeled data set for object detection
  - Wrote introduction section and related work section for the paper

- Nahyeong Kim
  - Researched the Hata Okumura model that predicts the distance in wireless network.[1]
  - Investigated the parameters suitable for test environment to predict the distance by using Hata Okumura model.
  - Wrote range test sections for paper works.

- Drew up a equipment list for network experiments.

- Nawon Kim
  - Researched on image downscaling methods required for image preprocessing.
  - Investigated how to transfer images without going through webserver.
  - Studied about process for sending image from OV2640 to the ESP32 board.
  - Implemented image transfer process by referring to CameraWebServer example.

Things to do by next week

- Implement the code to detect UAV.
- Integrate the detection code and the mesh network code.
- Conduct the field test to experiment the middle range communication(550m) in Purdue parking building.
- Conduct the field test to experiment the long range communication(a few kilometers).
- Write the explanation of Tensorflow Lite Micro and detection in methodology section of paper.
- Write implemenation section of paper.
- Prepare final presentation.
- Write the contents of README except for experiment and result.

Problems or challenges

- Communication range of the board.
- The quality of paper.
- Field test is delayed due to delivery of LoRa transceiver and portable battery.
- How field test will be consist.

References

[1] M. Hata, "Empirical formula for propagation loss in land mobile radio services," in IEEE Transactions on Vehicular Technology, vol. 29, no. 3, pp. 317-325, Aug. 1980, doi: 10.1109/T-VT.1980.23859.