Report Date: 12/09/2022
To: ematson@purdue.edu, ahsmith@purdue.edu and lee3450@purdue.edu
From: SharpShooter

- Donghyeon Na (201721402@sangmyung.kr)
- Hansu Jeong (201710982@sangmyung.kr)
- Minjae Kim (kmj5596@khu.ac.kr)
- Jeongwon Moon (bella7365@knu.ac.kr)
- Woojin Choi (twinsno119@sunmoon.ac.kr)

Summary
The research was worked with 4 teams. The front-end team was focused on calculating shot group. The IoT team completed MPLR protocol implementation. The sound detection team conducted data augmentation. The paper team modified the overall paper.

What Sharpshooter completed this week:

- Implemented the revised MPLR
  As shown in Fig. 1., devising LoRa packet architecture and packet communication logic is completed [1].

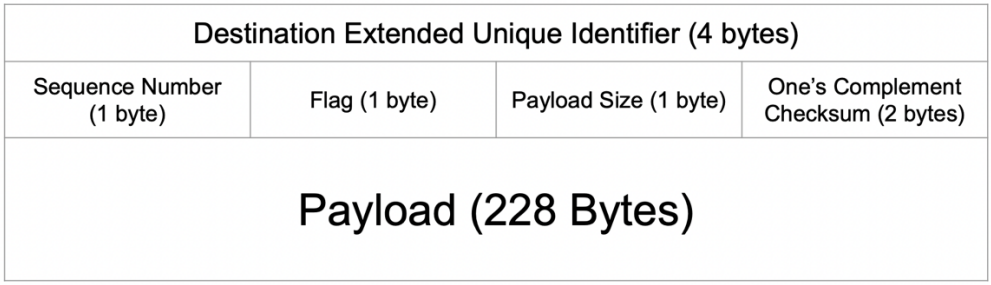

Fig. 1. LoRa packet architecture

Unlike general MPLR, the proposed protocol, called P-MPLR (Point to point Multi Packet Long Range), is specialized for point-to-point Lora communication. P-MPLR has 12bytes of header that has 6 bytes of Destination EUI(Extended Unique Identifier), 2bytes of Sequence number, 1byte of flag, 1byte of payload size and 2bytes of Checksum.

- Augmented data
  The library for preprocessing audio data has been changed from librosa to torch audio. Frequency masking from torch audio is used for data augmentation. This is a method of augmenting data by masking the frequency domain.

- Calculated the shot group
  The pixels obtained on the computer through PPI were converted into inches to obtain the shot group. Also, implementing the information page is completed.

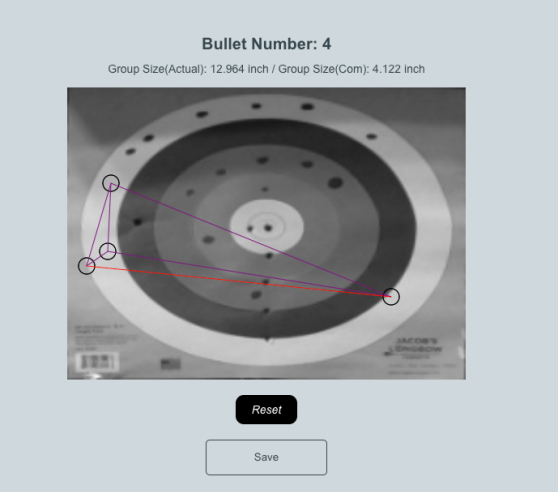

Fig. 2. Calculating shot group size

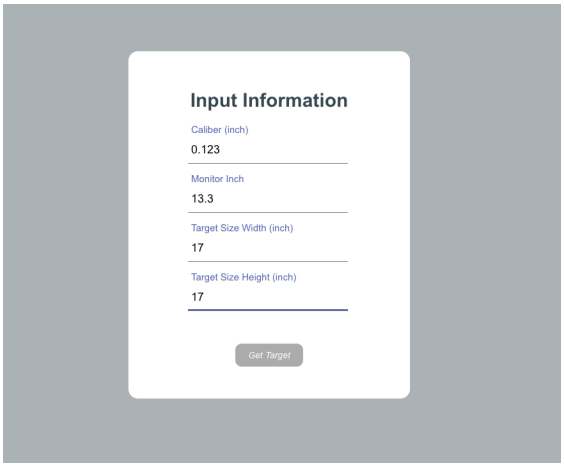

Fig. 3. Information page in Web

- Modified the overall paper
  The paper was changed because of some difference comparing to the beginning. Also, Sharpshooter wrote networking section of implementation.

Things to do by next week

- Test the overall system in outdoor
- Practice the final presentation
- Revise the overall paper

Problems or challenges:

- Shot group is correctly calculated in computer screen, but when the shot group of computer screen is converted to the actual shot group, it shows incorrect result.

References

[1] T. Chen, D. Eager and D. Makaroff, "Efficient Image Transmission Using LoRa Technology In Agricultural Monitoring IoT Systems," *2019 International Conference on Internet of Things (iThings) and IEEE Green Computing and Communications (GreenCom) and IEEE Cyber, Physical and Social Computing (CPSCom) and IEEE Smart Data (SmartData)*, 2019, pp. 937-944, doi: 10.1109/iThings/GreenCom/CPSCom/SmartData.2019.00166.