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Summary

Over the course of this week, We completed writing our dissertation and application implementation was completed. The experiment was conducted for maximum inference time, minimum inference time, and average inference time. This paper flew a DJI Phantom 4 and tested it at North St, West Lafayette, IN 47906. We prepared and presented the last ppt. The presenters were Gwangwon Kim and Hyunjong Jang, and the question respondents were Joonki Rhee and Min Seop Shin.

What SWATTER completed this week:

- We have completed writing our dissertation.
    - We wrote an experimental part and a conclusion part.
    - Some parts have been modified due to experimental results.
- Application implementation was completed.
    - Both the method using only the smartphone and the method using the server and smartphone are available.
- Implementation of the server was completed
    - Tests for the communication between the client and the server was done.
    - Usual inference time using the server: 500ms
- The experiment was conducted for maximum inference time, minimum inference time, and average of inference time.
- This paper flew a DJI Phantom 4 and tested it at North St, West Lafayette, IN 47906.
    - The application was executed with a galaxy z fold 3 5g smartphone, and the distance between the drone and the smartphone was 2000cm (787.402 in).
    - Inference time through 10 experiments is summarized as shown in figure 1.
        - The inference time of the method using only the smartphone consists of the time from when the drone is recorded until the inference result is obtained.

        - Furthermore, the inference time of the method using a smartphone and server consists of time for inference and data movement time between client and server.
- In order to check whether acoustic drone detection is possible in real life, an experiment was conducted outdoors.
    - The DJI Phantom 4 was launched and tested on the farm in Romney on February 23, 2023.
    - The wind speed was 20 miles per hour (mph) and the maximum wind speed was 29 mph.
- The flow chart was modified as shown in Figure 2.
- Overview was modified as shown in Figure 3.
- We prepared and presented the last ppt.
    - Presenter: Gwangwon Kim, Hyunjong Jang
    - Question Respondents: Joonki Rhee, Min Seop Shin

Feature Works

- It is necessary to further learn drone types and noise data through future research.
- It was confirmed that multi-classification rather than double-classification was sufficiently effective for drone detection, and since this experiment does not include noise data such as human voice in the acoustic data samples, more sample data should be trained to check the inference time.
- Moreover, since this experiment confirmed that smartphones is able to utilized for drone detection, there is room for improving performance by combining vision detection and acoustic detection as in other studies.

Problems or challenges:

- Errors continued to occur because various programming languages were used to implement the application.
    - The error code solved the problem.
- There was a lot of wind during the experiment, making it difficult for the measurer to conduct the experiment.
- Due to a problem with Github, the error continued to occur.

References

Fig. 1. Indoore inference speed test

TABLE VII: Indoor inference speed test

Method	Maximum	Minimum	Average
Only smartphone	1.0375	0.80937	0.8889
Smartphone and Server	530	860	689.6333

Fig. 2. Flowchart

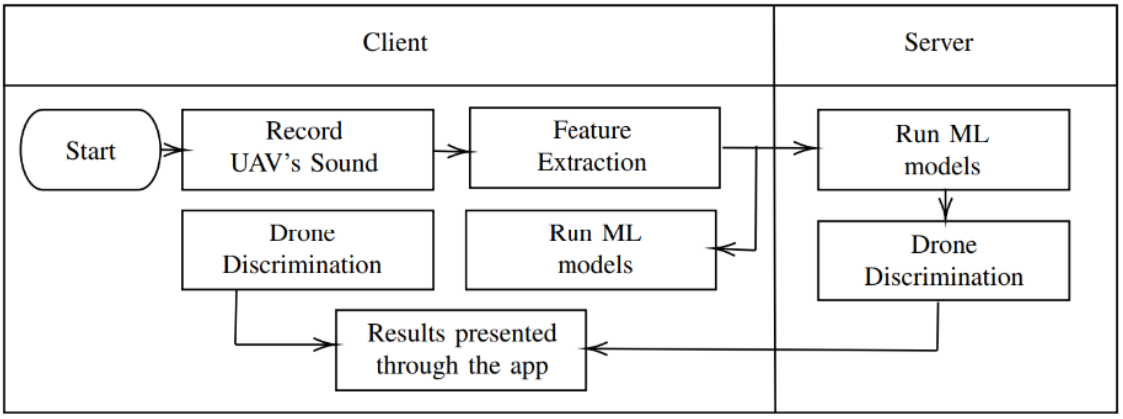

Fig. 1: Flow chart of two methods for drone detection

Fig. 3. Overview