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From: SWATTER

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Summary

We had a middle presentation about our project. Our presenters were Minsup Shin, Joonki Rhee. Gwangwon Kim and Hyunjong Jang were in charge of Q&A. We reviewed our presentation on 02/03. We had a meeting with Ph.D Yaqin and got advice for the project's progress and methodology on 02/04. We asked about the environment for drone sound collection, confirmed that the microphone specifications should be consistent, and checked why we should choose the model to use in the methodology section of the paper. We submitted the middle paper to M. Lee on 01/31. We took several suggestions, and based on them, we have revised the paper. We also added functionality to our machine learning program code, and received the UAV data on 01/30 afternoon and were in process of developing the server program. The components of the server program for receiving data were implemented.

What SWATTER completed this week:

- Had a middle presentation about our project.
    - Presenter : Minsup Shin (Introduction, Related work)
      Joonki Rhee (Methodology, Progress, Future work)
    - Q&A section : Gwangwon Kim , Hyunjong Jang
    - We reviewed our presentation video
        - M.Lee gave us useful advice for the final presentation.

- Had a meeting with Ph.D Yaqin and got advice for project’s progress and methodology. (02/03/2023)
    - We asked about the Environment for Drone Sound collecting.

        - Microphone specification should be consistent.
        - Mic spec related with sampling rate of audio data
        - Previous paper’s data was using a Macbook.
        - In previous research, audio data was recorded at 6 A.M or 3 P.M
        - Noise of data includes sounds of wind, bird, airplane, or something else.
        - We planned to add human voices.
    - We should write about why we choose this model in the methodology part.
        - e.g) We will use the SVM model because it is good for binary classification.
        - Select machine learning models refer from previous papers.
    - When observing a Training and Test accuracy/loss plot for a NN, the train/test curve of the graph should be similar for encountering overfitting.
    - We should check the model's test results like accuracy, precision, recall, f-1 score by using a confusion matrix or something.

- Submitted a middle paper to M. Lee
  (01/31/2023)
    - Write a 1st draft (Abstract~Related Work)
        - Avoid using modal verbs.
        - Don’t use “Now/specifically/then/hence/but/then”.
        - The target being compared must be explained in detail.
          ex) My height is taller than her.
        - Don’t use a translator.
          (to avoid plagiarism).
        - ‘Therefore’ is used just 1 time.
        - in this paper -> This paper.
        - Write numerically in detail.
        - Don’t use superlatives.
        - Check with the source team members one by one.
        - Add experience in the future.

- Modified paper according to M. Lee's suggestions.

    - There are a few sentences that need to be corrected after the experiment.
      ex) Hence, this method will be a viable solution when detecting UAVs in the future.

- Added function to machine learning program code.
    - We received UAV data on Monday afternoon.(01/30/2023)
    - Machine learning team added functions for using UAV data.
        - Rename data file because original name is hard to control.
        - Road data and extract MFCC feature for test.
        - MFCC and class labels were converted to dataframe.

- implemented the components for receiving data
    - Utils for memory management
    - Receive buffer
    - Listener
    - Utils for socket
    - Session for managing connection

Things to do by next week

- Writing Methodology
    - The paper will be written as soon as the development is confirmed
- Writing implement as much as possible
    - We will write the frame first
- Testing machine learning models via existing data.
    - Existing data will be splitted into train or test data.
    - We will train the NN model.
    - We will compare SVM, KNN, GNB, NN models for accuracy.
    - Also, CNN models will be revised for our detection method.
- Collecting noise data like wind, birds, airplane
    - If we go outside with another UAV team, we will collect noise data for training.
- Implement the components of the server program for sending
    - Implement Send Buffer
    - Implement send function through session
    - Complete implementing for running on multithreaded environment

- Design packets and protocol for the packets for communication
- Test the server program and upload to Cloud

Problems or challenges:

- Plagiarism is too difficult to avoid when writing a paper.
    - We should refrain from using a translator to reduce plagiarism.
- There are restrictions on writing papers without using auxiliary verbs.
    - Substitute using synonyms.
- Undeveloped parts are difficult to write on paper.
    - Part of the relevant part will be written in advance, and will be rewritten after development.
- Develop an application to be able infer UAV detection models by Android phone alone.
    - Feature extraction libraries aren't common in Android (JAVA).
    - Find audio feature extraction library for android.
    - Implementing application
- Sound data needs a lot of preprocessing before use.
    - Computers cannot understand the original status of sound data.
    - There are many features with feature extraction of sound.
    - Data shapes are depending on which sampling rate we select.
- Designing protocol for the packets
    - Should design what kind of data format will be in a packet and how to process it.

References

Fig1. Team Swatter middle presentation