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**Summary**

- Prepared the final presentation
- Arranged the code for the project

**What TN completed this week**

- chose the CNN architecture

| Layer | Layer Description |
|---|---|
| Layer 1 | Conv1D (20 filters with a size of 4, 2 Padding, 2 Stride)<br>ReLU activation function |
| Layer 2 | Conv1D (11 filters with a size of 4, 2 Padding, 2 Stride)<br>ReLU activation function |
| Layer 3 | Conv1D (5 filters with a size of 4, 2 Padding, 2 Stride)<br>Sigmoid activation function |

Table 1. The CNN model's architecture

- Arranged the code for the project
- Wrote a script for a presentation and made the presentation for the final presentation.
- Prepare the final presentation and Q&A.
- Finish writing the conclusion in the draft paper.

**Conclusion**

This paper proposes to detect UAV velocity using audio data generated by driving a UAV. This project uses three kinds of Machine Learning models(SVM, Random Forest, and LGBM) and Deep Learning model, CNN, to detect UAV velocity. In this paper, the dataset was collected in an indoor environment. If the UAV flies over 10 mph, it is considered a fast one. If the UAV flies under 10 mph, it is considered a slow one. The dataset consists of 3-second snippets, and there are 2355 audio files in the dataset. Each data extract the feature using MFCC, and the features of slow and fast audio data show

the differences between 6 of 20 features. The differences of features are helpful for the model to learn the difference between fast and slow. The dataset is used to train the Machine Learning and Deep Learning models. All of the models show over 0.95 f-1 score (SVM: 0.988, Random Forest: 0.998, LGBM: 0.996, CNN: 1.000).

The limitation of our research includes that we only used one kind of UAV for data collection in indoor conditions. In this paper, the model only can classify binary classes, fast and slow. However, Table 3 shows the difference between slow and fast dataset. So the model will classify the velocity of the UAV at 5 mph intervals in future experiments. Also, the amount of the dataset was sufficient for the experiment, at the next experiment, planning to collect more data for general use.

**Things to do by next week**

- Finish the final presentation

**Problems or challenges:**

- Prepare PPT presentation and Q&A question list