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Summary

- UAV velocity prediction paper was written to introduction.
- UAV papers were summarized.

What TN completed this week

- UAV velocity team was split that EunYoung, YeongMin, JeongYoun are teammate.
- UAV papers were summarized and used to reference.
- Project subject was discussed with Mia. UAV Velocity Prediction is a new task. However, Prediction Study was agreed to by Mia.
- UAV prediction project was discussed with Dr. Matson. Due to The project is new project, The project is deserved to challenge.
- Another project was argued by a teammate. Discussion is needed to a project.
- Some news and policy were found that why UAV velocity prediction needs.
- UAV velocity prediction paper was written to introduction.
    - Abstract
    - UAV price is getting reasonable and UAV are spread out. UAV is used for variable objectives like military, hobby and business. For this reason, UAV brings many convenience and threats. Responding to this threat, UAV detecting task has developed using variable method. Until now, many UAV detecting papers are published. However, UAV velocity prediction is less published. This paper conduct UAV velocity prediction using an acoustic node. Also, CNN is used to predict UAV velocity. F1-score, recall and precision are used to estimate CNN is well predicting UVA velocity accuracy.
    - Introduction
    - While Unmanned aerial vehicle(UAV) is supplied expansion, UAV is used to variable object like military, hobby and business. Due to variable developments and supply, UAV improve the quality of life. Recently, Delivery Industry uses drone to delivery parcel and grocery[1]. Also human detecting research for lifesaving was conducted using UAV[2]. On the other side, many threats increase about UAV. Recently, UAV with bomb approched to Croatia[3]. In addition, UAV attacked US troops[4]. Since these example, Military threats about UAV increase. In this background, Many UVA detecting papers are published to solve the menace. Almost paper about UAV is detecting UAV or predict UAV approach. some paper conducted to detact UAV using Acostic[5]. Furthermore, Direction of UAV is

studied using Deep Learning[6]. Other paper classify payload drone or not using variable Machine Learning Algorithms[7]. However, There is little paper about UAV velocity prediction. US government limits speed of UAV 100mph[8]. Dut to the restriction, If Some UAV velocity exceed 100mph, The UAV might be malcious vehicle and military UAV. Since many threat caused by UAV, UAV velocity prediction is still important task. This paper conduct to predict UAV velocity using Acoustic node. Machin Learning and Convolutional Neural Networks(CNNs) use to prediction model. MFCC is used to feature extraction. F1-score, recall and precision is calculated to estimate CNN model accuracy. Future work is to develop model that detect direction and velocity

- The environment was discussed to get UAV sound.

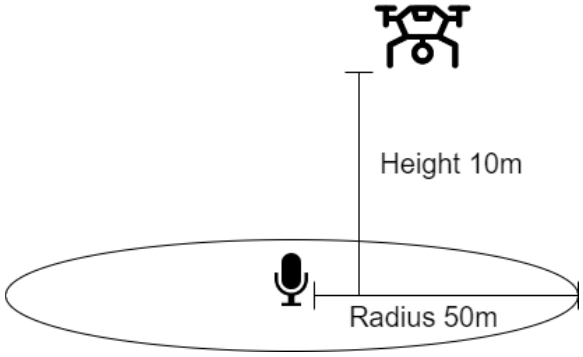

Fig 1 Boundary for UAV velocity prediction

UAV velocity is predicted under 50m radius and 10m height. UAV sound is recoded by microphone.

Things to do by next week

- Team project will be fixed until this weekend.
- If Team project was chosen to UAV velocity prediction, Literature review would be written and confirmed.
- If Team project was chosen to UAV velocity prediction, Feature extraction and CNN will be studied to weekly study.
- Dataset collection will be discussed with Dr. Matson

Problems or challenges:

- Paper to predict velocity using acoustic node is little. Velocity prediction paper is needed to use reference.
- UAV has 3 axis accelerometer. However How to use the sensor to check UAV velocity.

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