Report Date: 04/29/2022
To: include all managers (e.g., ematson@purdue.edu, ahsmith@purdue.edu, lhiday@purdue.edu and lee3450@purdue.edu)

From: K2S3.

- Dongwhan Lee (Leader) - derick_lee@khu.ac.kr
- Yeeun Heo (Member) – gjdpdms2005@soongsil.ac.kr
- Youngseo Kim (Member) - 201910787@sangmyung.kr
- Juann Kim (Member) – 201920951@sangmyung.kr
- Heeyeon Shin (Member) - 567didi@khu.ac.kr

Summary

In this week, an outline of this project was constructed. The keywords of this project were assigned with reading previous papers, and the topic of this project was drawn.

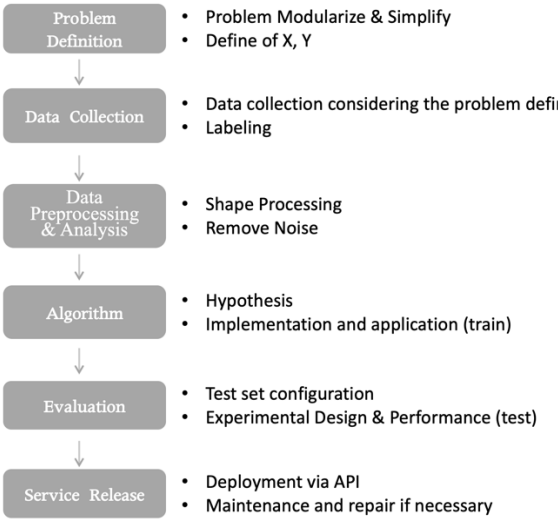
Based on the topic chosen, a list that is needed was written, constructing the flow chart and the presentation for Mia.

The problem exists, however, because there are few papers related to this project. Hence, related papers will be researched more by the end of next week, and then the first draft of "Abstract" on the paper will be written.

What K2S3 completed this week:

- Drawing the keywords and the main topic for this project.
    - Keywords of this project were discussed and drawn, which are "Altitude", "UAV", "Estimation", "Detection", "Acoustic", "Visual", "Video".
    - The topic of this project was drawn based on the keywords above, which is "The Altitude Estimation (or Prediction) of UAV using Acoustic and Visual Methodology".

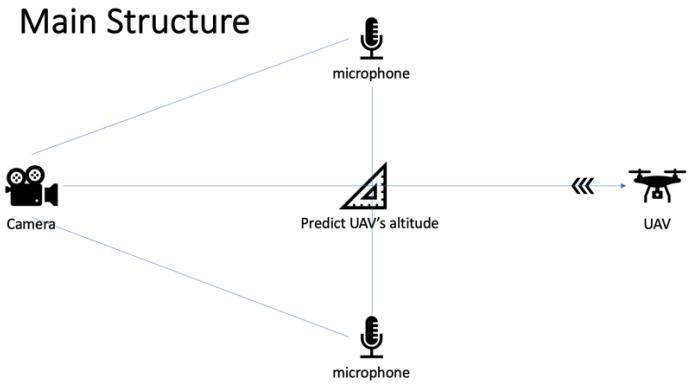
- Constructing the flow chart of the project



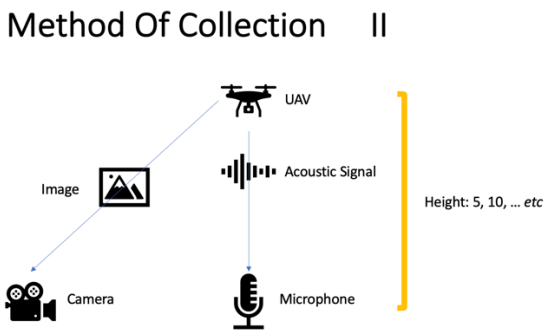
- Planning to learn knowledge related to this project
  - Rules
    - What will be learned is supposed to present every Tuesday and Friday.
    - Presentations will be uploaded on Google Drive in 30 minutes before starting presentations.
    - The knowledge related to this project, including both “Acoustic” and “Vision” parts will be learned in a week at once.
    - Presenters will be selected randomly.

- Reading related papers to this project.
  - Papers were assigned to all members.
  - This project will be specified by the previous research.

- Constructing the structure for Mia
  - Main Structure
    When anti-UAV invades the certain territory or security place, The UAV’s altitude will be predicted using a camera and microphones.



- Method of Collection
  The data will be collected from different altitude. The maximum of altitude will be set to 30m. To able to collect the dataset, a camera and microphones will be used.



Things to do by next week

- Writing the first draft of "Abstract".
  - Problems were defined in the past research and some reasons why this project, which is "Altitude Estimation of UAV", must be researched and developed.
  - Some examples and references related with anti-UAV Detection and Estimation were planned to research, then the first draft of "Abstract" will be written.
- Appointments from many experts including Ph.D. students and professors will be set for the feedback to this project.

Problems or challenges:
The topic of this project, "The altitude estimation of UAV" have never been researched before, so clear definition or goal for this project had to be set.

References

- H. Liu, Z. Wei, Y. Chen, J. Pan, L. Lin, and Y. Ren, "Drone Detection Based on an Audio-Assisted Camera Array," *IEEE Xplore*, Apr. 01, 2017. https://ieeexplore.ieee.org/abstract/document/7966780/authors#authors [Accessed Mar. 09, 2022].
- S. Al-Emadi, A. Al-Ali, A. Mohammad, and A. Al-Ali, "Audio Based Drone Detection and Identification using Deep Learning," *IEEE Xplore*, Jun. 01, 2019. https://ieeexplore.ieee.org/abstract/document/8766732 [Accessed Apr. 29, 2022].
- P. K. Rai, A. Kumar, M. Z. A. Khan, J. Soumya, and L. R. Cenkeramaddi, "Angle and Height Estimation Technique for Aerial Vehicles using mmWave FMCW Radar," *IEEE Xplore*, Jan. 01, 2021. https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9352744&tag=1 [Accessed Apr. 29, 2022].