Drone-to-Drone Detection using Microphones

Project Summary

This project aims to determine the viability of audio-based drone-to-drone detection. Along with collecting and analyzing the data offline, the developed method should ultimately also be deployed and experimentally validated in a real-world scenario.

Project Type

- BA Thesis (3-6 months)
- MA Thesis (6 months)
- Praktikum / Internship (3-6 months)

Required Qualifications

- Prior experience with Audio / Signal Processing
- Basic programming skills (Python, MATLAB)

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Detailed Description

As part of our "Hunter Drone" project, we seek to enhance drone-to-drone detection by also utilizing sound. While there exist ground-based systems utilizing microphone-arrays who already achieve this, drone-based ones do not exist (yet). This may be due to the challenging nature of
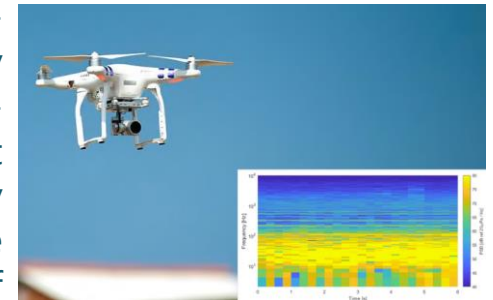
this task. Along with an overall smaller microphone array and limited computational resources, wind as well as the sound emitted by the Hunter Drone itself may severely limit the detection performance.

References

- Cabrera Ponce, A., Martinez-Carranza, J., & Rascon, C. (2020). "Detection of nearby UAVs using a multi-microphone array on board a UAV." International Journal of Micro Air Vehicles, 12, 175682932092574.

- Go, Y.-J.; Choi, J.-S. "An Acoustic Source Localization Method Using a Drone-Mounted Phased Microphone Array." Drones 2021, 5, 75. https://doi.org/10.3390/drones5030075.

- Toma, A; et al. "Towards Drone Recognition and Localization from Flying UAVs through Processing of Multi-Channel Acoustic and Radio Frequency Signals: a Deep Learning Approach.", 2021, NATO