Setup audio-measurements UAV

KU Leuven Team 1

Introduction

In this document the setup for some audio recordings made for the 2019 IEEE Signal Processing CUP will be explained. The ZIP-file also contains the actual recordings done with this setup.

Please note:

- This report is identical to the data collection report submitted by KU Leuven Team 2, because the same measurement setup was used by both teams. The submitted recordings are however different for both teams.
- Even if an 8-microphone array was used, one of the microphone recordings is corrupted, hence effectively only a 7-channel recordings is provided (channel 7 is an empty signal).

The UAV

The drone that was used in this setup is a MK EASY Quadro V3 with four MK3640/34 motors. This drone was mounted with a sound recording setup containing 8 Microphones [1] connected to a soundcard. 8 Omnidirectional MEMS Microphones are connected to a 16soundsUSB device [2], which sends the signals to a connected computer through a USB cable.

Figure 1: The drone setup

Figure 2: Detail of the drone's payload

Figure 2 shows the drone's payload. With, from top to bottom, the soundcard encased in a 3D printed structure, a case for a mini computer, and 8 microphones attached to the cubic microphone array.

Microphone array

The microphones are affixed to an 3D-printed array. The centre of the array lies 19cm vertically under de X-Y plane on which the motors lie. All microphone positions are relative to this point. In the XML-file *SPCUP19_KU_Leuven_Team_1_array_drone.xml*, you can find the exact positions of these microphones. All microphones are positioned outwards from the centre of the cube. In the picture underneath the positions of these microphones can be found.

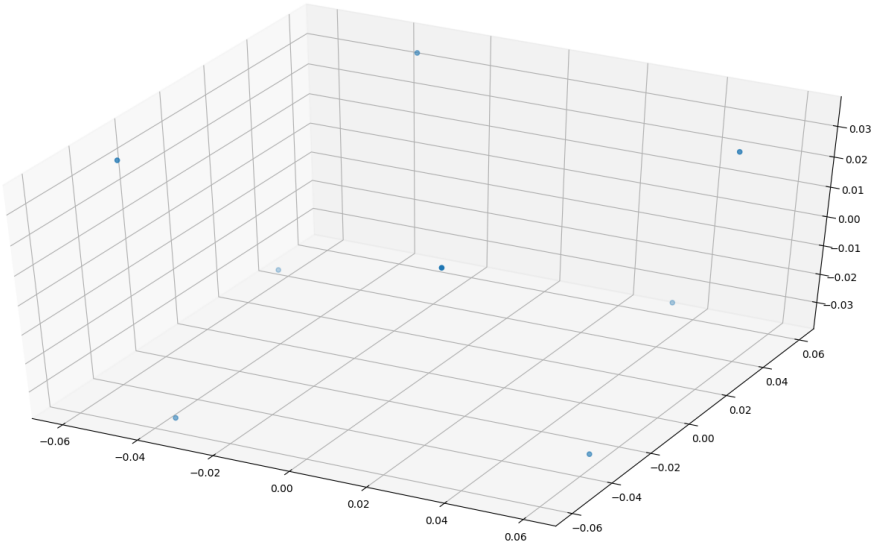

Figure 3: Positions of the microphones on the array

Recordings

The recording were performed in a medium sized room. The drone remained static and was held approximately half a metre above the floor.

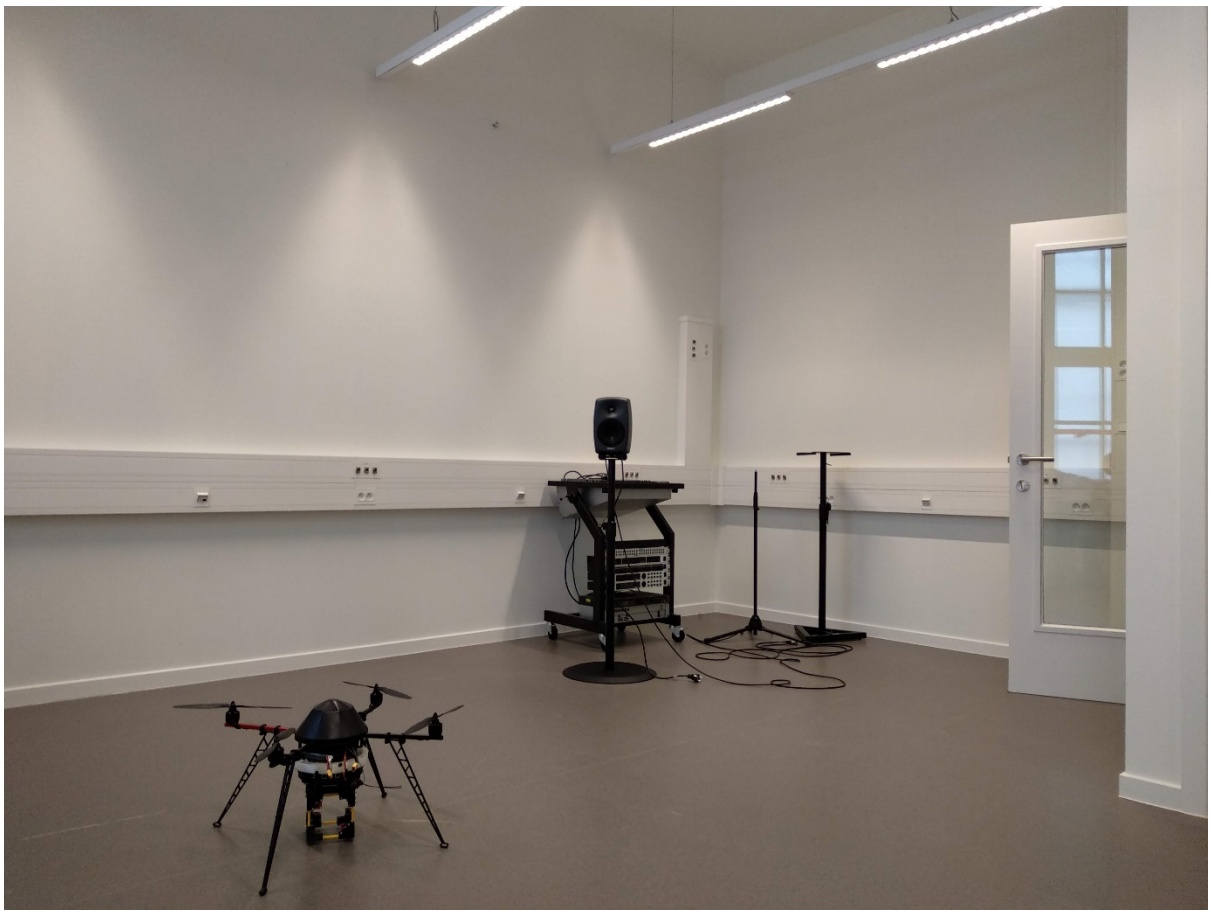

Figure 4: The drone inside the recording room

References

[1] V.-P. Rhéaume and D. Létourneau, "16 Synchronized Inputs USB (UAC2) Sound Card Based on XMOS xCORE-200," 16 July 2018. [Online]. Available: https://github.com/introlab/16SoundsUSB.

[2] V.-P. Rhéaume and D. Létourneau, "Microphones for 8SoundsUSB and 16SoundsUSB," 8 November 2018. [Online]. Available: https://github.com/introlab/xSoundsMicrophones.