Meeting Agenda (Week 7)

26th April 2019, 1PM – 2PM

Attendance:

Members	Attendance
Ben Li	Yes
Jiawei	Yes
Jireh	Yes
Jordan He	Yes
Jose	Yes
Link Geng	Yes
Minh Doan	Yes

Task review:

1. Capture sound with 4 mic array and comparing with USB mic

For the improvement of this version, a threshold was given for the sound input. This was achieved by converting the initial continuous time signal of the sound to a discrete time one through a built-in python package called pyaudio. After this, a noise gate was added which essentially will filter out the peak amplitude of a sound wave below a given threshold. When tested, this would eliminate unnecessary sound capture for background noise including random sound or chatter in the surrounding environment. When no one is speaking, the Mic array would give a default direction value of 0.

2. Finding a way to interface between Raspberry Pi and PC for Raspberry Pi to be recognised as a camera

From last week, the I/O team found there is two difficulties:

1) How to send data from Raspberry Pi to a PC through the USB master mode – there is no open source code available. This will require a lot of hardware coding outside the scope of our project.

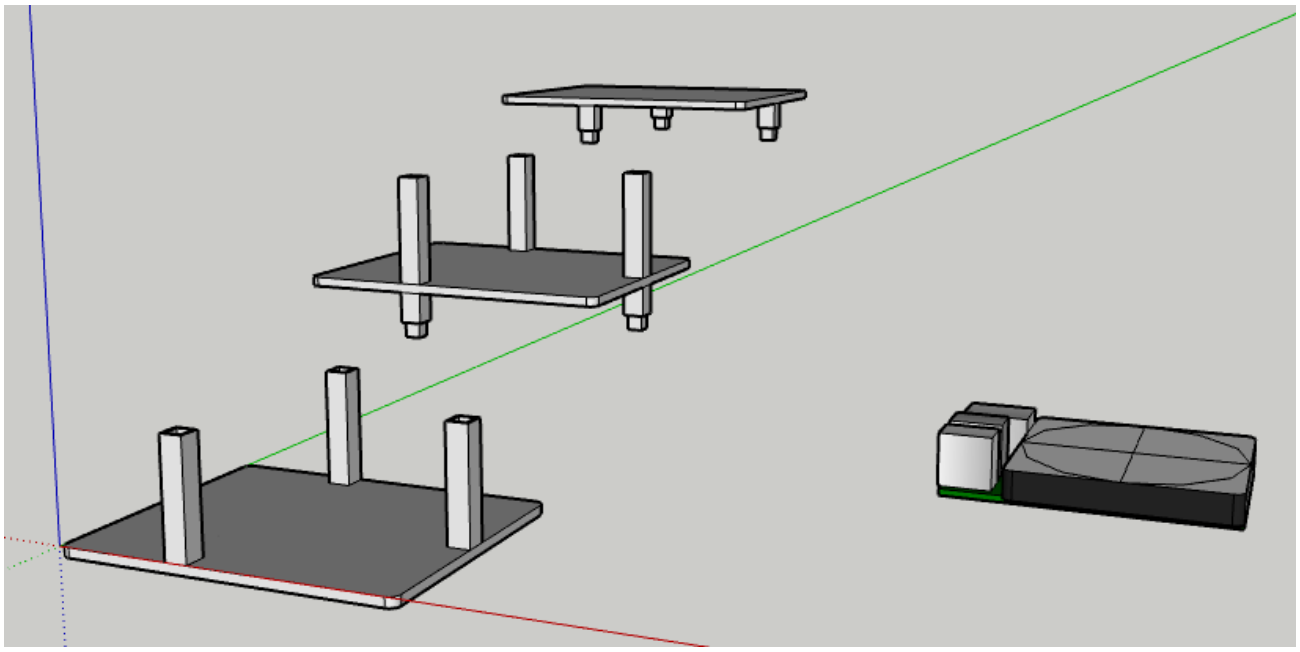
2) How to integrate image and audio from python into a UCV standard, which is the acceptable web cam output format

3. Face detection using neural networking, and de-warping

Originally, the plan was to de-warping before face detection which means that we only need face detection for normal orientation of the image. The image team found that if we do face detection first, the computation resource will be much less for de-warping, so now we will utilise rotation-invariant face detection. The image team is also using progressive calibration network.

Additionally, the image team has devised an algorithm to de-warp the fish-eye input into a panoramic view which can be segmented with respect to an angle.

4. Assembly
The assembly team has created some concept drawings based on the last meeting (26/4) for the casing of the device which may be viewed in the repository.



5. Documentation
The progress documentation has been updated on the repository to include the detailed processes and technical changes made for the device since last week.

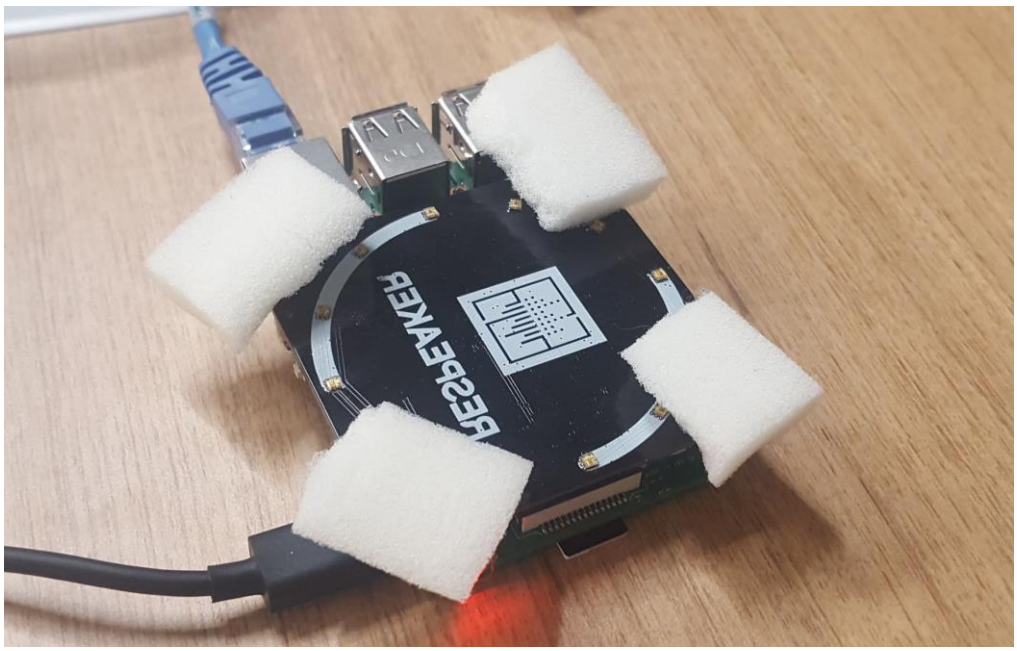
Main objectives:

1. Progress review for each sub-team
2. Making objectives for next week

Points of discussion:

Making objectives for next week
Sound team:
The Mic array was found to be a feasible option for sound capture although with reduced sound quality. The team is therefore presented with a trade-off: if the Mic-array is used for both sound DoA and capture, the amount of USB ports used will be reduced alongside the required costs and size of the device due to the USB microphone not being used. Of course, this would come at the cost of reduced sound quality. The team is still in the process of choosing between the Mic-array and USB microphone for sound input.

Additionally, the sound team has recently discovered that when a foam cushioning is used to surround the microphones on the Mic-array, the sound quality is greatly improved. For this week the team will focus on improving noise cancellation and reducing the size of these foam cushioning to optimise the design. Within the following weeks, the team must also find a way to cancel noise to avoid feedback from the user laptop/PC.



I/O Image team:
For the image team, the team has decided to leave the output format transformation problem for now, and will focus on the image processing including the combination of face-detection and de-warping

Assembly/documentation team:
Based on the team's decision to use the Mic-array or USB microphone for sound capture, the model will have to be updated to accommodate the potential removal of the USB microphone device, thus resulting in potentially 2 layers of the device housing instead of 3. Furthermore, the design may require some slight adjustments in order for the 3D printing process to be feasible (eg. avoidance of overhangs, including some tolerance for the interlocking columns).
In terms of documentation, the changes made by the sound and I/O image team will be updated in the Documentation process.md in the repository.

Critical decision made

No large or critical decisions have been made during this meeting, only minor decisions towards the tasks that need to be completed as shown above. At this stage of the project, the team is focused less on governance of the project and more towards completing the tasks and project outputs.

Task delegation

Sub-team	Team members	Task
Sound	John, Jose	Focus on improving further sound cancellation from the laptop/PC speaker to avoid feedback
I/O	Link, Jordan, Ben	-
Image	Link, Jordan, Ben	Focus on image processing including the combination of face-detection and de-warping
Assembly	Minh, Jireh	Update 3D model for prototype device
Documentation	Minh, Jireh	Work on 2 documentation files