Meeting Agenda (Week 9)

9th May 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:

- Sound team The team has managed to successfully capture sound live using the 4-mic array. They were able to do this through integrating an open source python code.
- 2. I/O team Letting Skype accept camera output
- 3. Image team The team has managed to combine de-warping and face detection algorithms, however, this has resulted in high latency for the video stream the computational power of the Raspberry Pi limits its performance. This is mainly due to the face detection code having several problems; when the image is de-warped it is difficult to implement face detection since the image aspect ratio is very high. In order to solve this problem, the team has found rotational invariant face detection which can be implemented prior to de-warping due to being capable of detecting face for a slightly distorted image.

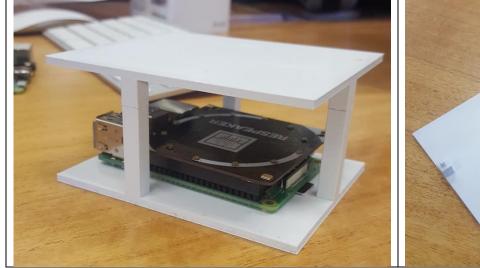




The results has shown to be very good because the algorithm is very robust, although this has caused slight lag-time in video-streaming. Previously, for each frame the algorithm would detect a face, now the team has allowed threading for the face detection, meaning it works independently and sends the face location only when found. Presently, the team is streaming the fish-eye video remotely to another computer through IP camera.

4. Assembly team -

The assembly team has managed to 3D print the designs created on SolidWorks (As shown in last meeting 3/5). In order to accommodate the fish-eye camera, a hole may need to be drilled at the top of the housing assembly.





 Documentation team – 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. What to demonstrate to the client in the next meeting
- 2. What to prepare for the Poster

Points of discussion:

What to demonstrate to the client in the next meeting

As mentioned in previous meeting logs, our client has been overseas for a month and has arrived this week. During our next meeting we will have to demonstrate the current functionality of the device and the challenges faced.

Critical Issues Encountered

- 1. The system will need to utilise the USB Microphone for voice input as the use of 4-mic array for voice input will cause significant delays in the signal. This will be detrimental to the quality of video call. When using the USB Microphone connected to the Raspberry Pi, the output sound quality is good and can be directly used by the PC as a microphone.
- 2. Currently, no open source code or software is available for transferring video signal from raspberry pi to a PC in a way that can be recognised by Skype for Python. All existing methodology of directly linking webcam through raspberry pi is copyrighted and the codes are closed source.
- 3. We considered the use of a pseudo IP camera and have implemented a solution where video signals are captured frame by frame from the raspberry pi, the frames are then pushed to a local network IP address. However, this causes significant delays in the video output. There is an existing open sourced code for utilising the Raspberry Pi as an IP camera, but it is written in Go Lang.
- 4. To implement a true IP camera, the project will need to forgo the use of OpenCV for it to operates as expected. This removes the face detection functionality, however.
- 5. The issues encountered above is due to the team attempting to provide a solution for the Windows environment. We are now considering providing a solution for the Linux environment instead as there is a higher potential of retaining functionalities developed.

What to prepare for the Poster

As a team we have looked at the posters submitted from previous years. More diagrams/flowcharts, and key-words; less walls of text. Highlight the before/after for each sub-system eg. face detection, de-warping, then combining

- Project scope/context
- Emphasise value/innovation of product
- Team structure (sub-teams)
- Hardware components (explain what each part does), can be combined with
- Interface between sub-systems (demonstrates how the system works)
- Results (Sound) image of DoA
- Results (Image) face detection
- Results (Image) de-warping
- Final product image

Critical decision made

Going forward, the team has decided that we are to try and provide a solution using the Linux environment instead of Windows in order for us to maintain the functionalities of the device we have developed. As outlined previously, the system will need to utilise the USB Microphone for voice input as the use of 4-mic array for voice input will cause significant delays in the signal. This will be detrimental to the quality of video call. When using the USB Microphone connected to the Raspberry Pi, the output sound quality is good and can be directly used by the PC as a microphone.

Task delegation

Sub-team	Team members	Task
Sound	John, Jose	-
I/O	Link, Jordan, Ben	Try and provide a solution using the Linux environment
Image	Link, Jordan, Ben	-
Assembly	Minh, Jireh	Will need to print another layer to accommodate the USB microphone
Documentation	Minh, Jireh	Continue documentation