Mid -Air Gesture Inteeraction in Cars

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1 Status report

1.1 Proposal

1.1.1 Motivation

Mid-Air Gestures provide a new way for us to interact with everyday objects. There has already been research done on drivers performing mid air gestures but nothing on passengers. This would allow them to be able to control aspects of the car without distracting the driver.

1.1.2 Aims

The aim of this project is to research what mid-air gestures could be most appropriately used by backseat passengers in a car. This will be done by creating a set of gestures for people to test while being given visual feedback. These gestures will be chosen through a series of surveys and analysis of their appropriateness and if they can be recognised by the gesture sensor.

1.2 Progress

- *Language and Sensor Chosen: Python with a Leap Motion*
- *GUI chosen: PyGame*
- *Background research completed on mid-air gesture interaction and feedback in cars.*
- *Background research on different cars and the features that are included*
- *Conducted a gesture elicitation survey and analysed results*
- *Conducted a follow up survey and analysed results to find most appropriate set of gestures*
- *Created a set of gestures that can be recognised by the leap motion*
- *Basic GUI created that is integrated with the gesture recognition*
- *Rough plan for experiments and evaluations*

1.3 Problems and risks

1.3.1 Problems

I have had several problems with downloading the right version of programs. My first issue with this was when I was downloading the leap motion software and I chose the wrong "kit" and struggled to find the right one. I assumed that no matter what kit you chose, there would be the availability to use python as the website was not very clear. After this, I tried to follow a tutorial and kept getting very confusing errors. I then realised I had a newer version of python than what was supported so I needed to uninstall it and install python 2.7 and there were a lot of path issues. I had no further issues with the leap motion.

As I progressed, I needed to start making a GUI for my experiment. I chose pygame as I knew it would support moving objects. However, downloading pygame for python 2.7 was also very complicated and since I had to integrate it with the leap motion code, I couldn't do it with python 3. Once I found the correct download link, it started to work but then I got an error saying that it didn't support win32. My laptop is win64 and so that is what my python version was. I decided to download python for win32 as my laptop can support it but then my leap motion wouldn't work. I fixed it by changing the leap motion to win32 but these issues took up hours of my time

To choose the gestures that I wanted to incorporate, I had to undergo a series of online surveys with people to ask them what gestures they would do for different actions such as turning up the volume of the radio. Due to me having to watch them, I had to do it over Zoom which was very time consuming

1.3.2 Risks

Due to being in the middle of a pandemic, it will be very difficult to conduct an experiment next semester and to find people willing to take part. Fortunately, there are measures in place at the university where I can have friends and family come and do the experiment in a controlled environment under safe conditions. However, these experiments will take longer than I would like as I will need to clean the workstations thoroughly after each experiment

1.4 Plan

- Weeks 1-2: Finalise Experiment Details and organise participant times
  - Deliverable: Complete experiment plan and participant timetable
- Weeks 3-4: Undergo experiments and evaluations
  - Deliverable: Gestures tested by participants
- Weeks 5-8: Evaluate Draw Conclusions on gestures
  - Deliverable: Graphs and analysis
- Weeks 8-10: Finish Up Dissertation
  - Deliverable: First Draft Submitted to supervisor