Mimic Me

Mimic me is a concept that helps enhance a mundane space (elevators)by encouraging residents of apartments to move outside their comfort zone and explore in an exhilarating and fun elevator ride.

The problem space for this project is enhancing a mundane space. The domain is about spaces that have an unamusing, dull or boring atmosphere that lacks excitement or enjoyment within a certain space. For example, these can be buses, elevators, waiting rooms, cars, or airplanes. Within all these spaces you most likely find people bored, wanting to kill their tome with aimless scrolling on their phones. The teams focus for this project became to help eradicate these areas with low interactivity and create a fun, interactive enjoyment that gives people an additional thrill to their everyday lives. By doing so we aimed to hopefully get people off their phones and get them moving, whether it be a new skill, or just simply entertaining themselves through a physical and digital interaction.

The team had decided to focus on improving elevators as this seemed like a dull area that could be more interactive and fun. Given that an elevator is a moving rectangular prism this gave us plenty of space to think of ideas. Specifically, we produced two interactions one for a single user and one for a group of people. The single user's interaction starts after they select their floor, before the elevator starts moving the elevator gives the user image with someone posing, in which that would have to mimic. If they can copy the pose then the elevator continues to the floor they selected, if not than they have unlimited attempts to try again. For multiple users, once they arrive in the elevator, one user is presented with a word which they must act out for the others to guess (just like a charade game). Once one user correctly guesses the charade word out loud, the elevator continues to the floors selected.

My project aims to follow these guidelines whilst also being focused specifically on residential people. Based on Rebekah Rousi's research within 'Designing the user experience of elevators' it is apparent that the design and interaction of the elevator must accommodate these users based on their age demographic, gender, and cultural background. Thus, the interaction should be hands free and easy to use for anyone who uses the elevator (people aged 0 – 100). In doing so I want people to move outside their comfort zone and make their everyday interaction with an elevator to become more thrilling. Since those who live in apartment complexes use elevators every day when leaving and coming back home, this audience seemed perfect. [1]

YouTube Link: https://youtu.be/6oKRlWFiLco

[1]Rousi, R., 2016. Unremarkable experiences - Designing the user experience of elevators. Swedish Design Research Journal, 11, pp.47-54.

Design Process

The projects design to enhance a mundane space has gone through several iterations since the beginning. Initially the idea that Team CDI has created was an elevator that required the user to dance specific dance moves, if the user performed the correct dance moves than they would be taken to the desired floor. If the user dances incorrectly than the elevator would only go half the way and the user would then be required to walk the rest of the way up. This idea seemed like it was prefect, being physical, interactive and in a mundane space. After the class presentations and feedback from peers we were proven wrong. With a lot of feedback from peers specifying that elevators are used by several people at once, dancing would become incredibly hard. Some people suggested that people may also be unable to dance or walk up stair if they have body limitations. The ideal outcome was for one user to use this prototype at once, but during feedback it was also suggested to use this space as a collaborative tool for others to interact with.

With this feedback the team went in the direction of both single user and multiuser interaction. After some brainstorming and research, we then came up with the current idea for the elevator, a mimic pose game for a single user and the charade game for the multiple users. The reason for the change being that the feedback opened the possibilities and limitations that an elevator had. Although this prototype is intended for the ideal user in an ideal world, we thought we could work on something that would interact with users better. By having multiple users in our project, it became more realistic but also opened more possibilities to enhance a mundane space. One of the major key points from the feedback that I resonated with was the question 'What If someone was in a hurry?'. From this question, I suggested to the group that we come up with something that is quick and easy that won't leave users frustrated that their time could be potentially wasted. My design has not strayed away from this iterations purpose. For my final iteration I do aim to have both single user and multiple users' interaction, for this prototype I only focused on getting the single user interaction completed.

Before I started building the prototype, (given the new idea) interviews were conducted with users to discover their day to day use with elevators within their apartments complex and how they interact with them. Some of these interviews were done in person and some online so the feedback and conversation flow varied, some users gave valuable feedback where others lack depth that some could have in person. The following is a set of questions that were asked towards users:

- Taking the elevator every day, do you find it tedious ? or do you think that it gives you a bit of time for peace and quiet?
- Do you believe that elevators can be a dull space, what do you do while waiting for it to reach your designated floor?
- Is there anything that you like or dislike about elevators specifically?
- When do you find yourself using the elevator? If given the chance to take the stairs, would you prefer the stairs over the elevator?
- Do you find yourself having your hands full when entering an elevator, whether that be groceries, luggage, or work bag, what do you do to select the desired floor?
- If you were required to perform a game before the elevator moves, would you participate in that or would you be reluctant?

From these questions, I was able to get valuable feedback from users. The most important information that was relevant from each user was that when in the elevator they do find it tedious to use to get to and from their apartment. User also stated that apartment owners tend to make the elevator livelier by placing artwork in the elevator. An example from the user was that they currently have children's artwork installed, she stated "although it's nice for something different, it only takes so many trips too view them all". Thus, even complex owners are addressing the issue of a the mundane space of elevators.

Design Process

Users said that when in an elevator, they just stand there waiting, scroll on their phone, look at themselves in the mirrors or watch the floor numbers go up on the led screen. With this feedback I ensured that users were entertained when in the elevator. Given that the prototype idea focuses in-between the time the user walks into the elevator and when the elevator moves again, there is still a period of time filled with nothing when the user finishes interacting with prototype and when the elevator reaches the floor. To overcome this, I planned to have an optional activity for users to interact with so that they can pass time a bit easier while reaching their floor. Seeing as this wasn't the main focus of the porotype functionality for this iteration, I am using an external website's webcam game for the users to interact with (if they want to) while waiting to reach their designated floor. The last major key point from the interviews conducted was that every user has found themselves at one point with their hands full which has made their everyday interaction with an elevator difficult. Some users stated that they hate to put their belongings down on the floor, where others state that they try and use one finger or even their elbow to click their desired floor. I have ensured that all the poses that the elevator gives the users are poses that do not require the use hands or finger gestures. Thus, allowing anyone, even if they have their hands full, to mimic the pose.

After interviews I looked into the build of the prototype. First, I built the elevator frame using the squat rack design as I knew this would take a couple of days. The reason I designed and built this was to try and simulate the experience of users being in an elevator (due to COVID-19) while using the prototype. In doing so I hoped to get a similar reaction when testing with users compared to a real elevator. After the build of the elevator frame, I then looked at the prototype's functionality. At first, I investigated the multiuser interaction which was getting the speech to text to work within JavaScript. After working through this for a bit and hitting a wall I decided to investigate the single user interaction. First, I looked into TensorFlow an end to end source platform machine learning platform. My first testing was using an AI JavaScript code that used saved images to compare with the live web-camera. Although after further investigation with my own coding I found that in the long run this wouldn't work due to storing existing images and comparing to the live webcam. After realising that the single user interaction might be more difficult, I decided to make this the focus for the first prototype.[2][3]

After Tensflow I found an article about the Comparison of Human Poses with PoseNet' this then lead me to find 'Move Mirror: An AI Experiment with Pose Estimation in the Browser using TensorFlow.js' which from there I was able to follow along and create the prototype system that I have today. [4][5]

The Design process for this project follows Hartson's and Pyla's The UX Book Design Lifecycle, where there is constant iteration process for each aspect for the project. After a prototype has been completed it re-iterates till it becomes the ideal prototype in which it becomes the finished product. Below is the Design for the Design Lifecycle. [6]

[2]Converting from Speech to Text with JavaScript. (n.d.). Tutorialzine. Retrieved May 10, 2020, from https://tutorialzine.com/2017/08/converting-from-speech-to-text-with-javascript

[3]TensorFlow. (n.d.). Retrieved May 5, 2020, from https://www.tensorflow.org/

[4]Garg, P. (2019, May 12). Comparison of Human poses with PoseNet. Medium. https://medium.com/@priyaanka.garg/comparison-of-human-poses-with-posenet-e9ffc36b7427

[5]TensorFlow. (2018, September 27). Move Mirror: An AI Experiment with Pose Estimation in the Browser using TensorFlow.js. Medium. https://medium.com/tensorflow/move-mirror-an-ai-experiment-with-pose-estimation-in-the-browser-using-tensorflow-js-2f7b769f9b23

[6]The UX Book- Process and Guidelines for Ensuring a Quality User Experience, Rex Hartson.pdf. (n.d.). Retrieved May 5, 2020, from https://www.docdroid.net/JaTCSqX/the-ux-book-process-and-guidelines-for-ensuring-a-quality-user-experience-rex-hartson-pdf

Interaction Plan

The interaction paradigm for this prototype is ubiquitous computing (also known as persuasive computing). Ubiquitous computing is the embedment of computational capability into everyday objects to make them communicate and perform tasks. This can occur at any time of the day on any device, with any means of data. Seeing as this project is using both camera detection and voice recognition this falls directly into the category.

The first structure and sequencing of the user and system for the single user includes the following:

The user enters the elevator and clicks their desired floor on the buttons panel. This button press is connected to the Arduino Uno. The Arduino Uno code receives this button press and returns a binary data to a serial port (Serial.Write). At the same time, unity is running with code that is set up so that if there is specific binary data at the specific serial port it than opens local host (using Xampp) within google chrome. The local host contains a website that than displays a live camera feed of the user alongside an image of someone posing, above this is the instructions for the user to pose. This screen is then duplicated onto an iPad which is above the button panel acting like an elevator screen. The website uses PoseNet and a Cosine-similarity to detect if the user is posing alike the image. If they are than the website congratulates them for matching the pose and redirects them to an interactive game they can play while they wait for the elevator to reach their floor.

The second structure and sequencing for users and system for multiple is the following:

The users enters the elevator and clicks their desired floor on the buttons panel. This button press is connected to the Arduino Uno. The Arduino Uno code receives this button press and returns a binary data to a serial port (Serial.Write). At the same time, unity is running with code that is set up so that if there is specific binary data at the specific serial port it than opens local host (using Xampp) within google chrome. The local host contains a website that than displays a terms and conditions as well as instructions. This screen is then duplicated onto an iPad which is above the button panel acting like an elevator screen. The users are then able to accept the conditions or leave the elevator. After clicking accept the website is redirect to another website which uses voice recognition to store words in an array. One user reads the charade word of the screen and the other users turn around too not cheat. The user who read the charade word starts acting that turned around users start guessing. Those guessed words are saved to an array using the voice recognition. If the user guessing, gets the answer correct then they are able to click the check answers button on the screen. The button then sends an event trigger in JavaScript to detect if the words said is the charade word given. If the word is correct than the website congratulates them for getting it correct and the elevator starts moving.

By participating in these fun and different experience from normal elevators I want users to not be disappointed when having to use elevators. I want them to be excited and have fun when coming to and from home.

Interaction Plan

The intended user journey for the prototype as a single user can be seen within the following scenario:

Scenario 1 (single user)

The user is a 27-year-old female who has just arrived at her apartment complex from grocery shopping and parked her car in her designated car park. She gets all her groceries (hands full cause no one takes two trips) and heads to the elevator. She manages to release her pinkie from the forceful weight of her reusable bags in her hand and clicks the elevator button. The elevator arrives straight away. She walks in and clicks her floor. She is than greeted with the message and voice clip explaining what she must do for the elevator to move. After reading the message she complies with the activity. She slowly struggles to raise her hands in the air as she mimics the pose. First scan and she gets it right. The elevator starts to move, and the screen greets her with an optional game to play to pass the time. Sadly, her hands are full of groceries. The elevator doors open and she walks out.

The intended user journey for the multiple users can be seen in the following scenario:

Scenario 2 (multiple users)

Two brothers (21 and 19) have finished surfing at the beach and are waiting in their lobby for the elevator. Their elevator arrives and they walk in with another person (female 26). The brothers and female click the buttons for their designated floor. Before the elevator starts moving, they are prompted with a message for the rules of the charade game on the elevator screen. They all agree to it and click accept. In the rules it requires that only one person look at the screen for the next 5 seconds. The two brothers turn their backs, and the female reads the word on the screen. The two brothers then turn around and the female starts acting out the word. The two brothers shoutout words till one of them guess correctly. The users here a loud double ding (signifying their answer is correct) and the elevator starts to move to their selected floors.

Project Objectives and Success Criteria

The outcome for the project is intended to be a functioning body pose scanner and speech recognition system that allows users to participate within the projects without the need for help. For the users to be able to experience the intended use, there are some objectives that need to be obtained:

	Objective	Criteria	Measure
1	An automated system that can inform the user vocally what the objective of the prototype is.	To be able to experience a hands free and easy experience for the user, the system needs to be able to directly tell the user what is required for the elevator to move. The user shouldn't be needing to read the display to understand what is required as this creates wasted time for the user.	After button press the system needs to be able to explain to the user what needs to be done without error. This needs to be done within 5 to 15 second.
2	Able to pose within the elevator space with multiple poses with easy.	Users are able to pose easily and swiftly while being hands free. As apartment owners may be bringing items to and from their complex the poses must be able to be completed without much hand motions.	User need to be able to complete any pose given by the elevator without any discomfort. Users should be able to complete pose within three attempts at most.
3	Able to play a charade game within the elevator without the need of touching the interactive screen.	To accommodate users and enable them to complete the task swiftly, the users should be able to speak potential charade answers without the need to interact (or look) with the touch interactive screen.	Users are able to speak different answers out loud and the system be able to record those words and save automatically.