Power Pose Elevator

*An interactive elevator that tests out how office workers react to gestures from charades*

The problem space for this prototype is to make a mundane space enhanced. The chosen space that has been identified is to enhance the space of elevator rides with a focus on the audience of office workers. This relates to the overall teams concept as an interactive elevator that the overall team wanted to incorporate was to for a single person, the elevator gives the user an image of a human silhouette posing. To continue, the user must pose the same for the elevator to move. This is similar to what an Xbox Kinect would entail in their interactions.

The related work that this prototype came from was Google's Move Mirror which used an open source tool called Posenet (see design process) which will be also used for this prototype. It allowed users to do poses and while this was happening a skeleton of their body would outline on them.[2]

A piece of literature that this was also inspired by was a paper written in the International Journal of Engineering Research & Technology (IJERT) about a system a few researchers from the Fr. Conceicao Rodrigues College of Engineering developed presents a simple method to compare users' real-time pose with any selected pose. The system uses PoseNet algorithm for real-time pose estimations. The pose comparison algorithm used in system allows a person to compare his/her real-time pose to check if it is successfully imitated. [1]

YouTube link:
https://www.youtube.com/watch?v=UoRVyo3eaYM
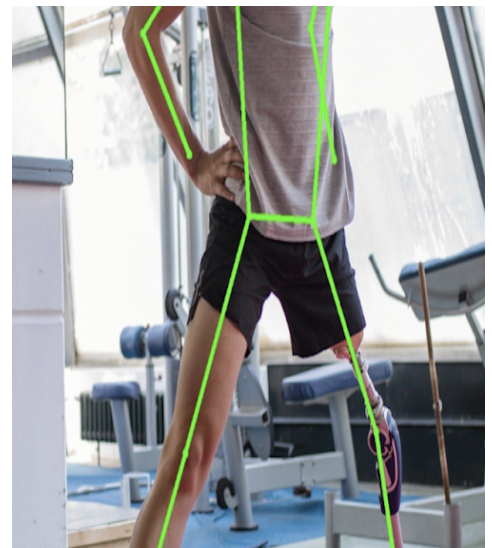
[1]"Match Pose - A System for Comparing Poses", *International Journal of Engineering Research & Technology (IJERT)*, vol. 8, no. 10, 2019. [Accessed 20 April 2020].

[2]"Move Mirror: An AI Experiment with Pose Estimation in the Browser using TensorFlow.js", *Medium*, 2018. [Online]. Available: https://medium.com/tensorflow/move-mirror-an-ai-experiment-with-pose-estimation-in-the-browser-using-tensorflow-js-2f7b769f9b23. [Accessed: 20-Apr- 2020].

Design Process

In order to create this prototype, an iterative design process was incorporated (see diagram).

To explain this process in more depth, the first thing that was done was to understand the requirements for this. To do that, some online interviews were conducted with users in particular office workers to see what sort of interactions can be done in the elevator space. From these interviews, it was apparent that many users had different opinions on the space.

However, it was decided as the interesting context on one particular member that the space could be utilized to do a pose to "hype themselves up for an interview or try to instill confidence in them". I wanted to explore this further as a prototype as this fits in perfectly with the audience of office workers

Some research was conducted into gesture based interfaces and what tools were available to get this to work. In this research, an interesting development tool became apparent in Posenet, an open-source tool that allows any web developer to play with body-based interactions, entirely within the browser.[2] From this, some research was done into how an Arduino could be used with Posenet. Some videos were watched on this, and from advice given from staff, it was apparent that Arduino was not necessary for this prototype to be developed.

After this was discovered, the poses that the users were going to do needed to be figured out. Research was done into these and two poses that the users could do were found. In 2012, Harvard Business School professor Amy Cuddy gave a now famous TED Talk on the benefits of "power-posing,". These poses were the Mick Jagger and Wonder Woman pose. It further explores the benefits of mimicking the body language of powerful people. She argues that power-posing can be more effective than traditional confidence-boosting exercises, like telling yourself how great you are. She describes power poses as expansive and open. When you adopt one, you take up a lot of space

and hold your arms and legs away from your body. For example, in "The Wonder Woman" power pose, you stand with your feet apart, your hands on your hips, and your chin tilted upward. [3]

Once this was done, it was checked against the chosen audience using a simple card sorting technique online that gave them several images with poses and they needed to sort them into categories like confidence and assertiveness. From these results, most users were able to sort the Mick Jagger and Wonder Woman pose into the confidence category.
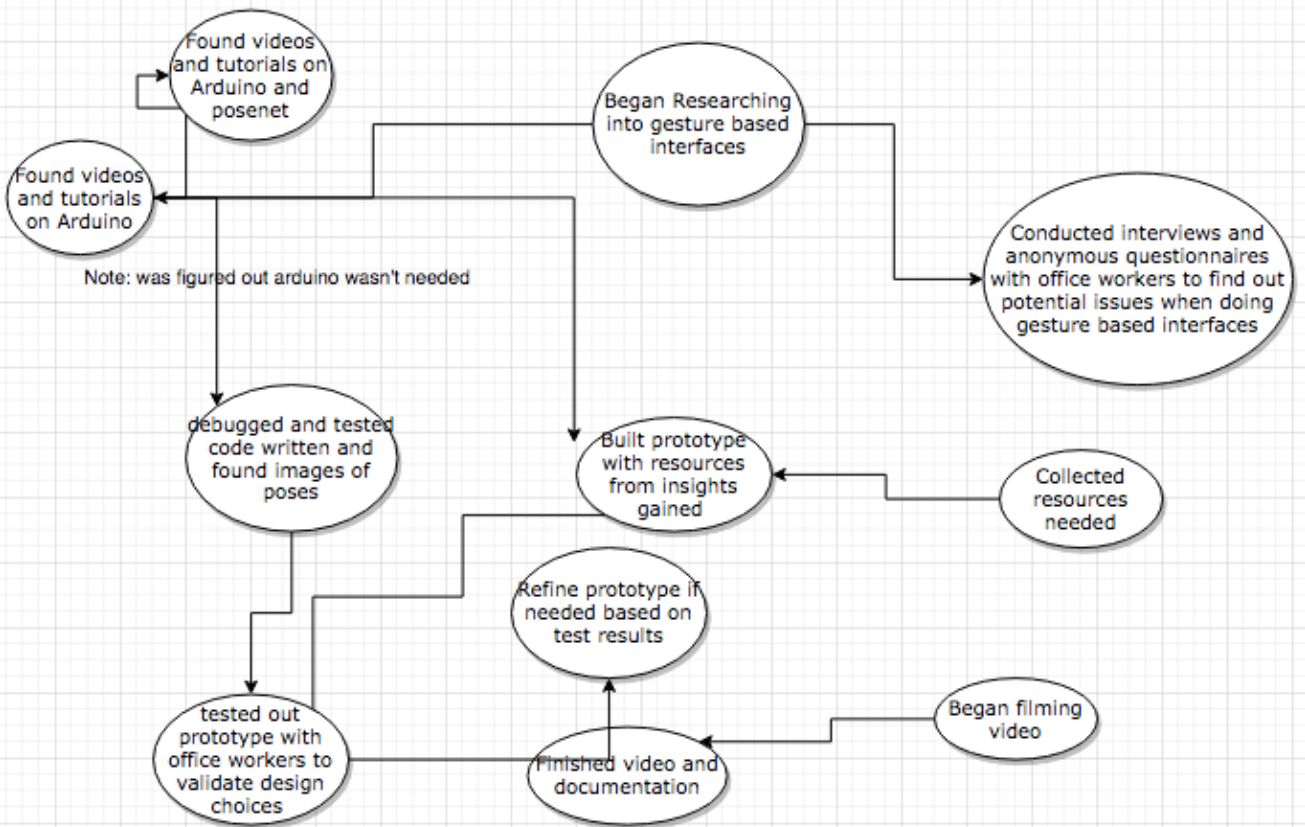
The development stage did have some issues as a small learning curve was needed at the beginning. After this stage, originally, the prototype would try to determine if the poses can be matched using cosine similarity. Cosine similarity is a measure of similarity between two vectors: basically, it measures the angle between them and returns -1 if they're exactly opposite, 1 if they're exactly the same. Importantly, it's a measure of orientation and not magnitude.[2]

After development was completed, the prototype was tested with users and interviews were conducted after for data collection, and insights on the prototype if anything could be refined.

[2]"Move Mirror: An AI Experiment with Pose Estimation in the Browser using TensorFlow.js", *Medium*, 2018. [Online]. Available: https://medium.com/tensorflow/move-mirror-an-ai-experiment-with-pose-estimation-in-the-browser-using-tensorflow-js-2f7b769f9b23. [Accessed: 20- Apr- 2020]

[3]"The 'Power Poses' That Will Instantly Boost Your Confidence Levels", *Inc.com*, 2020. [Online]. Available: https://www.inc.com/business-insider/amy-cuddy-the-poses-that-will-boost-your-confidence.html. [Accessed: 20- Apr- 2020]..

Design Process

Found videos and tutorials on Arduino and posenet

Found videos and tutorials on Arduino

Note: was figured out arduino wasn't needed

Began Researching into gesture based interfaces

Conducted interviews and anonymous questionnaires with office workers to find out potential issues when doing gesture based interfaces

debugged and tested code written and found images of poses

Built prototype with resources from insights gained

Collected resources needed

Refine prototype if needed based on test results

tested out prototype with office workers to validate design choices

Finished video and documentation

Began filming video

Interaction Plan

The chosen interaction paradigm for this prototype will be that of an ubiquitous computing nature as the prototype will attempt to sense when a pose has been performed and decide whether the pose matches the charade that is trying to be emulated i.e. (proactivity).

The structure and sequencing of the interactions will go like this:

User	System
Person enters elevator and chooses level	Randomly choose power pose to perform from list of poses
Person attempts pose/charade to be performed	Checks that pose is correct or incorrect
Person sees message and exits elevator at level	End of system

Interaction Plan

From the diagram below, it illustrates the steps taken for a user to go through the prototype and what will happen if something is done right or wrong i.e yes and no. From this diagram, the intended user journey is that the user will enter the elevator They then get given a pose to try and emulate. if they get it right, they get a quick positive message. If incorrect, they get a quick inspirational message to smash the day out.
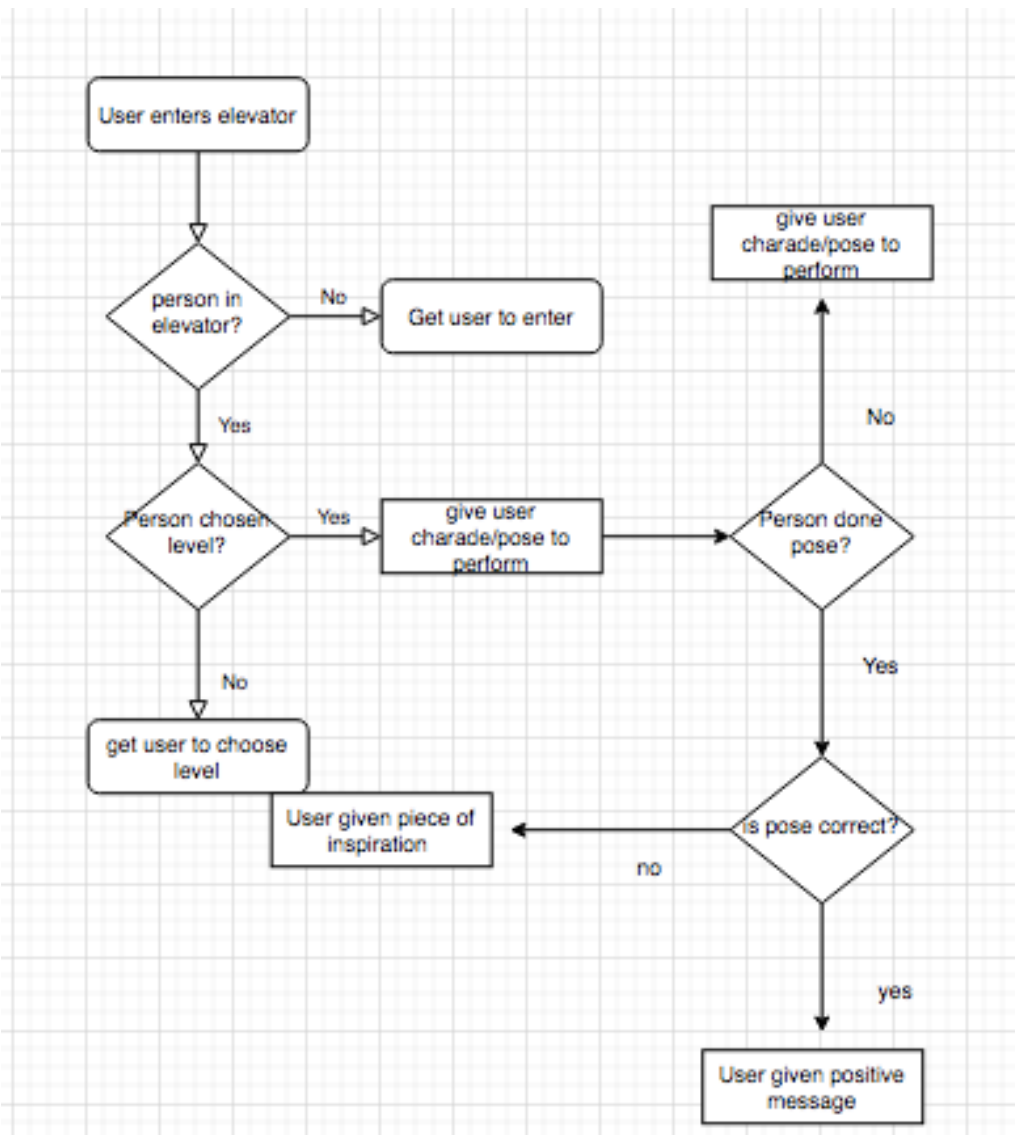
Project Objectives and Success Criteria

The following table represents the success criteria that the prototype will have in order to fulfil the intentions of the concept & the brief.

Objective	Measures	Success Criteria
User is able to pose given power pose in space	Observe how many attempts they try and see if they can easily perform it in space	If user is able to at least attempt the charade in the camera room without having any real issues like space and time
People are more positive after using the concept	Observe people entering and leaving elevator Interview users to see if they were inspired and confident from the message	60% of user satisfaction after exiting elevator is positive Users are generally positive in their responses
User is able to interact through the prototype	Observe how user interacts with prototype	User has no massive issues with the concept