Lab section F01

Project Deliverable B

Introduction

The purpose of this document is to empathize with our client and truly understand their problems, limitations, frustrations, desires, and needs. And then translate their statements into a list of interpreted needs. Finally, organize and prioritize their needs and formulate a problem statement.

Client Statement and Observations

The following is the list of client statements and observations made by the team during the client interview:

- For the Surface tension:
    - The main ideology behind building the surface tension was to have an interactive wall frame that could relate to math and science, based on the building's primary usage
    - The client mainly wants us to add more interactive features to the already established 'Surface Tension'
    - A major problem with the use of surface tension is that, the motors installed in between the triangles to move them are noisy
    - The client also wants us to find a way so that the maintenance of the surface tension is made much more easier and infrequent
- For Equilibrium:
    - The client wants us to improve their already installed function and make it much more efficient
    - To make equilibrium look more aesthetic infinity mirrors or additional lights could also be integrated into the piece
    - The option of adding sounds to the piece was also brought up

Customer Needs

Our clients had a few needs for the surface tension project and a fair bit of needs and concerns for equilibrium. The surface tension client stated that the motors were fairly noisy and that the best thing would be to replace them with stronger or better quality motors to be quieter. Our client also mentioned a way to fix the noise issue without replacing the motors could be to have lighter panels. Another concern is the longevity of the 3D printed panel vertices and the motors, every few months the vertices would need to be replaced because they were falling apart so fixing this would be a good idea. As for Equilibrium, our client needed for us to find a better way to wire the sensors or replace them because they are not functioning well, there was a huge power consumption concern which lead to the LEDs not working to their full capacity

because they need to consume under 100 W of power to be CSA approved. The components that need to be fixed can be accessed through the railings of the staircase where the sensors are located and the power box found under the staircase. The addition to equilibrium must have the piece as a whole be roughly under 1000lbs. Considering the piece is already 100-200 lbs, there is a lot of room for the inclusion of more design ideas. Having music play was a thing that they planned originally but it never caught on so the client desired such an aspect of the design. Overall both projects have a shared need of being a simple prototype that did not interfere with the functionality of where ever it is displayed, to operate within the jurisdiction of the building, to make it an efficient addition to the project, and have it complement the design.

General Problems and Ideas

Equilibrium:

The vision of the team that developed Equilibrium was to have a seamlessly working system that accurately registered the number of people walking on the stairs, that changes the LEDs according to the volume of people.

The sensors currently being used for Equilibrium have a tendency to fail due to a disturbance of frequencies in the open lobby of the STEM building. This results in a failure of the LEDs as the sensors cannot properly detect the number of people on the stairs.

Solving this issue would require different sensors that are able to compensate the frequencies in the room or a debugging of the code that is currently being used.

Surface Tension:

The conceptual design of Surface Tension was an integrated system that would perform efficiently while being structurally sound.

The current motors being used which allow the triangle panels to move are close to the max capacity, causing them to be noisier than needed. Along with the noise, the 3D printed panel vertices are not built to the best quality, forcing them to be replaced every six months.

A lighter triangle panel would reduce the amount of work the motors have to do, reducing some of the noise. The 3D printed panels can be made from a different material that will remain functional throughout the life of the project.

Problem Statement

In conclusion, our equilibrium prototype should keep weight and power consumption to a certain level while making an attractive, sexy, low maintenance, simple, cohesive modular design that provides a fresh interactive functionality.