GNG 2101 - Report
Waterproof Hearing Aid
Deliverable G - Prototype 2

Written By:

GNG 2101 - Team A4

Omolola Omowa, 300130234
Benjamin Losier, 300051021
Brandon Joseph Broderick 300128727
Rehana Lawrence, 300124577
André Lacroix, 300117612

Submitted On:

Thursday November 5th, 2020
University of Ottawa

Table of Contents:

Introduction 3

Client Feedback 3

Prototype 2 4

Introduction

The main purpose of this report is to discuss our second prototype and all the details associated with it. We will first go over how our third client meeting went and describe the things our client liked/disliked about our design. Then we will give a detailed description of our second prototype including sketches and pictures to clearly show the prototype's final state. The last part of this report will compare the results of our second prototype with the target specifications.

Client Feedback

This week we had our third client meeting to get feedback on our first prototype so we could ensure our design meets the client needs and make any necessary adjustments to our design. The first thing we showed our client was the conceptual design of our prototype, she was satisfied with the aesthetics of the design since it is discreet. This was important since the case should not affect her usual daily activities by being too big or causing discomfort. The next thing we discussed was the app to calculate the remaining battery life of her hearing aid. We showed her multiple designs that included the user interface of each so she could have a good idea of what the final result will look like.Pictures of the design will be shown below. She chose the second design since it was more convenient and relied less on her memory. Overall our client was happy with the progress of our project and with the overall design we showed her.

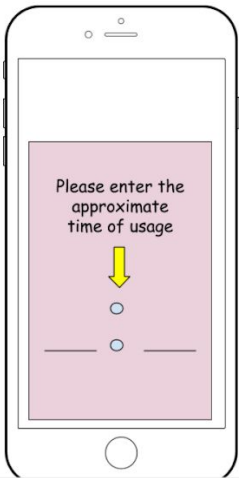

Figure 1.0 Option 1

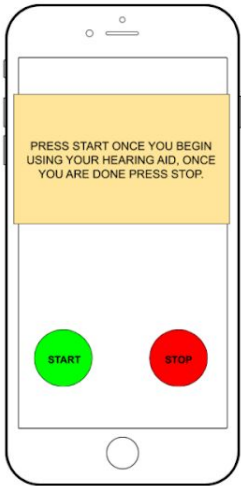

Figure 2.0 Option 2

Prototype 2

Similar to the first prototype, we have split our second prototype into two different sections. One more focusing on the case and its functionality. The other part of this prototype focuses on the formation of the app and the calculations for battery life.

As stated in our last prototype our case will be made out of ABS material. We were recommended to test the resistance of the material in terms of extreme weather cases. Since the material is plastic, it is obvious that it will not be able to withhold extreme heat otherwise it will melt. Although it is practically impossible for it to reach such a high temperature outside, there will be a warning label to keep the case away from very hot surfaces such as stove tops. We also needed to test the ability of the case to withstand cold temperatures. Through research of the properties of ABS, we have found that the quality of it starts to decrease at about negative 20 degrees celsius (-20℃). The case should be stored at room temperature for longevity and best results. Further testing will be done once we are able to get a physical representation of the case.

In order to properly test this, the ABS material needs to be exposed either directly to sunlight or left out in the cold over a long period of time. Unfortunately we don't have such a timeframe so instead we just researched how durable ABS materials are under certain weather conditions. From research we discovered that when ABS is exposed directly under outdoor sunlight over a very long timeframe it begins to yellow in colour due to UV radiation, but when exposed outdoors to a drastic cold weather it doesn't have much of an effect. Taking this to account, the case being designed with ABS material is not going to be exposed directly to sunlight enough for it to yellow or deform. This still makes ABS a suitable material for the design.

3D Model:
This preliminary design of the case demonstrates the idea behind it's functionality. The client's hearing aid will be enclosed within these 2 ABS shells that will fully cover the hearing aid.

How it's made:
This 3D model was designed using scalable vector graphics (.SVG file) and a direct profile view picture of the client's hearing aid. Using photo editing software to convert the profile view into a silhouette type view it is possible to convert the image into a usable .svg file. This profile can be directly uploaded into fusion 360 CAD software to create a fully defined sketch.

Future improvements to the design:

Functionally at least 2 dimensions of the client's hearing aid will need to be provided to

ensure the case properly encloses the device and sections of the case will need to be removed to allow room for the button and the wire connected to the ear piece and joint's will need to be created to secure the parts to one another. Aesthetically, the overall flow of the case can be improved by filleting the edges for a more comfortable and appealing design.

Conclusion

Through our third client meeting, we were able to further our design specifications to produce more intricate and performative designs. The case is ready to be printed for trial and the app should be functioning in the near future. Once the case is printed it will allow us to determine early on if the model meets specifically what the customer wants and what we have to modify. We plan to have all components of our design connected and fully functional by Design Day.