Project Deliverable D - Detailed Design, Prototype 1, and BOM

GNG2101

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Group E14 - SensAct User Interface

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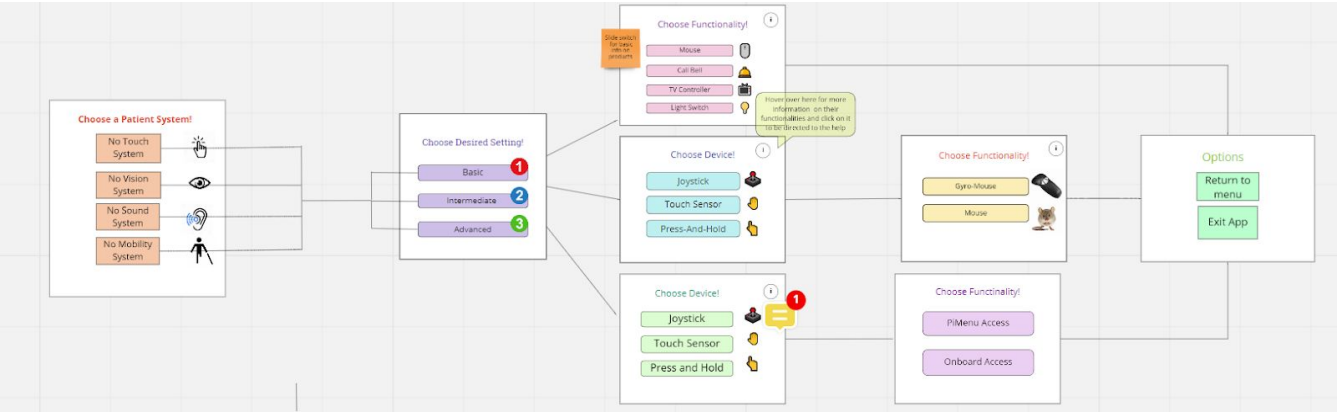
Introduction

A skeleton of our idea that we got from project deliverable C will be made during this deliverable. The screenshots of this prototype will be posted in this deliverable and shown to our client in our next client meeting. His feedback will then be collected. Based on his feedback, we will make evaluations of our current prototype then make necessary changes to our project plan and the focus of this project.

Client feedback

For our client meeting we showed him our conceptual designs, final design and our



current prototype for feedback.
Figure 1: Final Design Concept in Miro

Before our official client meeting, our client sent an email of previous prototypes for reference. From that we had to change our design from our visual representation shown in the previous deliverable. For our final design the client's feedback was that he believes we got the main idea of what he would like to have in the interface. The diagram of the final design showed all the components he wanted were included. The user interface design was created in Miro, as shown in Figure 1, however was changed slightly based on Node-Red limitations. We then proceeded to show him our current prototype to obtain feedback on our progress so far on the project.

Prototype Feedback

- He really liked the audio feature that reads out instructions as he believes that it is a needed setting.
- He thinks that the prototype is really good and that overall we understand the issue with the current interface and we were able to translate it into a design and prototype.

- He was surprised that we were able to create the prototype in node-red, and although we do not have all the tools or information we were able to get the appearance of the dashboard the way we wanted.
- He understands that we were unable to look at functionality yet, so he wants us to add a serial node which connects to the sensact. In node-red the command will be sent through the serial and we should be able to test it with user profiles.
- What the client desires at a base level has been completed, going forward, he mainly wants us to focus on the basic user interface functionality because of the time limit and the intermediate and advanced parts are additional goals.
- He wants us to try the interface with a variety of different kinds of people who have no idea what sensact is or how it works, and test if our interface design is simple and intuitive enough.
- Overall, he is impressed with the progress that has been made with the interface and wants a refined prototype that is usable and able to be tested.

Updated and detailed design of the concept: Prototype 1

Software prototypes:

Our final design and first prototype is slightly different from one another because of limitations with Node-RED that we were unaware of. Our objective for the first prototype was to tackle the design criteria which had to do with appearance and usability and not functionality. Specifically, we wanted to ensure our design could be created in Node-RED, and the design was simple, intuitive, and easy to follow/understand. Thus we essentially created a template of how we would like our user interface to function without implementing the actual functionality yet. After familiarizing ourselves with Node-Red some more we changed the prototype to the following design:

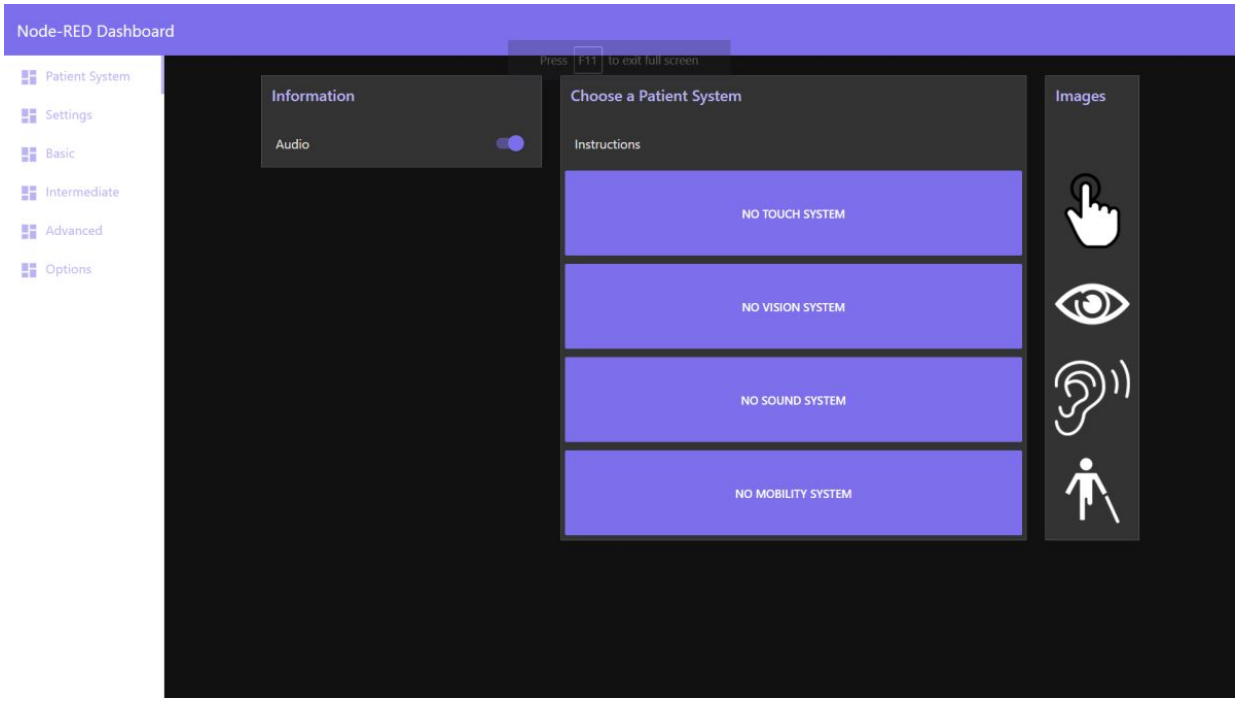


Figure 2: First Screen of Prototype Presented in Node-RED Dashboard

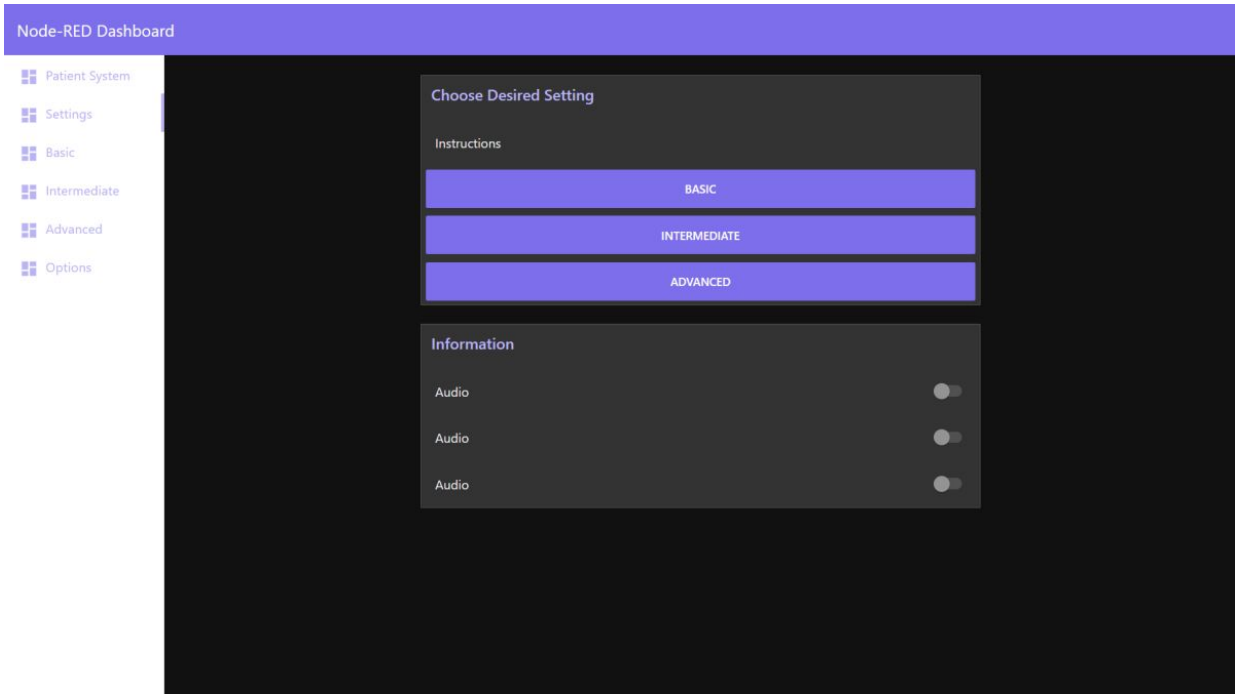


Figure 3: Second Screen of Prototype Presented in Node-RED Dashboard

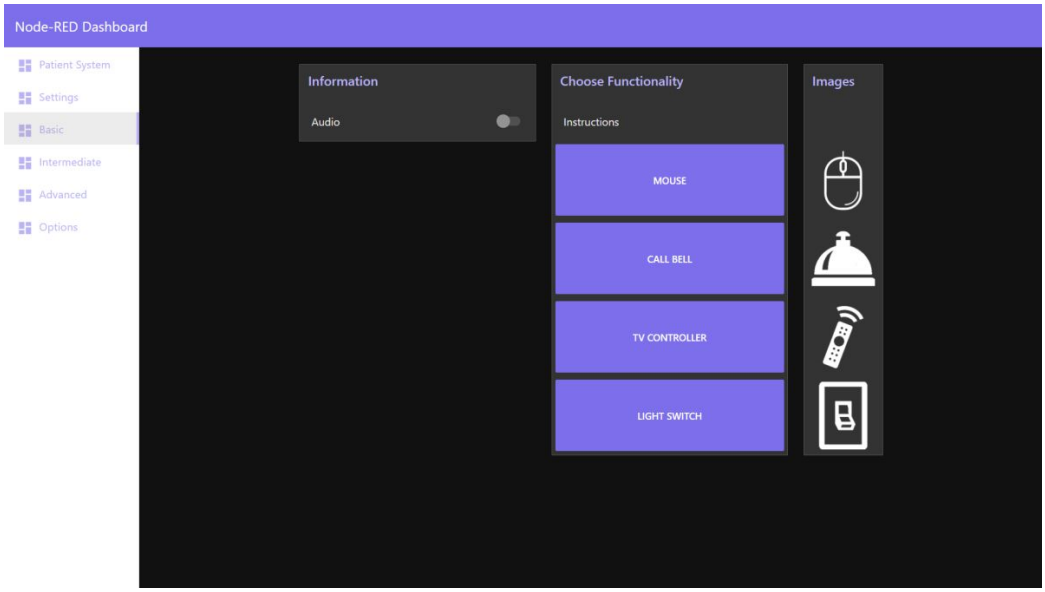


Figure 4: Third Screen of Prototype Presented in Node-RED Dashboard

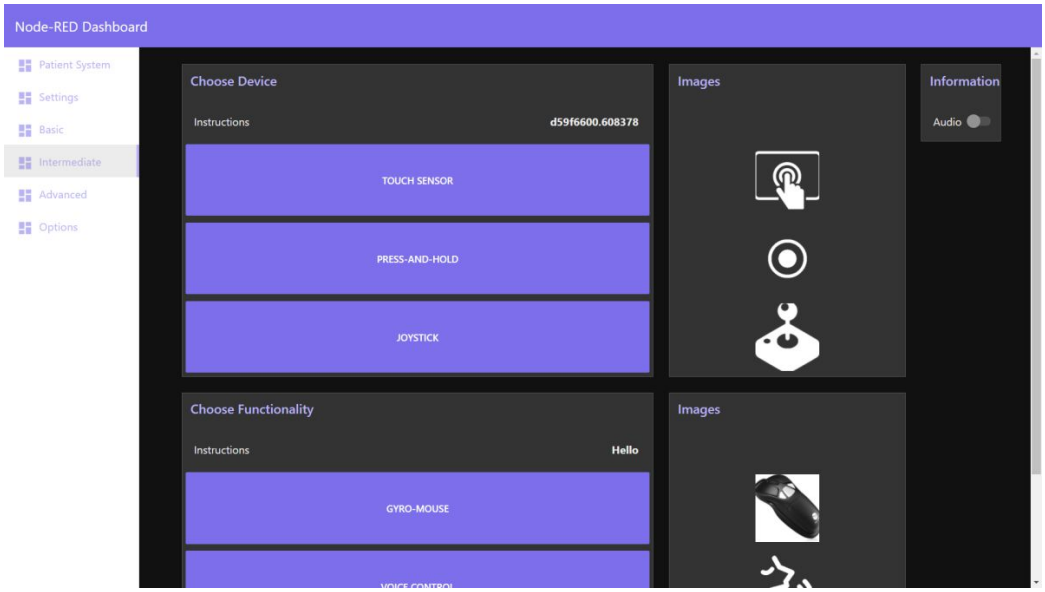


Figure 5: Fourth Screen of Prototype Presented in Node-RED Dashboard

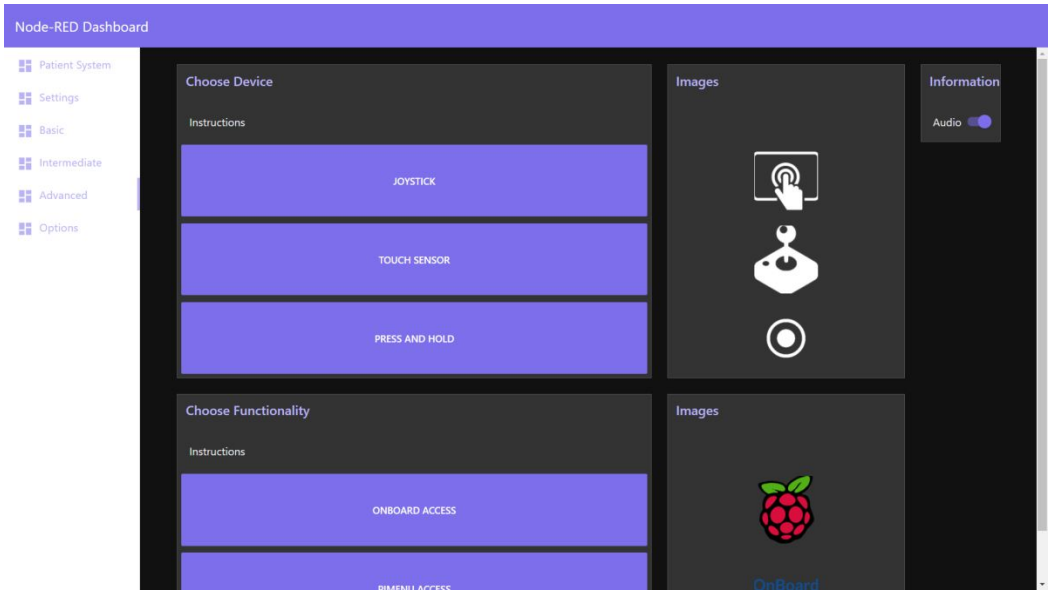


Figure 6: Fifth Screen of Prototype Presented in Node-RED Dashboard

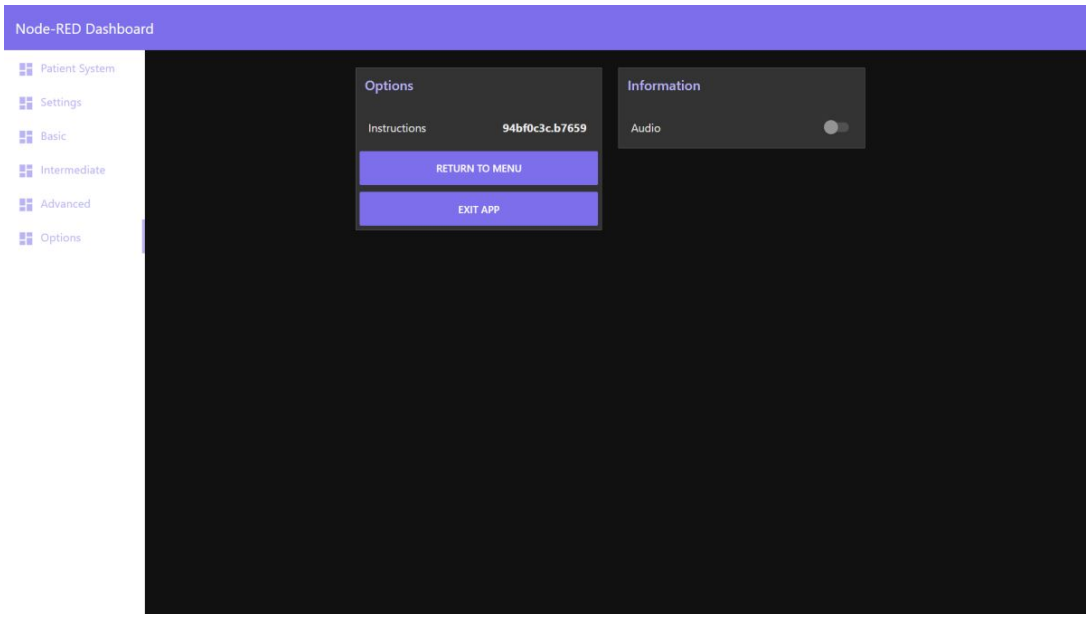


Figure 7: Sixth Screen of Prototype Presented in Node-RED Dashboard

The first screen [Figure 2] is the same as the design concept first screen, which offers options for the user to select a patient system based upon the patient's disability. The following screens of the design however differ from the concept because of the limitations of Node-Red. Instead of buttons that lead to different screens, there is a drop down menu on the left side allowing the user to select the setting they would like. The following figures show the basic, intermediate and advanced screens that were outlined in the final design concept. As shown in

figure 5 and 6 instead of having two screens as our design showed, we changed it so that all the buttons show up in one screen.

Critical Product Assumptions

Table 1: List of Product Assumptions

#	List Of Assumptions	Tested in Prototype I	To be tested in Prototype II
1	Program works close to flawlessly to enable users to operate using as few buttons as possible	✓	
2	Program accommodates the ability of the different users (different patients have different disabilities which might limit their use of the program)	✓	
3	Program is very scalable		✓
4	Allows the user to operate simply, even without knowledge of the software	✓	
5	Can be accessed on multiple devices (customizable)	✓	
6	The program can carry out multiple tasks consecutively		✓
7	The program is properly visually represented	✓	

8	Program is built with little expense	✓	
9	Contains shortcuts	✓	
10	The program is easy to use and requires little knowledge in programming		✓

Prototype Testing

Our first prototype mainly focused on meeting the clients needs in terms of the user interface and appearance instead of functionality thus the prototype testing was focused on useability. We wanted to ensure that we met the clients base requirements and were able to create a simple user interface. Functionality and criteria based upon user feedback will be tested in the second prototype. This is why fewer assumptions have been tested than the actual number of assumptions listed for the testing of our prototype. The testing was done by examining the appearance of the prototype interface, for example, how many buttons appear on screen at a time. Tests were done by us, and feedback testing was done using feedback from other students with no background in technology. The summary of the prototype testing follows:

Table 2: Summary of Prototype Testing

Testing Criteria	Expected Results	Actual Results	Evaluation	Test Units
Simplicity	2-5	2-6	The program is pretty simple so far, one screen has 6 buttons which is one more than the max	# Of buttons per screen

			expected but the screen still looks neat and easy to understand.	
Shortcuts	6	6	We planned to include 6 shortcuts to each screen on the side bar of our program and we ended up achieving this task. We might end up removing 2 shortcuts for our second prototype because they might not be needed later on.	# Of shortcuts on the interface sidebar
Customizable options	3	3	The programs can run on Mac, Windows, and even on a Raspberry pi.	# Of devices it works on
Easy Navigation	<8	7	When the program was run, it took only 7 clicks to get to the control of a device (not including asking for audio information help).	# Of clicks to use desired device
Visual Representation	>12	18	Most of the screens of the interface contain about 2-4 images which leads to a total of 18 graphics. Two screens have no images because they are very self explanatory.	# Of total graphics
Low Cost	$0	$0	Developing the prototype program cost 0 dollars as the required software was installed for free.	Amount of money spent on developing program
Intuitivity	5	4	Feedback: 'It looks really straightforward to use, some of the images aren't enough to explain what a device is if the customer doesn't already know"	Feedback rating from student with no technical background Scale: 1-5

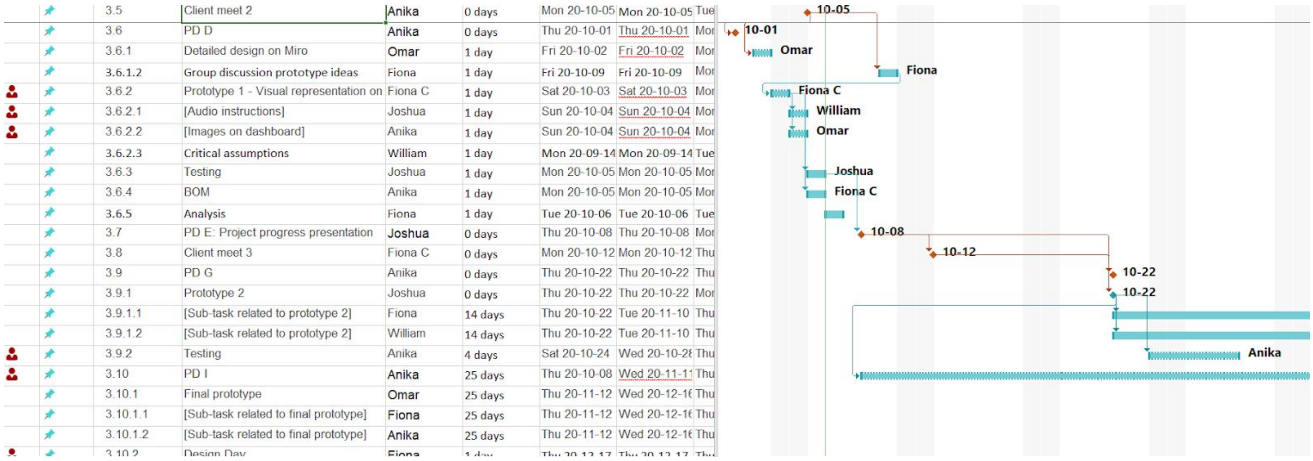
Bill of Materials

Table 3: Bill of Materials Summary

Item number	Name	Description	Quantity	Cost	Extended Cost
1	Node-Red Software	Our project is done on the Node-Red software, which is a free, flow based visual programming tool.	1	$0	$0
2	SensAct user interface	Our interface will be designed to connect directly to the SensAct device, where it will perform the desired functionalities. This will be provided to us by our client.	1	$0	$0
3	Raspberry pi	One of the main expectations of our client was for our device to be functional on a raspberry pi. So we will be using a raspberry pi to test device functionality. A Raspberry pi available on the market ranges from $25-$35 dollars, but for this project we will be able to use one we already have from previous classes.	1	$0	$0
				Total	$0

In our BOM, we included the products we will need to complete this project, as well as the products that are needed for future students to replicate our product. Since our project is heavily software based, designing our product has no cost. Our desired software is available to download for free and so are all the nodes we needed to install to complete this project. Our device will be designed to send signals to SensAct, where all the functions will be carried out. Our client has access to SensAct, which he will lend us to test on. In order to ensure the product works on a raspberry pi, we will be using one we already own to test our product's functionality.

Project plan



	3.5	Client meet 2	Anika	0 days	Mon 20-10-05	Mon 20-10-05	Tue
	3.6	PD D	Anika	0 days	Thu 20-10-01	Thu 20-10-01	Mon
	3.6.1	Detailed design on Miro	Omar	1 day	Fri 20-10-02	Fri 20-10-02	Mon
	3.6.1.2	Group discussion prototype ideas	Fiona	1 day	Fri 20-10-09	Fri 20-10-09	Mon
	3.6.2	Prototype 1 - Visual representation on	Fiona C	1 day	Sat 20-10-03	Sat 20-10-03	Mon
	3.6.2.1	[Audio instructions]	Joshua	1 day	Sun 20-10-04	Sun 20-10-04	Mon
	3.6.2.2	[Images on dashboard]	Anika	1 day	Sun 20-10-04	Sun 20-10-04	Mon
	3.6.2.3	Critical assumptions	William	1 day	Mon 20-09-14	Mon 20-09-14	Tue
	3.6.3	Testing	Joshua	1 day	Mon 20-10-05	Mon 20-10-05	Mon
	3.6.4	BOM	Anika	1 day	Mon 20-10-05	Mon 20-10-05	Mon
	3.6.5	Analysis	Fiona	1 day	Tue 20-10-06	Tue 20-10-06	Tue
	3.7	PD E: Project progress presentation	Joshua	0 days	Thu 20-10-08	Thu 20-10-08	Mon
	3.8	Client meet 3	Fiona C	0 days	Mon 20-10-12	Mon 20-10-12	Thu
	3.9	PD G	Anika	0 days	Thu 20-10-22	Thu 20-10-22	Thu
	3.9.1	Prototype 2	Joshua	0 days	Thu 20-10-22	Thu 20-10-22	Mon
	3.9.1.1	[Sub-task related to prototype 2]	Fiona	14 days	Thu 20-10-22	Tue 20-11-10	Thu
	3.9.1.2	[Sub-task related to prototype 2]	William	14 days	Thu 20-10-22	Tue 20-11-10	Thu
	3.9.2	Testing	Anika	4 days	Sat 20-10-24	Wed 20-10-28	Thu
	3.10	PD I	Anika	25 days	Thu 20-10-08	Wed 20-11-11	Thu
	3.10.1	Final prototype	Omar	25 days	Thu 20-11-12	Wed 20-12-16	Thu
	3.10.1.1	[Sub-task related to final prototype]	Fiona	25 days	Thu 20-11-12	Wed 20-12-16	Thu
	3.10.1.2	[Sub-task related to final prototype]	Anika	25 days	Thu 20-11-12	Wed 20-12-16	Thu
	3.10.2	Design Day	Fiona	1 day	Thu 20-12-17	Thu 20-12-17	Thu

Table 4: Task Breakdown

Task/Report/Project/ Topic	Description	Due Date	Team Member
PD E Project Progress Presentation	Prepare a powerpoint slide for project presentation.	Oct 15, 2020	William, Anika, Fiona, Omar, Joshua
PD F Business Model	Group meeting for discussing business model.	Oct 19, 2020	William, Anika, Fiona, Omar, Joshua
	Begin write up for PD F	Oct 19, 2020	William, Anika, Fiona, Omar, Joshua
	Submit PD F	Oct 22, 2020	Anika
Client meeting 3	Prepare a presentation for the client meeting as a powerpoint.	Nov 3, 2020	William, Anika, Fiona, Omar, Joshua
Review of client feedback	Look back at client meet notes	Nov 4, 2020	William, Anika, Fiona, Omar, Joshua
	Note the changes requested	Nov 4, 2020	William, Anika, Fiona, Omar, Joshua
	Benchmark and analyze the logistics	Nov 4, 2020	Anika, Joshua, Anika

	of these changes		
	Implement changes to the current design	Nov 5, 2020	Fiona
PD G Prototype II	Begin PD G Write up and Go over customer feedback	Oct 23, 2020	William, Anika, Fiona, Omar, Joshua
	Begin testing interface with real users	Nov 2, 2020	Anika, Fiona, Omar, Joshua
PD H Economics Report and 1 min. Pitch	Economics report	Nov 17, 2020	William, Anika
	Make a powerpoint presentation with key points so far	Nov 4, 2020	William, Anika, Fiona, Omar, Joshua
	Practice presentation and Begin Economics report	Nov 6, 2020	William, Anika, Fiona, Omar, Joshua
	Submit Economics report and await presentation queue	Nov 18, 2020	William, Anika, Fiona, Omar, Joshua
PD I Design day pitch and final prototype evaluation	Prepare a 2min pitch	Dec 3, 2020	Fiona, Joshua
PD J User manual	Begin work on user manual	Nov 24, 2020	William, Anika, Fiona, Omar, Joshua
	Submit user manual	Dec 10, 2020	Anika
PD K Final presentation	Begin work on the presentation	Nov 28, 2020	William, Anika, Fiona, Omar, Joshua
	Complete presentations	Dec 2, 2020	William, Joshua
	Submit all relevant work	Dec 3, 2020	Anika
	Run through presentation multiple times for practice	Dec 6, 2020	William, Anika, Fiona, Omar, Joshua

PD L Intellectual property search	Explore intellectual property databases	Nov 24, 2020	William, Anika, Fiona, Omar, Joshua
	Describe the relationship that exists between products	Nov 26, 2020	Omar, Joshua
	Explain the importance of these intellectual properties	Nov 28, 2020	William, Fiona
	Explain the importance of intellectual properties	Dec 1, 2020	William, Anika, Fiona, Omar, Joshua
	Submit the deliverable	Dec 10, 2020	Anika
Design Day	Final product must be completed	Dec 3, 2020	William, Anika, Fiona, Omar, Joshua

Conclusion:

In conclusion, this deliverable gave us an insight to both the view of our client and shortcomings on our prototype. The client wants our product to be a simple and intuitive interface for users that have no knowledge of technology. Compared to our prototype, we not only have the simple settings but also two other sections which are intermediate and advanced, those were created under the condition of customizability. Therefore we made a slight change on our future plan, we will focus more on basic settings, and if we have time we will work on the other two parts.Our client also set up a date for us to give us a space SensAct device of his, which can help us test out the efficiency and functionality of our prototype for the next deliverable.