Project Deliverable E: Project Plan and Cost Estimate

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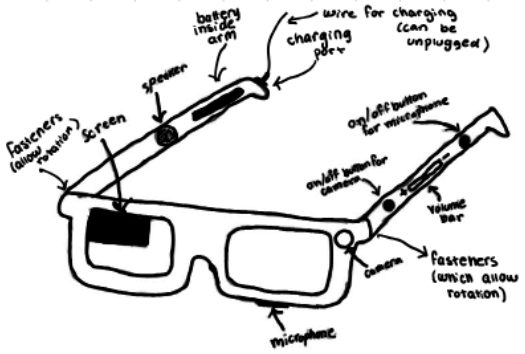
Introduction:

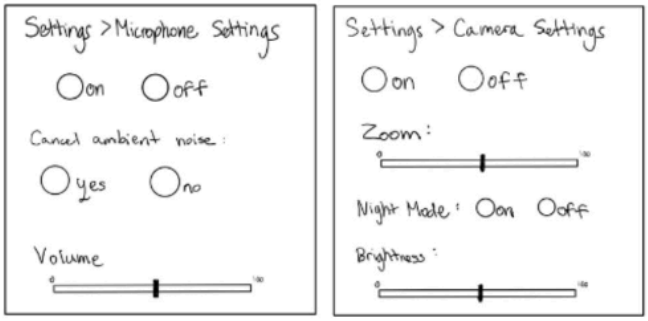
This document outlines solution 3 from Deliverable D, followed by the steps and schedules of the group members for the 3 prototypes while including the contingency plans for these schedules, the necessary materials with a budget plan, and testing methodology for prototypes. With the goal of designing glasses for people with visual impairment to test the camera subsystem, object detection subsystem, and location subsystem individually and collectively.

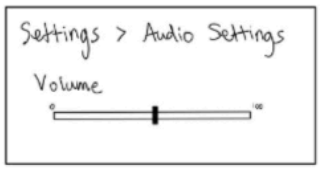
1.

Glasses:

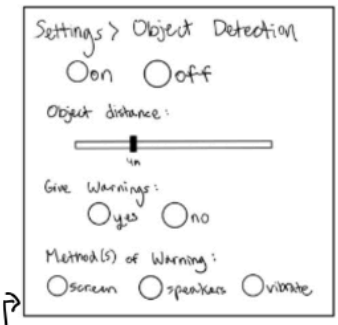


On the app:





use of Location/GPS APIs



use of Object detection APIs

2.

Steps and Schedules:

Steps	Teammate Responsible	Estimated duration	Dates
1-Prototype 1 (Design): ● Sketch and design first prototype. ● Include different subsystems in sketches.	Amélie	45 mins	Oct 28
2-Prototype 1 (Conception): ● Build and assemble first prototype	Mariyam	30 mins	Oct 29
3-Prototype 1 (Testing):	Luke and Michael	2 hours	Oct 31

● Create different testing methods. ● Test prototype. ● Note results and feedback.			
4-Prototype 1 (Feedback): ● Note and organize feedback. ● Interpret feedback into new constraints or target specifications if needed. ● Note changes to make for the second prototype.	Michael	30 mins	Nov 1 (Due Nov 3)
5-Client Meeting 3: ● Preparation for client meeting 3. ● Prepare questions. ● Take notes from client meeting 3. ● Organize notes and data. ● Change constraints or target specifications if needed.	All team members	30 mins	Oct 28 - Oct 30
6-Prototype 2 (Design): ● Sketch and design the second prototype. ● Include different subsystems in sketches. ● Include feedback collected and interpreted data from Prototype 1.	Margaret	1 hour	Nov 5
7-Prototype 2 (Conception): ● Build and assemble the second prototype.	Margaret	30 mins	Nov 6
8-Prototype 2 (Testing): ● Create different testing methods which will test different aspects than the first prototype. ● Test prototype. ● Note results and feedback.	Mariyam and Amélie	2 hours	Nov 8
9-Prototype 2 (Feedback): ● Note and organize	Amélie and Luke	30 mins	Nov 9

feedback. ● Interpret feedback into new constraints or target specifications if needed. ● Note changes to make for the third prototype.			(Due Nov 10)
10-Prototype 3 (Design): ● Sketch and design the third prototype. ● Include different subsystems in sketches. ● Include feedback collected and interpreted data from Prototype 1 and 2.	Michael	1 hour	Nov 17 and Nov 18
11-Prototype 3 (Conception): ● Build and assemble the third prototype.	Luke	45 mins	Nov 19
12-Prototype 3 (Testing): ● Create different testing methods. ● Test prototype. ● Note results and feedback.	Amélie	2 hours	Nov 22
13-Prototype 3 (Feedback) : ● Note and organize feedback. ● Interpret feedback into new constraints or target specifications if needed. ● Note changes to make for “final product”.	Mariyam	30 mins	Nov 23 (Due Nov 24)
14-Design Day: ● Prepare Design Day presentation.	All teammates	2 hours	Nov 25 - Dec 3 (Due Dec 3)

Risks and Contingency Plans:

1- Lack of time to complete prototypes for teammate responsible:
In the event that the team member responsible for the sketches, design, build or assembly of a prototype does not have the time to complete it, other teammates will help in any way possible to ensure the work is completed on time.
2- Lack of time to complete testing:
If the team member responsible for testing lacks the time to complete, other team members will help like with the completion of the prototypes.

3.

Link to excel spreadsheet: DeliverableE_BillOfMaterials.xlsx

4.

Materials needed for Prototyping:

Arduino kit with the following components (already acquired) for prototype 1,2,3.

- 1pcs UNO R3 Controller Board
- 1pcs LCD1602 Module (with pin header)
- 1pcs Breadboard Expansion Board
- 1pcs Power Supply Module
- 1pcs Joystick Module
- 1pcs IR Receiver
- 1pcs Servo Motor (SG90)
- 1pcs Stepper Motor
- 1pcs ULN2003 Stepper Motor Driver Board
- 1pcs Ultrasonic Sensor
- 1pcs Temperature and Humidity Module
- 1pcs 9V Battery with DC
- 1pcs 65 Jumper Wire
- 1pcs USB Cable
- 1pcs Active Buzzer
- 1pcs Passive Buzzer
- 2pcs Potentiometer
- 1pcs 5V Relay
- 1pcs Breadboard
- 1pcs Remote
- 1pcs Tilt Switch
- 5pcs Button (small)
- 1pcs 1 digit 7-segment Display
- 1pcs 4 digit 7-segment Display
- 5pcs Yellow LED
- 5pcs Blue LED
- 5pcs Green LED
- 5pcs Red LED
- 1pcs RGB LED
- 2pcs Photoresistor
- 1pcs Thermistor
- 2pcs Diode Rectifier (1N4007)
- 2pcs NPN Transistor (PN2222)
- 1pcs IC 74HC595
- 30pcs Resistor
- 10pcs Female-to-male Dupont Wire

-Laser cutting material (wood, plastic, aluminum) for prototype 1,3

-3d printing with PLA, PETG, and TPU with different types of filaments (for flexibility)-for prototype 2,3

Prototype 1,2,3: Printer Paper for sketches, and construction paper (Dimensions: letter size 8.5 x 11 inches)

Types of API:Bandwidth- Prototype 1,2,3

Type of Server for facial detection: Blue Irls and CodeProject AI.-Prototype-1,2,3

5.

	Design Criteria	**Relation (=, <, >)**	**Value**	**Units**	**Method of verification**
	Constraints: (includes some non-functional and functional requirements)				
1	Weight	<	45	g	Analysis
2	Cost	<		$	Estimation
3	Lens Width	<	56	mm	Analysis
4	Arm Length	<	150	mm	Analysis
5	Durability of material	=	1	month	Test
	Non-functional requirements:				
1	Aesthetics	=	Yes	N/A	Survey
2	Comfort of Material	=	Yes	N/A	Observation
	Functional requirements:				
1	Functionality	=	No	N/A	Observation
2	Adaptability	=	No	N/A	Observation
3	Number of uses	>	1	N/A	Observation

4	Number of features	>	1	N/A	Observation
5	Easy to use and understand	=	Yes	N/A	Survey

Objective of prototype:

Creating a prototype resembling the actual to receive feedback to receive feedback on general concept idea, design, subsystems and aesthetic or other non-functional requirement.

Stopping criterion:

Once a test has been successful twice in a row, the objective for the specific test can be considered as achieved.

Conclusion:

After sketching different conceptual designs, project, cost and prototype planning is the next step. This step, being one the most important steps, allows us to visualize what the final product could look like and prepare for designing and building prototypes. We began this step by sketching our final chosen concept. Then, we outlined a schedule for prototyping and testing, followed by an estimate of the cost of the prototypes based on a list of equipment and material. Finally, we outlined a plan for testing our different prototypes.

Trello Update: