Design Criteria and Target Specifications

Project Deliverable C

GNG1103

Team 13

February 2, 2020

Introduction:

In the previous deliverable, a list of interpreted needs were made using the information gathered from the first client meeting. Based on those interpreted needs, a list of prioritized design criteria, including functional and non-functional requirements, as well as constraints (where appropriate), is defined. The design criteria will provide a general idea as to what explicit goals the project must achieve.

To get a better understanding of the project, it is important to check what is already out in the market. This deliverable consists of benchmarking of five different products that each satisfy at least one of the interpreted needs stated before. Based on the researched products, a list of design specifications that the product should satisfy are defined. This will aid in creating potential solution ideas in the next deliverable.

Part A: Translating Needs into Design Criteria

Number	Need	Design Criteria
1	Device is affordable to target customers.	Cost ($)
2	Device is portable	Weight (g) Maximum length/width (cm)
3	The device is durable to wear and tear.	Impact Intake (N) Material Thickness (cm)
4	The device tracks location.	Accuracy & Reliability
5	Device is comfortable to wear for long periods of time.	Weight (g) Material
6	The device is small and compact.	Maximum length (cm) Maximum width (cm)
7	The device is water resistant.	Compliant protection against sprayed

		water
8	Device is non-intrusive.	Needleless, Weight (g)
9	The device is aesthetic/discrete.	Colour Style
10	The device accurately measures oxygen level.	Blood-Oxygen Saturation Monitor
11	The device is measures respiratory rate	Respiratory Rate Monitor
12	The device can administer Naloxone	Naloxone Administration Method
13	The device provides manual override for naloxone in case of false positive	Manual Override

Part B: Benchmarking

Specification	**Fitbit Versa 2**	**Finger Pulse Oximitor**	**Lookee Ring Sleep Monitor**	**Galaxy Fit**	**Purdue University Device**
Company	Fitbit	Tuger	Lookee	Samsung	Purdue University
Cost (CAD)	$300 CAD	$19.99 CAD + Batter Cost	$229.9 CAD	$69.99 - $149.99 CAD	N/A
Weight (g)	26.1+15.3 (band)	59g (shipping weight)	17.9g	23 g	~99g (shipping weight)+battery , ~166mg (capsule)
Device Material	Glass, Aluminum	Plastic	Elastic Silicone, Plastic	Silicone Glass Polycarbonate Stainless steel	Polyethylene, Stainless Steel, PureTemp PCM, PTFE
Screen Size	39.9 * 12.1	N/A	45.7 * 25.4	18.3 * 11.2	N/A

(mm)					
Battery Life	6 days	2 AA Battery Life (2 months)	16 hours	1 week	N/A (unknown)
Sensors	Acceleration gyroscope compass ambient light heart rate	HR Oxygen saturation	Heart	Accelerometer Gyro HR	ECG
Needleless	Yes	Yes	Yes	Yes	No
Water Resistance	5ATM	N/A	N/A	5ATM	N/A
Oxygen Saturation Monitor	Yes	Yes	Yes	No	Yes
Heart Rate Monitor	Yes	Yes	Yes	Yes	Yes
Respiratory Rate Monitor	No	No	No	No	Yes

Evaluation scale (blue = 5, green = 4, yellow = 3, orange = 2, red = 1) with 5 being the better option and 1 being the worst option.

The Finger Pulse oximeter was ranked as the highest overall, followed by the Lookee Ring Sleep monitor, the FitBit, Galaxy Fit, and lastly, the Purdue University Device.

Based on this information, the ideal product would cost around $19.99 CAD, weighing 17.9 g, be made from plastic and silicone, have a screen size of 18.3mm * 11.2mm, have a battery life of 2 months of longer, be needleless and water resistant, and have an oxygen saturation monitor, heart rate monitor, and respiratory rate monitor.

Part D: Specification

	Design Specifications	Relation (=, >, or <)	Value	Units	Verification Method
	Functional Requirements				
1	Accurately measure oxygen level	>	90	%	Test
2	Measures heart rate	>	10	bpm	Test
3	Respiratory rate	=	12-25	breaths/min	Test
	Non-Functional Requirements				
1	Aesthetics/discreteness	=	Yes	N/A	Test
2	Product Life	>	1	year	Test
3	Battery Life	>	24	hours	Test
4	Water Resistant	=	Yes	N/A	Test
5	Reliability	=	Yes	N/A	Test
6	Durable	=	Yes	N/A	Materials/ Test
7	Comfortable	=	Yes	N/A	Materials/ Test
	Constraints				
1	Weight	<	25	grams	Measure
2	Cost	<	100	CAD	Calculate
3	Size	<	45.7 * 25.4	mm	Measure

Conclusion:

During our meeting with our client we were able to ask important questions related to the opioid epidemic and how to detect an overdose. A pulse oximeter is necessary to detect an overdose. Popular places to attach a pulse oximeter are fingertips, toes, earlobes and forehead. Our next step will be to determine how our pulse oximeter will be placed, the shape & look of our product and how we will be contacting emergency services in the event of an overdose.