Wio Link For SVH

GNG 2101 - Deliverable B

Submitted by Team E24

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Client Statements

1. I want the product accessible for people with disabilities (physical, visual, cognitive,etc)
2. The nurses and medical staff use this to communicate with these patients
3. Each client has different accessibility issues, and they all need to use this product
4. Some devices the patients have use eye tracking. The clients use their own device (purchased by the ministry). → Used for email, talking
5. The device could maybe be used for tv control, maybe for calling the nurse
6. Each client has their own device that they use with their disabilities to function normally
7. We currently use Sensact but it's more expensive than other microcontrollers
8. Some patients use touch sensors
9. I like Grove sensor because is very do it yourself
10. I think Wio link is good but it gets messy with wires, and looks unprofessional
11. I like using node red, it is visual and great for IOT
12. I'm not very comfortable with programming, I leave that to other people
13. I want a Dashboard to help build these solutions
14. I Prefer to use open source low cost devices for people with disabilities
15. I started with arduino
16. Some patients devices connect using bluetooth
17. We want to upgrade sensact
18. Some current solutions we are working on use raspberry pi
19. I want a way to connect all my different devices (Wiolink,sensact,raspberry pi)
20. Some examples of the devices patients use are Touch sensor, eye sensor mouse click sensor (two touch sensor), joystick, lights
21. The patient must be able to do things simply because of their limitations
22. Some use infrared sensor to take in information
23. The Patients will use this, the nurses have existing devices they want to be linked to patients individual communication method
24. I want the patients to use a TV Controller → trigger button or sensor that communicates with the tv to change the channel
25. Some devices are Wifi Based
26. At the hospital we have a low number of resources

27. I’m afraid the students won’t deliver the project on time or at all
28. I don’t want to hear about any future crazy ideas with the project, I want project before anything else
29. My current system is not a perfect system
30. I think the wio link would add more functionality
31. I want the device to work with many things and be easy to customize for each different device
32. I like that it is Easy to use (wio app)
33. My staff say the app is really unreliable but I don’t have problems with it
34. the app makes it easy to connect and rearrange sensors, and gives great user feedback to the user, the app tells you a lot about what is happening
35. Node red helps position the sensors and know where used inputs/outputs are
36. Wio link has lots of features and functionalities
37. Visual programming is good, regular coding is time consuming, this is quicker
38. It uses curl language for web interaction

Translated Needs From Client Statement

#	Attribute	Description	Importance
1	Input Functionality	The product incorporates communication devices already used by patients	3
2	Output Functionality	The system can be used to control a tv	3
3	Simplicity	The patients find it easy to use the product	5
4	Simplicity	The medical staff finds it easy to use the product	5
5	Restriction	The device is inexpensive	3
6	Restriction	The solution doesn't require additional materials provided by the hospital	3
7	Aesthetics	The solution looks professional and clean	4
8	Input Functionality	The solution can connect to patient devices via wifi	2
9	Input Functionality	The solution can connect to patient devices via bluetooth	2
10	Input Functionality	The solution provides user feedback	4
11	Input Functionality	The product works with raspberry pie	1
12	Input Functionality	The product can interact with a variety of sensors (joystick, voice sensor, eye sensor)	5
13	Patient	The solution gives patients confidence and independence	4
14	Patient	The device is customizable for each patients needs	4
15	Input Functionality	The device works with previous solutions	3

Importance: *(least) ← 1 2 3 4 5 → (most)*

Problem Statement

St. Vincent hospital has expressed a need for an accessible, user friendly system that enables patients with disabilities to communicate with medical staff and interact with their environment using their everyday devices.

Metrics

#	Need #	Metric	Importance	Units
1	5	Cost	3	$
2	1,8	Connection to wifi	2	Mbps
3	1,9	Connection to Bluetooth	2	RSSI
4	2	Tv remote	4	cm^{-1}
5	10	User Feedback	4	Satisfaction grade (1-10)
6	3,4	Ease of use	5	ISO 9241-11 standard
7	7	Aesthetics	3	subj
8	15,14	Customizability	4	# of input/output pairings possible
9	13	Instil Confidence	4	subj
10	6	External Materials	3	#of materials
11	12,11	Device Compatibility	4	# of compatible devices

Benchmarking

Metric #	Need #	Metric	Imp	Units		VIZIYON	Procedia Device	Xbee Module
1	5	Cost	3	$		N/A	“Low”	Low
2	1,8	Connection to wifi	2	Mbps		--------------	--------------	Yes, no value given
3	1,9	Connection to Bluetooth	2	RSSI		--------------	--------------	no
4	2	Tv Remote	4	cm^{-1}		--------------	--------------	--------------
5	10	User Feedback	4	Satisfaction grade (1-10)		10	8	N/A
6	3,4	Ease of Use	5	ISO 9241-11 standard		9	9	N/A
7	7	Aesthetics	3	subj		Appealing	Appealing	Poor
8	15, 14	Customizability	4	# of input/output pairings possible		0	1	12
9	13	Instil Confidence	4	subj		Yes	Yes	N/A
10	6	External materials	3	#of materials		0	1	0-1
11	12,11	Device Compatibility	4	# of compatible devices		0	~3	~4

Target Specifications

Metric #	Metric	Units	Value
1	Cost	$	$50>
2	Connection to wifi	Mbps	Yes
3	Connection to Bluetooth	RSSI	Yes
4	Tv Remote	cm^{-1}	Yes
5	User Feedback	Satisfaction grade (1-10)	9
6	Ease of Use	ISO 9241-11 standard	9
7	Aesthetics	subj	Appealing
8	Customizability	# of input/output pairings possible	12<
9	Instil Confidence	subj	Yes
10	External materials	#of materials	0-1
11	Device Compatibility	# of compatible devices	2<

Conclusion

In conclusion, our client meeting helped us to better understand the needs of the client for this project. We learned that they want their Wio link Interface to be user friendly, accessible and cost effective. We also learned that the client wants the product to be able to serve several different patients with a wide array of medical conditions.

This knowledge will allow us to take on the problem with a fresh perspective and to suit the final product to the client's needs to the best of our ability. After hearing the client speak of his vision, we will be able to approach the problem with more empathy and true understanding of the task at hand. Though some things are unknown and will be left up to our creativity and imagination, we believe that we can create a product that the client will love and find extremely useful in their day-to-day activities at St. Vincent Hospital.

Sources

[1] A. Karmel, A. Sharma, M. Pandya, and D. Garg, "IoT based Assistive Device for Deaf, Dumb and Blind People," *Procedia Computer Science*, vol. 165, pp. 259–269, 2019.

[2] S. M, J. Joy, A. Kuriakose, B. M. B, A. K. Babu, and M. Kunjumon, "VIZIYON: Assistive handheld device for visually challenged," *Procedia Computer Science*, vol. 171, pp. 2486–2492, 2020.

[3] "IOT based system for person with physical disability," *Ijireeice*, vol. 4, no. 2, pp. 157–160, 2016.