Deliverable C
Design criteria

Done by Oct 1st
Group 13

Introduction

Following the meeting with both Rose video and CEED, the team chose to commit to developing a machine vacancy monitoring for a 3D printer. And a list of interpreted needs was developed in the last deliverable. In deliverable C, we first analyzed the functional and non-functional needs, as well as constraints. Secondly, our team analysis three existing similar projects (benchmarking). Finally, we declare the target specifications in our design refer to the benchmarking. The objective of this document is to serve as a design template that can assist the team in further design.

prioritized design criteria

Functional requirement

1. Ability to keep a digital record of who is using the 3D printer from anywhere
2. The solution provides staff with an interface of the labs from anywhere
3. The solution can remind users how much time is remaining in the day
4. The solution can estimate the complete time of the current 3D printing.

Non-functional requirement

1. Materials that will be durable and last.
2. The system can be moved in conjunction with the 3D printers.
3. The solution continues to allow users to easily access the contents of the 3D printers.
4. The device is aesthetically pleasing.
5. The User Interface is easy to understand.
6. The User Interface is in English and French.
7. The system utilizes the dashboard for interacting with the interface.
8. The page can be displayed properly on both the phone screens and the computer screen.
9. The programming is simple and easy to follow, using comments to explain the processes.
10. The solution is safe to use
11. The solution is easy to set up

Constraints

1. The cost is less than one hundred Canadian dollars.
2. The solution physically takes up small amounts of space within the lab
3. Our team has limited time to design the project.

Design criteria

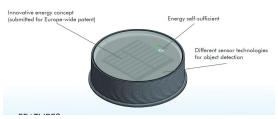
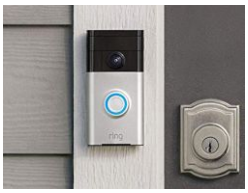
Table 1. Design criteria

Number	Need	Design criteria
1	Ability to digitally keep a record of who is using the workspaces	Disk capacity(GB)
2	The solution physically takes up small amounts of space within the lab	Height(m) width(m) length(m)
3	The solution is light	Weight (kg)
4	The sensor knows who is using the 3D printer from a distance	Sensor distance (cm)
5	Materials that will be durable and last over time.	Durable material
6	The solution can estimate the complete time of the current 3D printing	Accurate rate (%)
7	Solution is cheap	price($)
8	The solution is safe to use (safety voltage and current)	Voltage(W) Current(A)
9	The solution is easy to set up	Setup time (min)

Benchmarking

Table 2. Benchmarking

Specifications	LTS TAPS park sensor	Active infrared (area reflective) human detection sensor	Ring Video Doorbell with HD Video, Motion-Activated Alerts
Company	LTS AG	Panasonic	Ring
Price ($)	60	2	100
Materials	V4A/safety glass	Not specified	plastic

Weight (kg)	1.5	0.02	0.8
Lifespan (year)	>10	Not specified	Not specified
Size	155mm x 41.5 mm	Depend on the type	4.98 in x 2.43 in x .87 in
Area of application	Traffic management	Sensor faucet; Amusement market	Home security
Sensor range	20-30m	5-15cm	150cm
Setup time (min)	15	Not specified	5
Picture		 Thin short type (Mounting direction: V type)	
Additional Features	• Charging during Operation • Low lifecycle costs • Short installation Time • Energy self-sufficient • Data in real-time	• Certain detection unaffected by the reflectance of the object • Only connecting DC power supply for operating • Use in adjacent positions is possible	• Two-way talk with noise cancellation • 720p HD Video, Live View, Night Vision

Engineering design Specifications

Table 3. Engineering design Specifications

Design specifications	**Relations (<,>,=)**	**Value**	**Unit**	**Verification Method**
Cost per 3D printer	<=	25	$	
size	<=	155 x 41.5	mm	ruler

weight	<=	0.5	kg	balance
Sensor range	>=	5-15	cm	test
Sensor voltage	<=	36	V	multimeter
Sensor current	<=	10	mA	multimeter

Conclusion

We focused on the design specifications that we must meet by our product and constraints in this group meeting. After realising our true needs and restrictions, our team can develop a design that meets client needs more efficiently.

Reference:

https://lts-ag.ch/wp-content/uploads/2019/04/FS-383-10001_Factsheet-Bodensensor_EN.pdf

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