Project Deliverable F

Prototype I and Customer Feedback

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1. Introduction

The top priority for our product is to seek help immediately for the child or pet locked in a car, this was made clear after a meeting with our TA. The solution outlined in this report satisfies this condition. It is an audio alert system installed outside of the car, using motion detection to detect a child or pet. The sound reminds the parent, and can also alert nearby pedestrians to help. In this deliverable, we will present a detailed diagram of our final product as well as the list of materials of prototypes and their costs. We will also outline the plans for prototypes which will take place three times. The project plan will give information about assigned members, duration and due dates. This deliverable will also explore the possible risks of the prototype plans and contingency plans for each risk.

List of materials

Name	Links	Unit Price	Tax	Total per item	Quanity	Total before tax	shipping	Total after shipping
Motion sensor	From GNG lab	$0.00	$0.00	$0.00	2	$0.00	0	$0.00
Speaker	link	$9.26	$1.85	$9.26	1	$9.26	0	$11.11
Car charger	link	$15.29	$2.53	$15.29	1	$15.29	0	$17.82
Electrical Wire	link	$9.98	$2.70	$9.98	2	$19.96	0	$22.66
Arduino Board	From GNG lab	$0.00	$0.00	$0.00	1	$0.00	0	$0.00
breadboard	From GNG lab	$0.00	$0.00	$0.00	1	$0.00	0	$0.00
Jumper wires	From GNG lab	$0.00	$0.00	$0.00	20	$0.00	0	$0.00
Resistors	From GNG lab	$0.00	$0.00	$0.00	15	$0.00	0	$0.00
Battery	link	$16.50	$2.15	$18.65	1	$18.65	0	$18.65
TOTAL		**$74.00**	**$9.23**	**$53.18**		**$63.16**	**0**	**$70.24**

2. Prototype 1

2.1. External characteristics

The device is always turning off when the car engine is on. it starts working once the charging is disconnected. The motion sensor from the front and back seats will start scanning, then if it detects something is moving, the speaker will make some noise to remind the driver

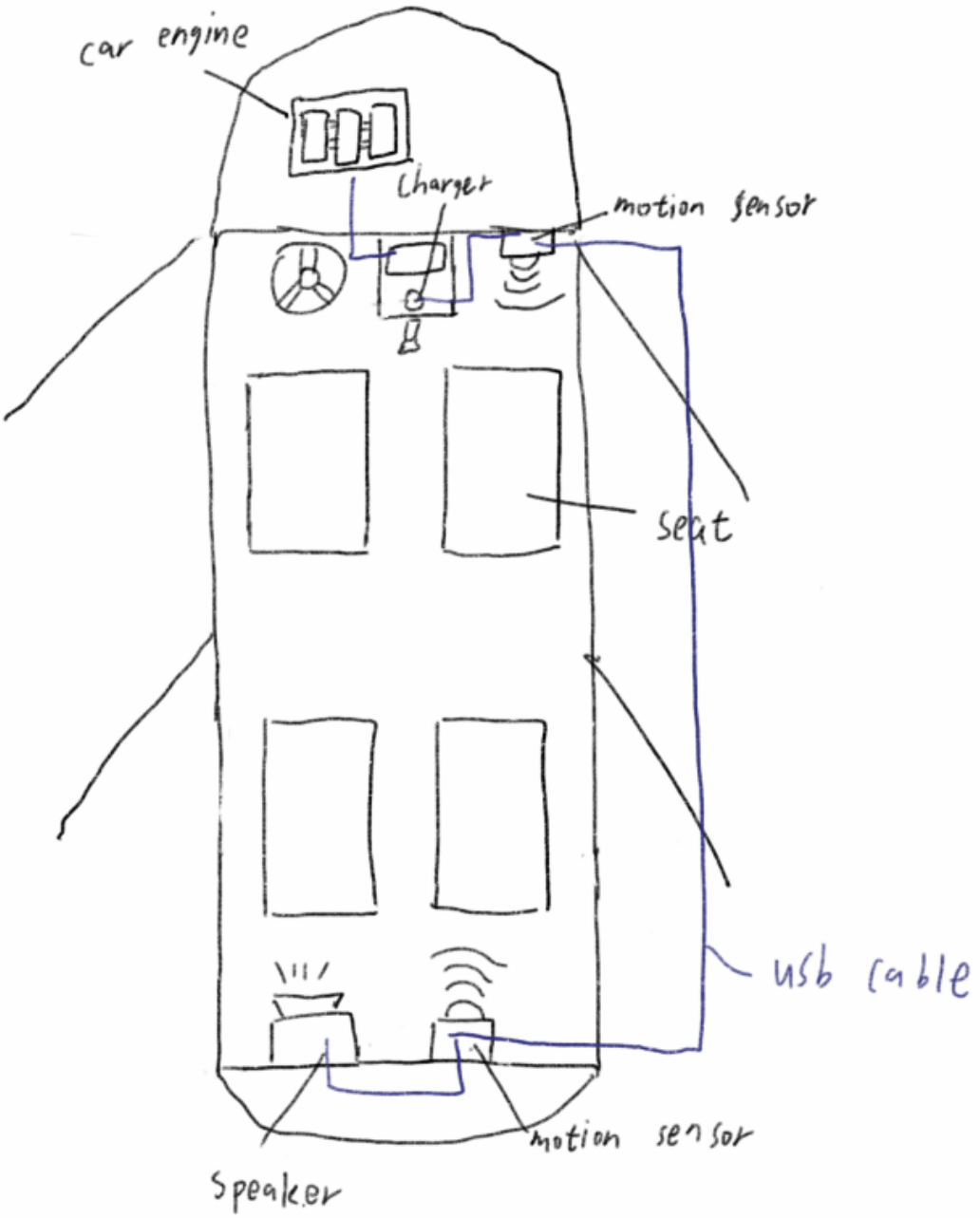

Figure 1: The structure of the device

2.2. Internal characteristics

Inside the device is the combination of the materials. the speaker is connected with the uno board and breadboard, the motion sensor is also connected with the breadboard, the car engine is connected with the uno board to ensure the charging, and the battery is connected with the charging port for power supply

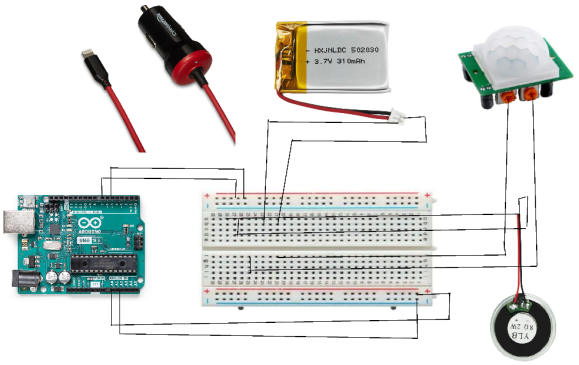

Figure 2: The internal structure of the device

3. Prototype Test Plan Outline

Since we had to go through a major design change, we had to re-discuss the details of our prototype. Since we had to modify the major part of our project, the first tangible prototype will be produced the following week.

During the zoom meeting with the TA, we have noticed a major problem with our design; thus, we enhanced our design and decided to use a motion detector with an audio system that can notify people around the car. Since the "detecting children in the car" part have been changed, we needed to find different materials for the prototype. Our team mainly searched on Amazon to get the delivery in the shortest time with convenience. We found all the required materials on Amazon and notified the TA. Since some materials will be provided by the TA, we only needed to order the "notification" part of the project: the speaker and its accessories.

After figuring out the necessary materials for the prototype, we made a diagram that shows what it would look like after installation (Figure 1). We have determined to put two motion detectors in the car: one in the front part and the other in the back to monitor the entire vehicle and its movement. A speaker will be installed at the back part and will be connected to the Arduino uno, which will be attached on the backside of the front seat.

Our solution has three parts, the charger, speaker, and motion detector. Our first prototype is to be able to connect the speaker with the Arduino board and the charger. The speaker should sound when a signal from the Arduino is received. We will also record a voice message for the speaker.

Fred will pick up the materials on November 6th and the rest of the materials will be delivered to Fred's house. Once he receives all the materials, Fred and Don will get together and start building the prototype. Since Yunsu is not in Ottawa, she will be joining them via a video meeting and participating in the prototype building process.

4. Analysis

Changing the major design and figuring out new materials was the challenging part. Even though we were confident with our initial design, we realized that it needed many changes after receiving the feedback from the TA. Another challenging part was the lack of communication among the team members. Since all of us have been very busy with school work and exams, we were not able to keep up with what we had planned initially. Even with the regular team meetings, we have realized that we need to contribute more time to comply with the fast-paced course and project deadlines.

Since we do not have a physical prototype with us yet, we will do a more detailed analysis for the following prototypes.

5. Feedback and Results

Once the prototype is completed, we will install it in the car and test it. Based on the risk and its contingency plans that we did for Deliverable E, there are three major parts we need to check. The first is the volume of the audio system. Since we need to find the appropriate volume that would notify others, we will test out the different volumes. The next part is the motion-detecting sensor. We do not know how sensitive the sensors would be, so we will test them out five times so that they are sensitive enough to detect the motion of babies and children. The last part would be the length of the cables. Since our device will be extensively installed in the front as well as in the back part of the car, we need long cables to connect the parts with the Arduino uno and the breadboard.

After the installation is complete, we will do five official testings and record them. During the weekly meeting, we will discuss how to enhance our model and modify the minor designs to make it better function.

6. Conclusion

In conclusion, we have built our first prototype with a specific prototype plan. This helped us solve some questions throughout our process as well as gave us a clear understanding of how to build our device more efficiently. The first prototype builds a basic structure to help our team recognize what we need to enhance for our future prototype.