Project Deliverable H

Prototype III and Customer Feedback

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Abstract

Our team has gathered all required components for the final product. During the process of constructing the container, we learned that the field of view for the motion sensors are too restricting, thus we modified the design of the system and placements of the motion sensors. The soldering for components such as the motion sensors and speaker is complete, and new containers have been designed and constructed for them. Plans for the following week include: Integrating car charger with the box containing the arduino uno, coding and assembling the photo-sensetive triggering system, soldering components onto circuit board, designing and constructing the container for charger, testing the system, and final assembly of all components.

Table of Contents

1. Introduction

From the last prototype, we solved several problems with our code, and made a new design for the final solution. The new design reduces the footprint of the original container by more than half, while increasing the range of detection. Soldering for both motion sensors and the speaker unit is complete, and their respective containers with the aim of lowering footprint are also complete. This report will discuss design changes in detail; list the design, construction, testing, and assembly plan for the following week; and discuss target specifications and achievements so far.

2. Prototype III; Updates and Changes

The new design separates the motion detectors such that it is capable of detecting motion in most cars carrying 2 to 8 passengers. This design reduces the footprint of the original container by more than half, while increasing the range of detection. The sensors are attached to the roof of the car using velcro. The speaker will be placed on the inside of the windshield near the dashboard, where its sound can be heard from the outside.

3. Design, construction, testing, and assembly plan.

3.1. Overview of work

Plans for the following week include: Integrating car charger with the box containing the arduino uno, coding and assembling the photo-sensetive triggering system, soldering components onto circuit board, designing and constructing the container for charger, testing the system, and final assembly of all components.

4. Target specifications and achievements

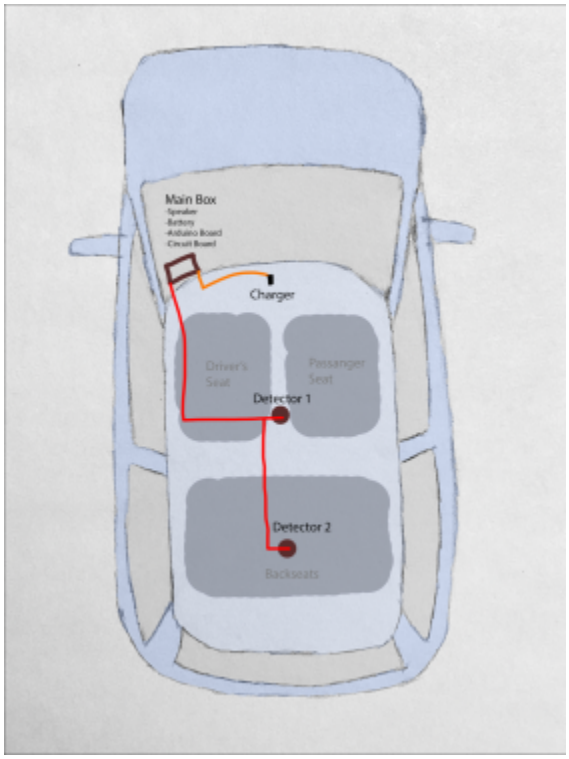
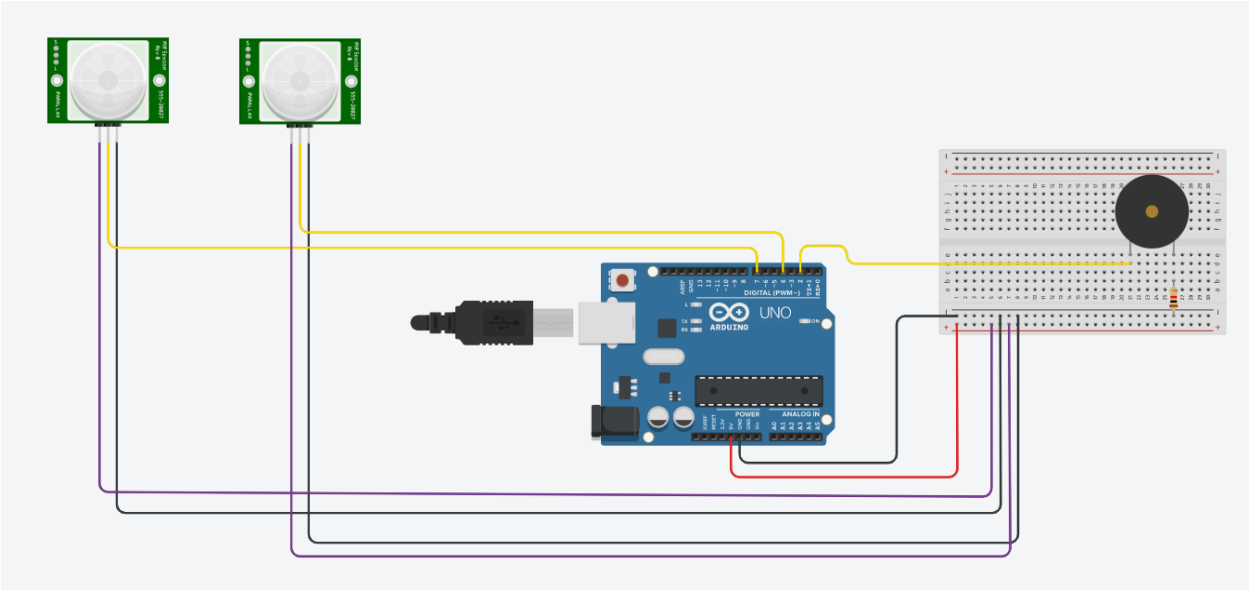


Figure 1: the sketch of the final design

After the meeting with the TA, we removed a 9V battery from our TinkerCad design model. We initially added a 9V battery because we could not find a 3.7V battery

from the TinkerCad material list. The battery was added so that it can work as a back-up battery when a car engine turns off. We realized that the 9V battery in our design diagram can be confusing so it was removed. We ran the simulation four times to make sure that the motion sensors and a speaker properly work.



Lee, Xu, Hung

Figure 2: Revised Tinkercad model

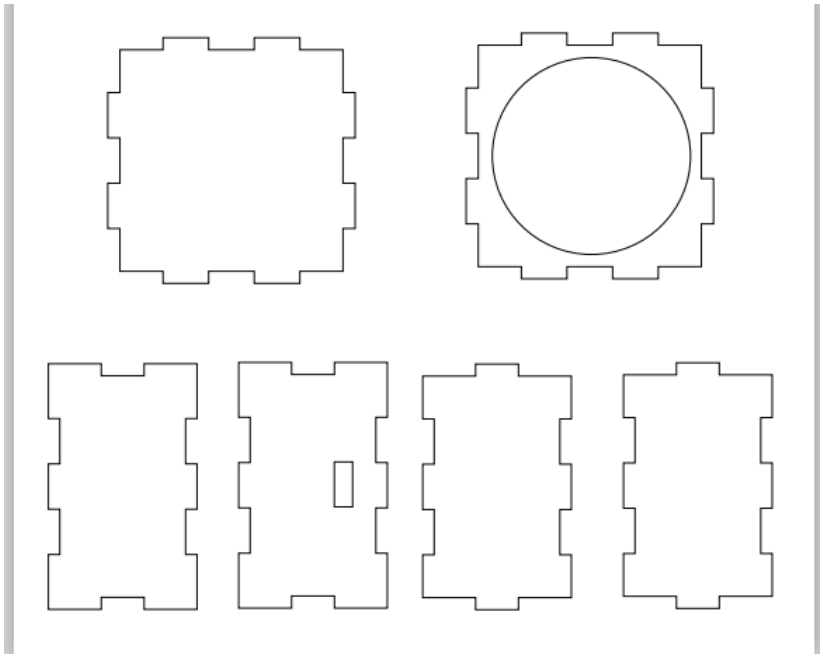


Figure 2: Case structure of the speaker for laser cutting

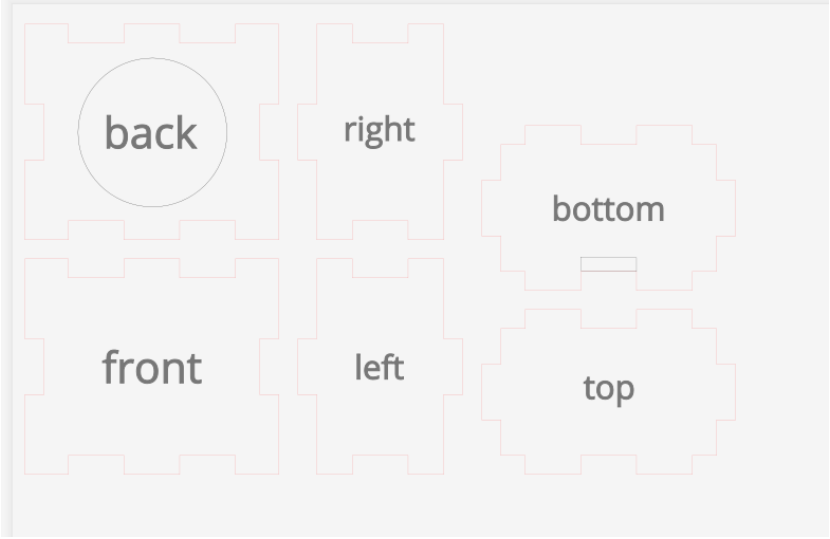


Figure 3: Case structure of the motion sensor for laser cutting

Figure 4: The case of speaker and motion sensor.

Table 2. Revised BOM chart

Name	Links	Unit Price	Tax	Total per item	Quanity	Total before tax	shipping	Total after shipping
Motion sensor	link	$10.99	$2.08	$13.07	2	$26.14	0	$26.14
Speaker	From GNG lab	$0.00	$0.00	$0.00	1	$0.00	0	$0.00
Car charger	link	$15.29	$2.53	$17.82	1	$17.82	0	$17.82
Electrical Wire	link	$9.98	$2.70	$12.68	2	$25.36	0	$25.36
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	From	$0.00	$0.00	$0.00	1	$0.00	0	$0.00

	GNG lab							
Male to Male header pin	From GNG lab	$0.00	$0.00	$0.00	1	$0.00	0	$0.00
Arduino Cable USB Type A-B	From GNG lab	$0.00	$0.00	$0.00	1	$0.00	0	$0.00
Protoboard	From GNG lab	$0.00	$0.00	$0.00	1	$0.00	0	$0.00
MDF sheet	link	$2.50	$0.00	$2.50	2	$5.00	0	$5.00
5FT Hook-Up wire 22AWG(Black)	link	$1.60	$0.00	$1.60	3	$4.80	0	$4.80
Total		$40.36	$7.31	$47.67		$79.12		$79.12

During our iteration, the motion sensors were burnt due to invalid connectivity with the Arduino Uno. Therefore, we needed to order more motion sensors. We also needed to order two MDF sheets and three hook-up wires. This makes the total of $79.12.

5. *Possible results of each prototype*

The result of the first prototype didn't achieve the function it needed. The size of the case, the connection with the Arduino board and motion sensor, and the coding part was full of mistakes.

The result of the second prototype achieved our requirement of laser cutting and material assembling, but there are still some problems with the coding part and the assmbling of the casing

The result of the final prototype achieved every requirement we need and works as we expected, which means our design properly can meet the needs of the client.

6. Conclusion

Afer today's working in lab, we assembled the speaker and the motion sensors into the container that had been laser-cut. The new design of the container allowed the motion sensors to have a wider range of detection. This resolved the problem with the previous container design, which had too much restriction on the sensitivity and detection of the motion sensors. The soldering for components is completed and the appropriate case for the speaker and the motion sensors were produced. The focus of the following week will be the integration of a car charger, assembling the photo-sensitive triggering system, soldering, the final assembly and feedback of the system.