Project Deliverable F: Prototype I and Customer Feedback

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Abstract

The main objective for this project deliverable will be to outline a prototyping plan with the components we chose in our last deliverable, or a plan on how to properly manufacture and bring our ideas into fruition. After outline a plan we also have the objective or describing the way in which we will be testing this first prototype so that it can be further optimized later on on the next deliverable.

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Introduction

As seen in our lectures, after we have defined both the systems and subsystems we are going to use for our design solution, we must come to the part in which everything will come together by creating a proptype, which consists of the manufacturing, programming, and assembling of all the components our device will be comprised of. Since at this stage this is only the first prototype, the entire manufacturing methods will not be outlined, this is just a proof of concept that our system can actually work together, but our first prototype outlined on this deliverable must be optimized after. We will create in this report a prototyping plan and a testing plan on how we will make sure our device will work properly.

System Analysis

For the components we chose in our BOM submitted on our last deliverable we have the following systems:

- **Motion alert system:** through our PIR motion sensor and our Arduino UNO, we will create a program which sets up alerts sent to the phones of the parents/guardians of the children or pets inside the vehicle, this can be easily done. Also, the motion sensor will be connected to the buzzer so that if it is activated after the car is locked, it can set off the buzzer, this will also be done through a program in the arduino.

- **Temperature alert system:** through the TMP36 temperature sensor and the Arduino UNO, we will create a program which will trigger a failsafe alarm, in case the motion sensor fails to alert the parents that they left someone on the backseat, when the temperature inside the vehicle arises, the program will also act the same way as the motion sensor in that it will send the parent/guardian text messages and notifications to the parents so that they become aware they left someone on the backseat. As a fail safe, the temperature sensor can also be programmed to the buzzer, in case the first alarm fails.

Prototype Plan

The prototype plan for our device will be outlined below:

- First, following our BOM we will acquire the components that are available to us through the Maker Store.
- Then the components that are not available at the Maker Store will be purchased through Amazon or other online retailers.
- After gathering all of the components together, we will proceed to build the Arduino and Sensors' circuit, while also creating the code for the proper functioning of our system.
- After building the circuit, and getting it all running (although it does not need to be perfect at this stage), we can make some minor adjustments, we just need to build the prototype to make sure our proof of concept works.
- Lastly, we will proceed to build a box or case for our components so that they can be protected while in use.

Test Plan

For testing our device we will adhere to the following plan to which all group members agreed:

- First, we will start by testing the code and functioning of our Buzzer.
- Then we will proceed to do the same for our Temperature sensor, while also tweaking the code until we get to the desired output.
- We will proceed to the same for our Motion sensor which takes more work than the other components outlined above, therefore will be the last part of our code.
- Then we will proceed to set up the system of notifications sent by our device to the parents/guardians through text messages.
- After the testing of all the coding components, we can proceed to arrange the components inside the box that we will make using the laser cutter.
- We would then proceed to test the entirety of the system all at once and keep tweaking those things that need to be improved for the proper functioning of our device.

Conclusion

Throughout this project deliverable we were able to come up with the plan to manufacture, purchase and assemble our device’s components. Through this we learned how to abide within design constraints, and in doing so we get a clearer understanding of the design process, more specifically the prototype and testing stage of it. With the foundation laid in this deliverable, now we can start following the prototype plan and assemble our device together. After putting our prototype together, we can proceed to start with the coding necessary for the proper functioning of our sensors, and when it is all completed we can move to the last part before the next deliverable which is testing our device for any type of malfunctioning that might be present.

References