Project Deliverable H: Prototype III and Customer Feedback

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Abstract

The main objective for this deliverable is to describe our last and final prototype, which was developed after receiving feedback on our prior efforts. Through our client's feedback and testing we will analyze the design that we finished. After describing our prototype we will be showing the benchmarks we reached, along with the results from the tests that we performed through the different subsystems and sensors that we included in our design. Finally, this prototype will be the one presented on our design day, for which we will do a presentation to show both our professor and our client and judges.

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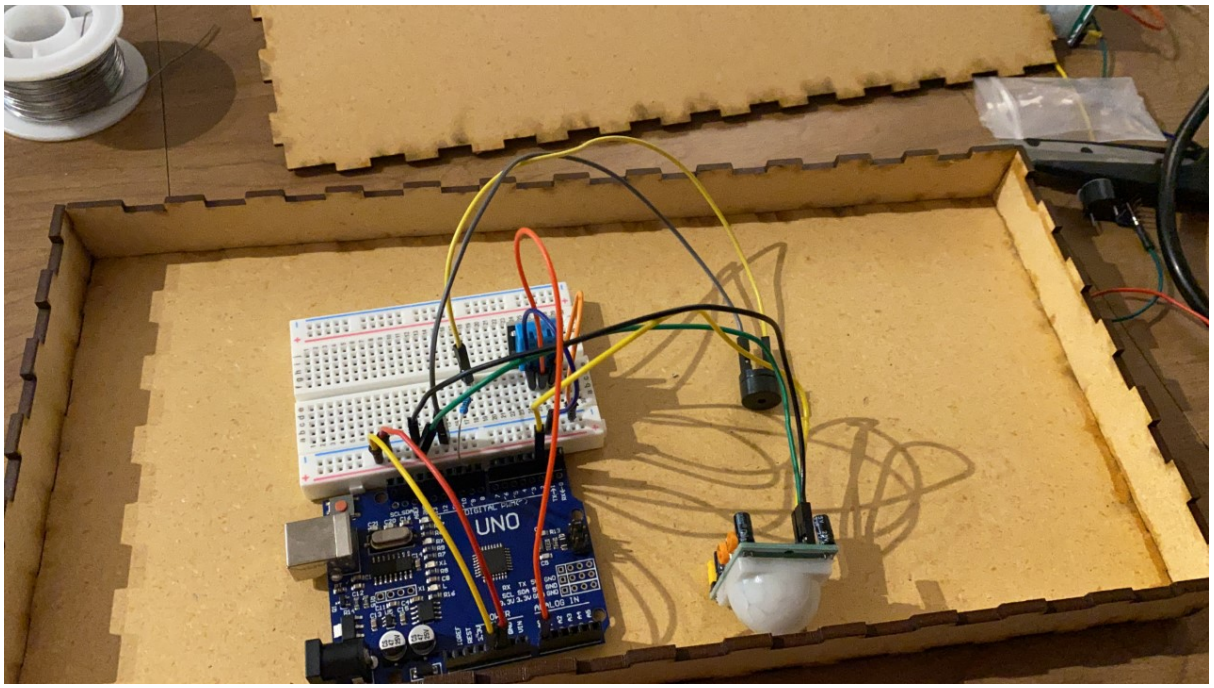
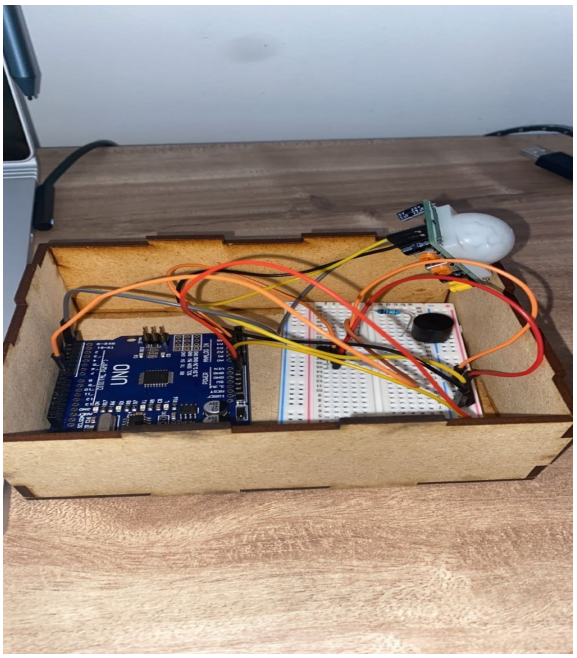
Introduction

Throughout the semester we have learned in the lecture portion of this course about the different stages of the design thinking process, which has been implemented in the design project that we have successfully completed. The final stage of the design thinking process is Prototyping and Testing, which is the stage that we have completed, and will be explained and shown during this deliverable. After choosing the subsystems we were going to implement in our design, we proceeded to manufacture, assemble, and code all the components in our device, and through rigorous testing and tweaking we finally arrived at the final prototype, where as we will see, we reached the goals we set during the defining stage. After showing the different components of our design with their corresponding functionalities, we will proceed to attach images of the different results obtained from the execution of our device, namely, the execution of the motion and temperatures. Finally, we will proceed to draw conclusions and things we learned throughout the final stage of the prototyping and testing phase.

Prototype Progression



prototype 2



prototype 3

https://youtu.be/AN5O1M3yCtI (Alarm Test with threshold set to 20°C)

Test plan

For testing our third prototype, we will carry out the following plan:

- First we have to make sure that the TMP36 is reading the correct temperature inside the car. This will be checked by recording the internal temperature of the car using the TMP36 sensor and comparing this value to a alcohol thermometer to ensure the correct temperature is recorded
- The prototype will then be set up in its respective position in the car in order to test and adjust the sensitivity of the PIR sensor. This test ensures that motion can be detected within the car.
- For this test the car will be brought to or above a threshold temperature of 30℃ with the prototype set up inside. When the threshold temperature is reached motion will be introduced inorder to test if the alarm system will trigger.
- Finally the car's internal temperature will be kept below the threshold temperature. motion will then be introduced in order to confirm that there will be little to no false alarms.

Conclusion and Reflection

Throughout the time frame of this project deliverable, we successfully completed the assembly of our last prototype, which we can conclude is the most important one, since it is the device to be presented on design day. We have made some changes to our code, gathered the last components for our device and tested our prototype. We have also laser cutted a new box which is more compact. We also got a clearer understanding of the design process and the steps we must take to create, modify, and test a prototype. We have laid a solid foundation to keep working on our design so that it can be ready and fully functional for our design day presentation. Finally we will have a fully functional prototype with the last touch ups, and our product will be ready for the design day presentation.

References

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2. KY-006 PASSIVE BUZZER MODULE. Retrieved November 25, 2021 from https://arduinomodules.info/ky-006-passive-buzzer-module/

3. PIR Motion Sensor. Retrieved November 25, 2021 from https://learn.adafruit.com/pir-passive-infrared-proximity-motion-sensor