

Cole Feely
Apr 6, 2022
Electrical and Computer Engineering 304
Junior Design Project

Build 1 Report

Introduction

This report will serve as an overview of the first build's tests and results. This build was expected to meet the specifications laid out in the first preliminary design review. As expected in any engineering project, the results were not exactly as predicted before the build was initiated. Overall, this build serves to lay the ground work for the main functionalities of the device. Section 1 will go over the previous plans and tests, Section 2 will denote design changes and Section 3 will design the results of the tests.

Section 1: Original Specifications

1. Automatically detect patrons that are up to 10 feet away
2. Shall track the distance of the approaching individual and display it for the visitor and the user
3. Will alert both the approaching individual and the user that the visitor is in violation
4. The system will direct the patron to be 6 feet away
5. The system will utilize a display for the approaching party to show their distance from the desk
6. The system will employ another display for the desk attendant that details the distance of the current patron
7. The desk attendant display will also show the minimum two distances of the patrons over a time-period

Section 2: Design Changes

The first design change was due to the capabilities of the Arduino uno. The Arduino Uno did not have input pins for the seven-segment display and the LEDs to alert the approaching party and the user of a violation. Additionally, the Arduino only had one 5V power output to provide to the boards, so the boards needed to be connected to both be powered.

I also changed the measurement to centimeters as it is easier to display on the displays and setting up the displays to show the distance in feet would require extra calculations and a work around the decimal system for the seven-segment display.

The minimum two distances were dropped as a main resign requirement for this build because I wanted to shift focus on displaying the current distance and incorporating this would detract from the main functionalities of the build.

Section 3: Test Results and Conclusion

This build was able to meet the following specifications:

Spec 1- Automatically detect patrons that are up to 10 feet away

Spec 2- Shall track the distance of the approaching individual and display it for the visitor and the user

Spec 5- The system will utilize a display for the approaching party to show their distance from the desk

Spec 6- The system will employ another display for the desk attendant that details the distance of the current patron

This build was not able to meet the following specifications:

Spec 3- Will alert both the approaching individual and the user that the visitor is in violation

Spec 4- The system will direct the patron to be 6 feet away

Spec 7- The desk attendant display will also show the minimum two distances of the patrons over a time-period

The build was not able to meet Specifications 3 and 4 because of the previously explained unanticipated shortage of output pins on the Arduino board. Specification 7 was dropped according to the explanation found in Section 2.

Section 3: Test Results and Conclusion Contin.

While working on this build, I learned that the provided code from class had a major bug where the 1 was displayed as a 7 on the seven-segment display despite having the proper hexadecimal value in the array for the digits.

Conclusion

From this build, I learned to not assign myself too much to work with. The purpose of this build was to get something up and running right away and that was not the focus. I tried to get the final build running on the Arduino Uno, but this was too much to handle with the time constraints.

I feel confident and prepared to enter the final build phase, although after conducting this build, I realize that some specifications that I failed to meet in this build will be more difficult to incorporate in the final build than anticipated. I spent too much time trying to get all the extra components of the design working rather than making sure the bare essentials was adequate.