Parker Authier & Ben Kepner

Prof. Foster

CE 420-03L Lab 6

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# Objectives

The objective of this lab is to use the ultrasonic sensor with the Micros II board to measure distance and display the result on an OLED display. The device should be able to be communicated to via Bluetooth terminals. The functionality and accuracy of the sensor was then compared to that of a store-bought laser distance sensor.

# Hardware

The hardware used was the Microcomputer Systems II board, the expansion board designed for the class, the LCD display module and the ultrasonic sensor module.

# Program Source Code

## Main.c

|  |
| --- |
|  |

## Sonar.c

|  |
| --- |
|  |

## Sonar.h

|  |
| --- |
|  |

# Experiment and Data Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Distance (cm) | Ultrasonic Sensor (cm) | Laser Sensor (cm) | Measurement Error |
| 20 |  |  |  |
| 30 |  |  |  |
| 40 |  |  |  |
| 50 |  |  |  |
| 60 |  |  |  |
| 70 |  |  |  |
| 80 |  |  |  |
| 90 |  |  |  |
| 100 |  |  |  |
| 110 |  |  |  |
| 120 |  |  |  |
| 130 |  |  |  |
| 140 |  |  |  |
| 150 |  |  |  |
| 160 |  |  |  |
| 170 |  |  |  |
| 180 |  |  |  |
| 190 |  |  |  |
| 200 |  |  |  |

Our sensor is accurate at shorter distances and becomes less so given larger distances. This is mainly because there is more interference with our ultrasonic waves as they reflect off other objects and get distorted by noise in the surrounding environment. The laser sensor is not affected by the same conditions of that of the ultrasonic sensor. Therefore, the laser sensor is more accurate at larger ranges than the ultrasonic sensor.

# Conclusions