CSC 615-01 SP 21 Assignment 2 – Tapeless Ruler

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This assignment was an excellent opportunity to utilize what I learned from physics class using Echo Sensor. I built a program measuring distance using the Echo sensor (HC-SR04) and Raspberry pi. The echo sensor has a transmitter(trigger pin) and a receiver(echo pin). The Echo sensor triggers ultrasonic to the object, and it reflects back from the object. The code calculates the distance out of the time difference from the total time of the pulse.

Speed of sound in air (v) = 340m/s

Distance = speed * time = 340m/s * (duration of purse/2)

The program prints out a result in cm, and is only executed once.

I wired the Trigger pin in GPIO 23, Echo pin in GPIO 24, got power from 5v pin with VCC pin, and ground it with physical pin 39. To connect the PI from C, I used the wiringPi library. I put the TRIGGER pin in LOW to initialize the sensor and wait for 1 second. Then I trigger the sensor to send out the pulse. My ECHO pin will measure the duration of time-lapse.

In this project, I repeated the same code with two different conditions: two resistors (2.4Ω) and without any resistor. I wondered whether I could get an extra maximum measured distance if I put my sensor directly on the pi. They both give me a similar result.

For me, the hardest part of the assignment was understanding how to prepare the Echo sensor to make it do the assigned task. TRIGGER pin and ECHO pin should be initialized as LOW before it gets the pulse which makes sense. The pins only have 1 or 0 as a value.