SIT210: Embedded Device Development

Task 4.1P mBed: Ultrasonic sensor

Hardware Required

mBed
Ultrasonic sensor 2 options: I2C sensor SRF08 (more expensive) or PWM sensor SR04 (cheaper)

Software Required

Browser:
For SRF08 library: https://os.mbed.com/cookbook/SRF08-Ultrasonic-Ranger

Pre-requisites: You must do the following before this task

1) All previous mbed task

Task Objective

In this task, you will learn to read range data from an ultrasonic sensor using I2C.

Steps for SRF08:

1) Create a schematic diagram, and using breadboard to connect the SRF08 to the I2C pins of mBed.
2) Import the SRF08 library into your mbed online IDE.
3) Create a main.cpp to start reading the range data from the ultrasonic sensor.
4) Read the distance data and divide into 3 regions: far, close, and closest.
    a) When the ultrasonic sensor senses an object within the far region, the system turns on the mbed LED.
    b) When an object comes to the close region, the system blinks LED slowly
    c) When the object comes to the closest region, the system blinks LED rapidly.

    Note: you can determine the values for the regions and the speed of the LED using variables so this can be updated quickly.

Steps for SR04:

1) Create a schematic diagram, using the breadboard to connect the SR04 sensor to digital pins of mbed.
2) Consult the datasheet of the SR04 at http://www.micropik.com/PDF/HCSR04.pdf to work out the logic for using the SR04.

3) Read the distance data and divide into 3 regions: far, close, and closest.
    a. When the ultrasonic sensor senses an object within the far region, the system turns on the mbed LED.
    b. When an object comes to the close region, the system blinks LED slowly. When the object comes to the closest region, the system blinks LED rapidly.

Task Submission Details

Q1: Submit a video that demonstrates the system working.

Q2: Create a repository named ultrasonic on Github. Upload your code to the repository. Include the link to your repository here.

Q3: Describe a real life usage scenario for your system.

Remember to submit this to Doubtfire, and check the status of any existing tasks. You may need to fix and resubmit some of your work. You want to check out why, so that you can learn from this and make it faster and easier to get later work to the required standard.