McGILL UNIVERSITY

ECSE 211: Final Design Project

Testing Document

Yin Jun Huang
(Charles)

supervised by
Frank P. Ferrie

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1 SUMMARY

This document is intended to indicate the object and the methodology of testing of our project as well as discussing the result of testing.

CONTENTS

2 TASK

Project: Design Principles and Methods Final Project: Capture the Flag - Team 15
Task: Design an autonomous robot that can play a one-on-one version of the Capture the Flag while navigating through an obstacle course.

3 EDIT HISTORY

    a.   Document Version Number

      i. 0.0.1: Version presented to Prof. Ferrie on the 2017/10/27

    b.   Edit History

      i. Charles Huang, 2017/10/25 (4.30pm) - Created the document, designed the tests of the project

     ii. Aliah Mohd Nazarudin, 2017/10/26 (1230pm) - Change the format of the document

4 SENSOR CHARACTERIZATION TESTING

4.1 Test 1: Tests of the detection range of ultrasonic sensor

Objective: The objective of the tests is to determine the detection range of ultrasonic sensor .

Methodology: We will place a block in front of the ultrasonic sensor , which means the angle between the block and the ultrasonic sensor is 0 degree. Then, we will program the robot to rotate 360 degree and record the angle when the robot detect the block and when the robot can no longer deter the block in order to determine the detection range of ultrasonic sensor.

Results:

Discussion:

Conclusion:

4.2　Test 2: Tests of accuracy with ultrasonic sensor

Objective: The objective of the tests is to test the accuracy of the three ultrasonic sensor and determine which ultrasonic sensor is most accurate so that we can use it for the final project.

Methodology: We will place a block in front of the ultrasonic sensor for certain distance to determine the accuracy of the ultrasonic sensor. We will first place the block 5 cm in front of the ultrasonic sensor, which means the angle between the block and the ultrasonic sensor is 0 degree. Then, we will fetch the data from the ultrasonic sensor to compare with the actual distance. After, we will increase the distance between the block and the robot to 10 cm, 15 cm and 20 cm and fetch the data from the ultrasonic sensor to compare with the actual distance. We will do the same tests for all three ultrasonic sensor in order to determine which one is most accurate.

Results:

Discussion:

Conclusion:

4.3   Test 3: Gridline detection tests with light sensor

Objective: The objective of the tests is to determine the changes of light intensity detected by light sensor when it detect the gridline.

Methodology: The test robot will be place on an open field. We will place the centre of rotation of the robot at an intersection of grid line. The robot will rotate 360 degree while continuously recording the value detected by the light sensor after a simple differential filter is applied.

Results:

Discussion:

Conclusion:

4.4   Test 4: Colour block detection tests with light sensor

Objective: The objective of the tests is to determine the changes of light intensity detected by light sensor when it detect different colour blocks..

Methodology: The test robot will be place on an open field. We will place a colour block 10 cm in front of the robot. The robot is programmed to pass by the block. The robot will continuously record the value sent by the sensor after a simple differential filter is applied. Then, we will repeat the previous step with different colour block.

Results:

Discussion:

Conclusion:

5 UNIT TESTING

Test number	Category	Description	Pass/Fail	Comments
1	Odometry			
2	Navigation			
3	Zip line traveling			
4				
5				
6				
7				

6 INTEGRATING TESTING

Test number	Category	Description	Pass/Fail	Comments
1				
2				
3				
4				
5				
6				
7				

7 SYSTEM TESTING