Weight Balance Test

Project: Design an Autonomous Robot

Task: To design an autonomous robot that is capable of navigating to a predetermined position while avoiding obstacles and firing objects at two targets. This is to be done in the shortest time possible.

Document Version Number: 1.0

Hardware Version Number: 5.0

Software Version Number: 5.0

Date: April 8th, 2015

Author: James Fuh

Table of Contents:

Purpose…………………….......................................................................................... 1

Objective...................................................................................................................2

Procedure..................................................................................................................2

Format of Output...........................................................................................................3

Conclusions ...................................................................................................................3

Distribution..................................................................................................................3

Purpose

The purpose of this report is to observe the effect of putting batteries on the left side of the robot to balance the overall weight of the robot. Because the launcher is only installed on the right side of the robot, the overall weight of the robot is imbalanced. It might cause the robot to deviate from its desired path it should travel. It is important to observe what the weights of the batteries can do to the robot while it is travelling.

Objective

The objective of this test is to see if the robot can travel in a straight line with a balanced weight. In the best case scenario, the robot will travel straight on a gridline. In the worst case scenario, the robot will travel away from a gridline.

Procedure

The Robot in white circle will travel in gridline with around 120 cm long (4 tiles),. After it travels to the spot, it will stop. As the robot stops, we will record the angle between the robot and the gridline. We will repeat this procedure 8 times to verify the consistency.

Format of Output

The test result is in the file “Test Result.xlsx”

Sample calculation

Taking the arctan of the X and Y distance travelled from the robot and comparing to the theoretical value do calculations.  
Theta = arctan(y/x)

Conclusions

With the installation of the batteries on the left side, the course of the robot is clearly fixed. Without the batteries on the left side of the robot, the heading of the robot is about 7.64. After the batteries are installed on the left, the heading of the robot becomes closer to the gridline, with about 2.84. As a result, it is viable to balance the weight of the robot by putting a batch of batteries on the left side of the robot.

# Action

9 batteries will be added so that the robot will be able to travel in a straight line over long distances. The batteries serve as a counter weight to balance out the extra launching motor located on the right side of the robot.

Distribution

This test belongs to the hardware development.