CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

34012

Project Title

Battle of the Bots: Raspberry Pi vs. the NXT and Omnidirectional Steering vs. Car-Steering

Abstract

Objectives/Goals

The purpose of this project was to study how processors affect the speed of a robot following a track and to study how steering design affects the speed of a robot following a track.

Methods/Materials

We measured the time it takes robots made from Lego Technic parts to travel four times around an oval path taped on the floor. There were 15 trials for each of the four robot and processor combinations. The robots used Lego motors and a Lego color sensor. One of the processors was a Lego NXT processor and the other was a BrickPi with a Raspberry Pi. One of the robot designs used omnidirectional steering and the other used car-steering.

Results

A car-steering robot using the NXT processor was faster than a car-steering robot using the Raspberry Pi. For an omnidirectional robot, the speeds were about the same for both processors. A robot with a car-steering design was faster than a robot with omnidirectional steering when using either the NXT or Raspberry Pi.

Conclusions/Discussion

We concluded that the efficiency of a controller is based not only on its computer power but on other parameters such as the car design, coding and sensor and motor relay paths. We concluded that a car-steering robot is faster than an omnidirectional robot for this particular task. In general, a car-steering robot is faster compared to an omnidirectional robot, but a car-steering robot can get stuck in dead-ends on more complicated tracks. Since the track used was wide enough for the car-steering robot to turn on, it is not surprising that the car-steering robot was faster for this task.

Summary Statement

The purpose of the project was to compare the efficiency of two different processors and the efficiency of two different robot designs at performing a particular tracking task.

Help Received

We received help from our parents with editing our posters and presentations, and programming help from the Santa Barbara Makerspace which meets at the Santa Barbara Public Library.