CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)
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Project Number
J0318

Project Title
Table Cleaning Robot

Abstract

Objectives/Goals
The objective of this project is to design a table cleaning robot that will wipe spills and dust off the table without human supervision.

Methods/Materials
I used ev3 lego pieces to build my robotic vehicle and programmed it using the Mindstorms software. I used drag and drop action blocks, flow blocks, sensor blocks and a loop to give commands to the robot on how to move and when to shut off. I attached an ultrasonic sensor to sense the edge of the table. When it reaches the edge, it moves back, does a pivot turn on a ball caster and goes in another direction

Results
I built 3 different prototypes and performed 105 trial runs. The first prototype used a color sensor but only worked on a rectangular shaped table. So I switched to an ultrasonic sensor for the second prototype which could now clean all different table shapes. In the final prototype, I moved the cleaning sponge to the back to minimize drag and added a wet wipe for better cleaning. The robot can clean dust and liquid spills on a table of any shape without human supervision. After 20 testings it did not fall off once from different table shapes. It passed the wet wipe cleaning test and surface wetness test. It shut off after 3 minutes and made a beeping sound to the user to signal the cleaning was finished.

Conclusions/Discussion
An ultrasonic sensor is more effective than a color sensor for the table cleaning robot. The color sensor only works on a rectangular table and gets confused with colored spills like ketchup. The ultrasonic sensor works on all table shapes. It continuously measures the distance from the closest object using sound waves. The table top is near the ultrasonic sensor, but as soon as it crosses the edge, it reads a very large distance from the floor indicating that it has reached the edge and then it is programmed to move back and in another direction. This robot will be useful for those who want to save time cleaning and the disabled.

Summary Statement
I designed and programmed a table cleaning robot that wipes spills without human supervision and uses an ultrasonic sensor to sense the edges of the table

Help Received
I designed and programmed the robot myself using online research. My science teacher and parents reviewed the design and results.