Name(s)	Project Number
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Project Title
Detecto-Bot

Abstract

Objectives/Goals
I take a lot of medications because of a health condition I have. Whenever I eat, I take capsules containing enzymes. Sometimes I used to drop them on the floor without realizing, and would miss out on my required enzymes. I wanted to build a robot that would help me and others in similar situations, by detecting dropped objects on the floor, and alerting when this happens.

Methods/Materials
Materials:
LEGO Mindstorms EV3 Kit; EV3 Home Edition Software; Computer

Method:
1. Build a robot with touch and ultrasonic sensors.
2. Program the robot to:
➢ Back away when it hits an obstacle.
➢ Detect objects on the surface.
➢ Turn around when about to fall off a surface.
3. Test the robot to see if it can properly back away from obstacles and detect objects on the surface.
4. If the robot isn#t able to complete step 3 successfully, then repeat steps 1 and 2 as needed.
5. Test how many times it can detect certain types of objects out of 10 trials for each object.
6. Convert results into a percent to determine the accuracy of the robot.

Results
Using ultrasonic and touch sensors, a robot can navigate through obstacles. It can detect small objects on the floor. But detection rates depend on the size and shape of the objects.

Conclusions/Discussion
My hypothesis is if a robot is equipped with the right sensors, then it will be able to detect the desired conditions and objects, because the robot will be able to use the sensors to avoid obstacles and navigate properly.
 I tested my hypothesis by designing an experiment where I built a robot using a LEGO Mindstorms EV3 kit. I observed what objects it could detect, and how it navigates using an ultrasonic and a touch sensor. During my tests I found that the larger the objects are, the easier it is to detect. Sometimes the robot misses an object completely because of its size. Also, if objects have reflective surfaces or have dents, the ultrasonic sensor gives incorrect measurements, and the robot fails to detect those objects.

Summary Statement
Build a robot that can navigate obstacles and detect small objects on the floor.

Help Received