EEL 5666 INTELLIGENT MACHINES DESIGN LABORATORY

Search-n-Fetch

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Abstract

Search-n-Fetch locates and fetches balls of a given color. The robot is designed generically to fetch any ball since it has no ball-specific fetching mechanism. It uses a camera to detect the environment and Atmel MAVRIC-IIB microcontroller for the behaviors. It uses IR and bump switches to avoid obstacles.

Introduction

In a game of tennis, or cricket, fetching a ball can interrupt play for considerable lengths. The autonomous robot Search-n-Fetch can locate and fetch balls there by letting the players concentrate on their game.

Integrated System

Search-n-Fetch has a MAVRIC-IIB microcontroller as the brain and a camera as its eyes (slightly projected from its main body). It has Sonar sensors to avoid obstacles and a simple one-way flipping door (not controlled) to collect the balls.

Mobile Platform

The platform should have the camera projected in front of the robots main body with a light weight door to the front forming a small area to collect the balls.

The diagram below shows the overall structure of the robot. I am still contemplating whether to keep a door in the front or not (to prevent collected balls from falling away from the robot).
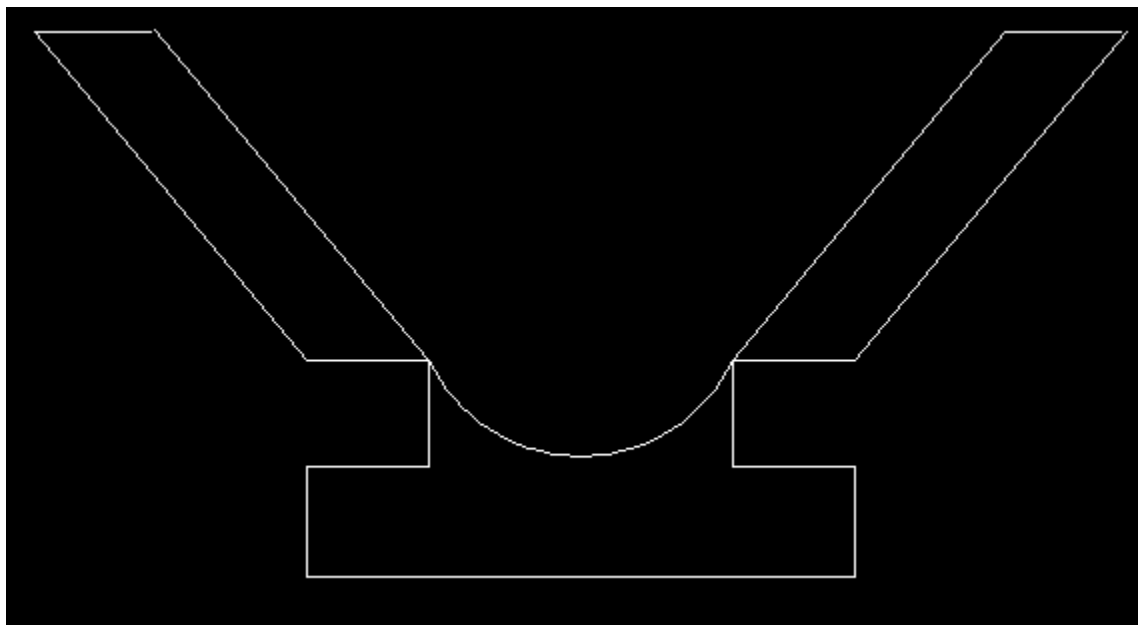
I am having difficulty doing 3D in Autocad. I need to have my motors and the electronics in the rear and the camera should be in the middle over a small poll (to have better view). I am

planning to start designing using solidworks since the interface is more intuitive there.

If there is a way to design a mechanical (control free door) which can open inward but not outward, I will implement that. If that's not possible, I will have some mechanism to do it with servo motors.

Actuators

I am planning to buy the DC motors from the following site http://www.lynxmotion.com/Product.aspx?productID=597&CategoryID=11

Sensors

1) CMUCam
I am planning to order this camera in this site http://www.seattlerobotics.com/
2) Sonars
I am planning to order 2 sonars for obstacle avoidance. I am planning to order them from www.acroname.com

Behaviors

Upon initiation the robot searches for balls of the given color and radius. Obstacle avoidance is implemented using sonar. Once it collects all the balls (or it cannot collect any more), it finds a wall and stays close to it (to keep away from the court).

Experimental Layout and Results

Conclusion

I have a lot of work to do to keep up the deadlines and I should order all these parts as soon as possible.