RoboTag

Programming Computers to Make Robots Play Bumper Tag

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Challenge

- Program the iRobot Create using MATLAB to engage in a friendly game of tag.
- Robots score by hitting the opponent with their bump sensor.
- Each time the robot, Robert, bumps the opponent he beeps the amount of times he has scored.
- All participants must remain within the battle arena, designated by white duct tape, using cliff sensors. Robert has a total of four cliff sensors.

Assumptions

- Robert is playing on a blue carpet with a white duct tape border.
- He is playing against other robots, not humans.
Design

Drive

Bumpers Makes Contact

Throughout Entire Process

Sense for Cliffs

No Cliff

Cliff

Turn 120°

From Left

Beep

Turn 90°

From Center

Beep

Turn -90°

From Right

Beep

Return to Top
Code

beep = [50 0]
WriteSong(Robert, 15, beep)
SetFwdVelAngVelCreate(Robert, 0.5, 0)
[BumpRight, BumpLeft, WheDropRight, WheDropLeft, WheDropCaster, BumpFront] = BumpsWheelDropsSensorsRoomba(Robert)

while WheDropRight == 0
[BumpRight, BumpLeft, WheDropRight, WheDropLeft, WheDropCaster, BumpFront] = BumpsWheelDropsSensorsRoomba(Robert)
[strg] = CliffFrontLeftSignalStrengthRoomba(Robert)
WriteSong(Robert, 15, beep)

if BumpFront == 1
    playsong(Robert, 15);
    turnAngle(Robert, 0.5, -70);
    SetFwdVelAngVelCreate(Robert, 0.5, 0);
    beep = [beep 50 30]
end

if BumpRight == 1
    playsong(Robert, 15);
    turnAngle(Robert, 0.5, -70);
    SetFwdVelAngVelCreate(Robert, 0.5, 0);
    beep = [beep 50 30]
end

if BumpLeft == 1
    playsong(Robert, 15);
    turnAngle(Robert, 0.5, 70);
    SetFwdVelAngVelCreate(Robert, 0.5, 0);
    beep = [beep 50 30]
end

if strg >= 6.1
    turnAngle(Robert, 0.5, 120);
    SetFwdVelAngVelCreate(Robert, 0.5, 0);
    SetLEDsRoomba(Robert, 1, 0, 99)
    end
end
StopCreate(Robert)
playSong(Robert, 15)
Problems and Solutions

- Robert would repeatedly cross over the border.
  - We changed from using two cliff sensors to one.
- After initiating the command, he would spin in circles, stop, flash his lights, “die,” and then turn back on automatically.
  - We realized there was an extraneous line of code interfering with the command. After erasing this line, Robert fulfilled his requirements perfectly.
Demos
Demos
Demos
The End

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