Microprocessors-2

Spring 2023

CaiRobOlympics

Project Description:

Football (Penalties): This game is divided into two: Shooting and Goalkeeping

1- **Shooting:** The robot is put in front of the ball at a known fixed distance and is required to score a goal
2- **Goalkeeping:** A robot of another team is required to stop the ball from getting in

This game will be held as a tournament between all robots

Football Rules:

- A stress ball is used in the game., 120 cm goal wide, 60 cm height
- In penalties, the goalkeeping team is allowed to place the shooting robot away from the ball, a maximum of 1.5m (radius) from the ball, the ball must be in front of the robot.
- The goalkeeping goal should not use any tool that covers the whole goal, the max width with extensions is 70cm
- The robot should shoot the ball within 1 minute of placing it.
- The penalty spot will be 1.8 m away.

3- **Maze**(Line Following): The robot of each team enters a maze, and the score of each robot is calculated based on how accurately(bumps or takes another wrong route) the robot solves the maze

Maze Rules:

- Line Following Maze: minimum distance between lines is 35 cm
- Every mistake in the maze solving, such as returning to a wrong route or bumping into something, or moving away from the line will be penalized with +5 seconds(second time only).
- Each team will bring one maze(one path and no loops in design) and each robot should enter all 9 other mazes twice each, the time of the second attempt is taken into consideration.
- The score is equal to the average of the mazes times. The one with less time is the winner and so on...
- The line is (5cm)-- The distance between 2 lines is a maximum of 35 cm - There will be a TIME LIMIT for each first trial for each maze. if exceeded the robot will pass its first trial in this maze
- No zigzags are allowed in the maze (Only sharp Turns (angle: 90))
- Maze size should b 300*300

4- **Ball Collecting**: Each robot is required to collect as many balls as possible at a given time

Ball Collecting Rules:

- Each robot will play alone with 4 colored balls and is required to collect a specific color that he specifies before his time starts. If the robot collects the wrong one it will be penalized (-1 ball).
- 300*300 Field is limited by a black line and a wall, ping pong balls.
- 30 cm distance between each ball.
- If the robot wants to unload the balls to collect others, it can unload at the starting point which is inside the goal.
- If the robot failed to reach the goal before time, all balls collected with him will be multiplied by 0.75. (Only the balls that are with him, Balls that were already in the goal are counted normally.
- The balls or the robot with the balls should pass the line drawn in front of the goal (20 cm away) to be counted.

5- Gunshooting (رماية بالخرز)

Similar to the actual sport, each robot has to aim at a target (max distance 2m, min distance 1.5m (radius), max height 1m, arc 60 deg)

Accuracy is determined by how far the shot is close to the bullseye

Gun shooting Rules:

- The doctor places the robot anywhere within a radius of 2 meters from the target but should be in front of the target not behind it.
- The shot should only leave a mark on the paper to be taken into consideration.
- The robot should find the target and aim within 2 minutes of placing it.
- Each robot will have 3 shots from different locations (The robot will be placed again after each shot) and the total of the 3 shots will be calculated.
- Color of the bullseye is red

Guidelines

N.B: Use of any device that causes malfunction of other robots (تشويش) is not allowed. And the team that does this will be forbidden from joining any of the games.

- Robot size should not exceed 50 cm in width
- Color of the goal will be red
- Using extensions on robots is accepted but any score the robot gets will be multiplied by 0.8 in this game. (This is not related to the Doctor's final evaluation)
- Each game is given a score out of 100.
- At the end of the Olympics, the robot with the highest score of all the games combined wins.
- The evaluation process for each game will be as follows:
- 1st:100
- 2nd:80
- 3rd:70
- 4th:60
- 5th:50
- 6th:40
- 7th:30
- 8th:20
- 9th:10
- 10th: **ZERO**
- In case of multiple robot failures in a single game, all failed robots get **ZERO** in this game.
- In case of a tie, both robots get the score of their place.