2021 International Competition of Autonomous Running Robots
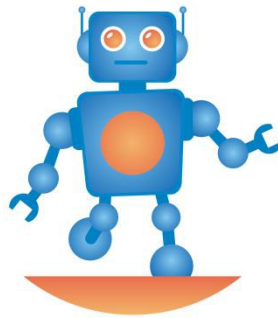
Running-Robot 2021

Simulation Competition-Football Competition

Rules and Arrangements

V1.0

Contents

Chapter 1: Competition Rules

1. Participating teams and participating robots

Those who are willing to participate in the virtual football World Cup will organize their own teams and register with the competition organizing committee to participate in the competition.

Each participating team should have no more than 6 people (5 team members and 1 instructor).

2. Training environment

Operating system: Ubuntu 16.04 (64bit)

Simulation environment: Simspark 0.3.1, Rcssserver3D 0.7.2.

See installation method: https://pan.baidu.com/s/1UPWsBwg4JOz_N26 vAoszcw   extraction code:k434

3. Game environment

The code warehouse that holds the execution files of the participating teams. The code warehouse of each participating team is a private warehouse, which can only be accessed by the corresponding team members and judges.

Roban simulation football game system.

4. Competition rules

Team size: The number of robots controlled by the team in each round of the competition is 5 robots, and the game is a 5vs5 football match.

Kick-off rules: The kick-off goal is invalid. The kick-off player cannot touch the ball twice in a row. If this rule is violated, the kick-off right will be transferred to the opponent team. The kick-off goal is not scored, and the opponent will get a chance to serve the goal.

Goalkeeper: The goalkeeper's jersey number must be number 1.

Handball: Handball refers to players holding or touching the ball with their hands or arms. Handball will be determined by the referee. If one side commits a handball foul, the other side will take a free kick. The goalkeeper can touch the ball with his hand in his penalty area.

Own goal: When serving from the goal, if the serving side has an own goal, the opponent player will get a corner kick.

Passing: When the ball is close enough to a player (<0.5m) and the speed is low enough (<0.05m/s), the player can declare the pass, and enter the pass mode if it is legal (the pass can be declared again after 4s). The law needs to wait 3s before making the next pass statement. In pass mode, all enemy players must not be too close (<1m) to the player who initiated the pass. After a period of time (1s) after the start of the pass mode, the team that initiated the pass will score an invalid goal and the opponent will be sentenced to a goal serve.

Self-collision: In order to be consistent with the real environment, players are forbidden to perform some actions that cannot be done normally (such as passing the right leg through the left leg when kicking the ball,

etc.). Once the player's parts touch each other to a certain extent (>0.04m), it will be judged as a self-collision. After it is judged as a self-collision, the colliding joint will be locked for a period of time (1s), and the same joint will not be locked repeatedly within 2s after locking.

Obstacle: Obstruction refers to the player's use of his body, arms or legs to hinder the normal progress of the game, such as the player lying on the ball, the player holding the ball, the player holding the ball with his foot, or lying on the line of the opponent's attack . The case of deliberate obstruction is determined by the referee. If the obstruction time exceeds 10 seconds, the opposing team will get a free kick. If the unintentional obstruction exceeds 10 seconds, the referee will throw the ball.

Illegal defense: At any stage of the game, no more than 3 defensive players are allowed in the penalty area. If a fourth defensive player appears in the penalty area, the player will be ejected from the field. If there is a fourth defensive player in the penalty area, the player will be ejected from the field. If the fourth defensive player is a goalkeeper, the other defensive team member farthest from the ball in the penalty area will be ejected from the field.

Crowding: When there is an opposing player near the ball (0.8m), it is not allowed to surround the ball. If two players of a team are in a circle with the ball as the center and a radius of 0.4m, the player who

is far from the ball will be ejected. If 3 players are within a circle 1m from the ball, the player farthest will be ejected.

Do not move: Players who do not move, or who fall on the ground for a long time and do not stand up for a long time will be ejected. A goalkeeper who does not move for more than 30 seconds or does not stand up within 60 seconds after falling will be ejected; if other players do not move for more than 15 seconds, or if they do not stand up within 30 seconds after falling, they will be ejected. pop up.

Player collision: It is required to avoid collisions between players. If 3 or more players collide, a player of the team with more collision players will be ejected out of the field. If the two teams collide with the same number of players, Then a player randomly pops up. If a player of a team deliberately interferes with the opponent's attack by colliding, such as hitting an attacking player from behind, the referee shall decide and award a free kick.

Output: Each player is allowed to output some data to a file. The file name should be named stdout and stderr followed by the player number. These writable files will be stored in the log subfolder of the team's main folder. Except for these files, the files in the team's home directory are read-only during the game, and other files cannot be opened for data writing operations at this time.

Fairness: The game is guaranteed to be fair and just, follow the rules

of football that everyone generally knows, and abide by the rules of 3D simulation.

Cheating is not allowed in the game, such as:

- Use executable programs of other teams.
- Disturb the server by controlling the players to send excessive instructions.

5. The flow of each round

Participating teams can repeatedly update the main branch in the code repository before the end of the current competition to the start of the next competition to prepare the final strategy for the next round of competition. Ensure that the team can use the best strategy in the next round.

According to the competition schedule, the referee group pulls the execution files corresponding to the main branch of the participating team's code warehouse to compete. And record the game points, the number of goal difference, the number of goals, the number of games played.

6. Match schedule

- Regular season

The game is divided into weeks, each week starts on Monday and ends on Sunday.

Before the start of the game, draw lots to determine the teams to play each week, and each team will participate in one round of the game within a week. In the lottery, the competing teams cannot be the same for two consecutive weeks.

The time period of each round is 10:00-11:30 or 14:00-15:30, and the time of each round is 10 minutes. Depending on the total number of participating teams, there may be two groups of competing teams competing at the same time at the same time.

If the total number of participating teams is odd, one team will have a bye each week. In order to ensure fairness, the same team may not have a bye again before all the teams have a bye. Do this in a loop.

- Top 8, semi-finals, finals

After the regular season, the top 8 teams selected by the competition committee will participate in the top 8 competitions, semi-finals and finals. The quarterfinals, semi-finals and finals only win and lose without a tie.

Top 8 Tournament: Mark each pair as team 1 to team 8 according to the team's points. Battle according to the following arrangement.

Team 1 vs. Team 3 = Team A

Team 2 vs. Team 4 = Team B

Team 5 vs. Team 7 = Team C

Team 6 vs. Team 8 = Team D

Semi-final: From the top 8 teams from A to D, they will compete according to the following arrangement.

Team A vs. Team C

Team B vs. Team D

Finals: The winning teams in the semi-finals compete for the championship and runner-up. The losing team in the semifinals competes for the third place.

7. Competition is over

At the end of the game schedule, the referee team will calculate the current game results based on accumulated points, number of matches, goal difference, and goals.

Chapter 2 Competition Arrangement

1. Pre-match preparation

Participating teams are required to have one or more members to master the basic use of Git.

After successful registration, each participating team will get a designated code warehouse address and access account. This warehouse is a private warehouse, and only team members and judges can access it. After the competition, the code warehouse of the participating teams will be changed to a public warehouse.

The participating teams use the pre-built pre-built files and codes in the code warehouse to deploy the training environment on the local computer and prepare for the competition.

Team representatives: Each team should appoint a captain, and the captain should contact the referee before the start of the game. During the game, if there are questions or objections, only the captain of each team can negotiate with the referee. Participants use a lottery to determine the order of the game before entering the arena.

2. Scenes and tasks for each round of competition

Teams need to ensure that the main branch in the code repository corresponding to the team is the final strategy version execution file selected by the team before the start of the competition.

During the interval between the two games, the participating teams can improve the code and push the compiled executable file to the main branch of the code repository. The executable file must be an independent executable file and does not depend on the system environment or other configuration files.

The referee pulls the execution files of the main branch of the code warehouse corresponding to the participating team on the same day and conducts the competition.

The referee group counts the goal difference, the number of goals, the number of games played, and the number of wins of each team.

3. End of the game conditions

The referee team announced the end of the game.

4. Competition results and scoring rules

In each round, 3 points are awarded for a win, 1 point for a tie, and 0 points for a loss. 1 point for a bye.

Teams with the same points will compare the number of entries first, and the team with the less number will be ranked higher;

If the number of matches is the same, compare the goal difference. The goal difference rule is: after the end of the game, the winning team's score minus the losing team's score is the winning team's goal difference, and the losing team's goal difference in that game is 0. Those with more goal difference are ranked higher;

If the goal difference is also the same, compare the number of goals scored, the highest scorer is ranked;

If all the above are the same, the results are tied.

5. Other instructions

In the event of a dispute, the chief referee will make a final decision.

The final interpretation of the rules belongs to the organizing committee's name to be determined.
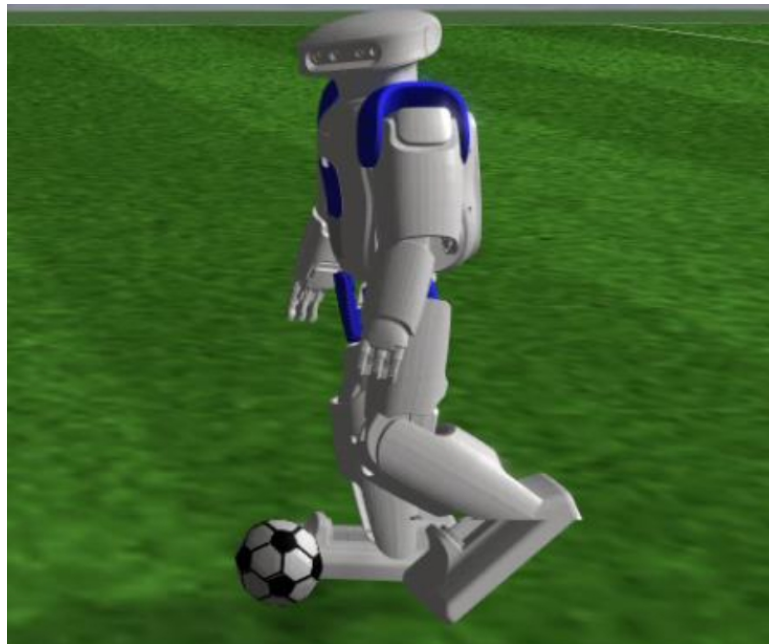
Attachment - Game Scene

1. Scene summary

- The area of the playing field is 30x20 meters, the goal width is 2.1 meters, the depth is 0.6 meters, and the height is 0.8 meters.

- Robot model: height 682 mm, arm span 705mm.

2. Recommended training environment

- 1v1 Battle configuration

Computer: CPU intel i7, 8G RAM, GeForce GTX750 graphics card or higher.

- 5v5 Battle configuration

2 computers: CPU intel i7 quad-core 3.0G or higher, 16G memory, Gigabit network card, 500G solid state hard disk, used to run the robot team control node. One computer can run multiple programs that control team members at the same time.

1 computer: CPU intel i7 quad-core 3.0G or higher, 16G memory, 500G solid state drive, GeForce GTX750 graphics card or higher, used to run server nodes.

Gigabit switch with 4 ports or more, connect all computers.