

The 13th Annual RoboCup IranOpen 2018

Soccer Simulation 3D Competition Rules

(April 2018)

1. Hardware and Software Specification

Software Specification	Simulator	Rcssserver3d-0.7.1 Simspakr-0.3.0
	Required Packages	ODE-0.11.1-tbb (possibly ODE 0.14)
		Ruby-2.4.3
	OS for Simulator	Fedora 27 64 bit (x86_64)
	OS for Agents	Fedora 27 64 bit (x86_64)
Hardware Specification	Server 3D System	Intel Core i7-4820K 3.7GHz 8GB RAM DDR3
	Monitor System	Intel Core i5 6600K 3.5Ghz NVidia GeForce 9400 GTX 4G Ram
	Teams System	Intel Core i5 6600K 3.5GHz 8GB Ram

2. Tournament Rules

2.1. Match

Each match runs with two teams of 11 players each (11 vs 11) in a 30x20 field. There will be one machine per team and they can communicate with the simulation server over a network. Each match will be run in two halves of 5 minutes (in total 10 minutes). In the case of having extra half, each extra half will be 3 minutes.

2.2. Tournament

Groups will be determined in the competition days. Before every round - except between the preliminary round and the first round - only during the time specified by OC, teams participating in that round are allowed to upload/update their binaries/files using ssh. Teams do not have access and are not allowed to access their home directory in the other times.

3. Scores

There will be three points allocated for a win and one point for a draw. A forfeit will record a score of 3:0.

In the case of tie breaks between teams in a round, the winner will be determined in the following order:

- The result of their head-to-head games
- Goal differences of teams in this round
- The number of goals scored in this round
- Two extra 3 minutes halves
- 5 penalty shootouts for each team
- Coin toss by OC

In the setup date, OC will specify a time for team test. All teams have to run and test their team successfully once with the presence of OC in this time. Teams who don't have successful run and do not get approval of OC are not eligible to participate in the competition. OC is not responsible to solve problems of teams after the end of uploading time.

4. General Rules

- All teams are obligated to test their players in presence of technical committee members and get a confirmation prior to start of the competitions. If not done, the technical committee will not accept any kinds of objection on the subject of team's failure (e.g. startup problems).
- Teams who are allowed to participate in each round can update their binaries (including, but not limited to, scripts and configuration files) only in the time periods which will be specified later.
- Messages sent over network by teams shall not be too large. In case these kinds of problems are detected, the technical committee will decide the consequences for the team.
- The home directory of teams is read-only during the games, so agents should not try to open any other files for writing. If you need this possibility for a good reason, you should contact OC about it before the games.
- Each player is permitted to generate output in files named stdout and stderr with the player number as its prefix. These write-only files will be located in log/ directory inside their home directory.
- All matches are run automatically or by a human referee. All teams can only communicate with the technical committee with one represented member. Referee's

decisions will be final at all stages and teams should not complain when final decision has been made.

- All teams are to create files for their players' start and end of execution. These files should be called start.sh and kill.sh. All players of a team must be running in less than 15 seconds when start.sh is executed. Additionally, each team must provide start_penalty_kicker.sh an start_penalty_goalie.sh scripts to run their penalty kicker and goalie respectively. The IP address of simulation server is given as the first parameter to the start scripts. When players introduce themselves to the simulator, they should send exactly their team name to it. An example of each script is presented below. Teams will be executed using the same pattern as the presented samples.

```
#!/bin/bash
#
# IranOpen 2018 sample start script for 3D soccer simulation
#
AGENT_BINARY="my_agent_binary"
BINARY_DIR="."
NUM_PLAYERS=11

killall -9 "$AGENT_BINARY" &> /dev/null

for ((i=1;i<=$NUM_PLAYERS;i++)); do
  echo "Running agent No. $i"
  "$BINARY_DIR/$AGENT_BINARY" -h $1 > log/stdout$i 2> log/stderr$i &
  sleep 1
done
```

```
#!/bin/bash
#
# IranOpen 2018 sample kill script for 3D soccer simulation
#
killall -9 "my_agent_binary" &> /dev/null
```

- The decision of the technical committee is the final decision in any stage of the competitions and no other further complains will be accepted. If any team tries to prevent normal competition execution, the team will be given a penalty. The penalty is decided by technical committee and can include team disqualification.
- In case – in any rounds of the games – it is found out that a team has not followed fair play rules, the team will be immediately eliminated from the competitions and game tables. The technical committee is responsible and allowed to decide on the fairness of teams' actions. If possible, technical committee might allow another team to take part in the competitions instead of the eliminated team.
- Heterogeneous players: the default rcserver3d settings are used.

5. Acceptable game

In the following section it will be cleared out what happens when a team or the simulator encounters a problem and how the referee and technical committee will decide on the matter.

5.1. Problems of teams

- If the players of a team disconnect from the simulator in the first 30 seconds of the game, except when it is a bug in the server side (which will be decided by the referee), the team can request restarting the game up to two times. If the problem still persists, the team can ask the opponent team for inspecting and fixing the problem. If the opponent approves, the team will have 3 minutes to find out the problem and solve it. In the given time, the team is allowed to modify their scripts and their source code (bug fixing only) only if it is uploaded to the server. Teams are not allowed to bring new source or binary. Also, the team can request replacing their binary with the binary of the previous round. If any problems occur after the given time, the game will continue as is.
- In case the problem makes it difficult or impossible for the game to continue, and the problem persists for more than 120 seconds, the game will end by the result of 3-0 and the opponent will win.

5.2. Simulator Problems

- In any moment of the competitions if the technical committee detects that there is a problem with the simulator which can be advantageous for one of the teams, the referee may stop, restart or continue the game or repeat the game when it finished after consulting the technical committee. In case starting the game over would lead to changes in the chart of the competitions, all the necessary games will be repeated. The decision of the technical committee is final and no further objection is accepted.

6. Fair Play

The purpose of the games is provocation of scientific research and exchange of information in the field of multi-agent systems under physical rules. In such an academic environment, respecting fair play rules is of special importance. Examples of unfair actions are (but not limited to):

- Disobeying copyright laws and source code licenses
- Using another team's binary instead of the team's own one
- Direct connection and communication of players in any moment of games using any type of inter-process communications (e.g. pipes)
- Using the competitions hardware without the direct approval of technical committee or turning the competition systems off or on

It should be cleared out that these are only examples of unfair actions and in any case, deciding whether an action is unfair is up to the technical committee and no obligations are accepted in these cases. If the technical committee finds out that a team doesn't adhere to fair play rules, the team will be disqualified and eliminated from the competitions.

7. Player Behavior

For all teams, the goalie – if any – should be the player number 1. Players should follow these rules:

- 1. Lying in front of the goal:** If the goalie or any other player lies in front of the goal for more than 30 seconds and this action leads to the prevention of the ball to enter the goal when the opponent has a scoring opportunity, the team will be fined with a direct shoot out from a corner of its penalty area. If the team continue this behavior for more than $\frac{1}{4}$ of the game time, the game will be stopped and the opponent will win with the score of 3-0. In case the referee decides that the goalie lies intentionally without any effort to catch the ball, a similar penalty will be considered for the team.
- 2. Touching the ball with hands for the goalie:** The goalie can touch the ball with his hands only when the ball is in the team's own penalty area.
- 3. Carrying the ball by the goalie:** The goalie should not carry the ball with his hands for more than 5 seconds. If he violates the rule, the referee will issue a drop ball command.
- 4. Kickoff:** If a goal is scored directly by the kickoff taker, it is not accepted. The ball shall exit the middle circle of the field by a teammates kick. Also, the kicker must not touch the ball again until it has touched another player. In case of infringement, a kickoff is awarded to the opposing team.
- 5. Walking:** Walking should be like human walking in the natural way. Teams are to implement their robot's walking like human walk sequence. Walking is defined as a series of gaits with length of less than $\frac{1}{4}$ of the robot's height. Otherwise this is considered illegal and the penalty for this foul is a free kick for the opponent team. If the referee decides that a team has intentionally behaved illegally for more than $\frac{1}{4}$ of the game period, the game will end with the score of 3-0 for the opponent team.
- 6. Blocking the ball:** Players are not allowed to intentionally block the ball with unfair actions like lying in front of the ball, falling in front of the ball, blocking the ball or blocking other players to reach the ball with the mentioned actions. In these situations the referee uses drop ball action.
- 7. Pushing and pulling:** Intentional pulling and pushing of players is considered as foul. Referee uses his own senses to judge player actions in these situations. If intentional pushing or pulling is performed on a player, a free kick is given to his team.
- 8. Illegal defense:** At any time during the match, no more than 3 players of a team may be inside of their own penalty area. If a 4th player enters the penalty area, it will be placed outside of the field. When the last to enter is the goalkeeper, the player furthest away from the own goal of the three that were already in the penalty area will be placed outside of the field instead.
- 9. Crowding the ball:** Crowding of the ball when an opponent is near (within 0.8m of the ball) is illegal. If two players of one team are within a circle with radius 0.4 m. of the ball, the furthest of these two is repositioned. If three players of one team are within a circle with radius 1 m. of the ball, the furthest of these three is repositioned.
- 10. Immobility:** Players that have been immobile or fail to stand up for too long will be re-positioned. The goalkeeper will be re-positioned after 30 seconds of immobility, or after failing to stand up for 60 seconds; other players will be re-positioned after 15 seconds of immobility, or after failing to stand up for 30 seconds.
- 11. Penalty shots:** During penalty shots, each team only has a single player in the field: the goalkeeper for the defending team and a striker for the attacking team. Each penalty shot

starts with a kickoff. The attacking team gets 50 seconds to attempt to score. The goalkeeper of the defending team has to stay within his penalty area the whole of this time. If neglected, the penalty is considered goal.

- 12. Colliding with other players:** Players must avoid touching other players. If two players touch each other and another player gets in touch with them, the third player will be re-positioned outside the field. If 3 players get in touch with each other at the same time, one of them will be randomly chosen and re-positioned.