RoboCup German Open 2014
3D Simulation League Rules

Version 1.0

Klaus Dorer, Stefan Glaser

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1 Changes to 2013 in Brief

- Enforced use of Heterogeneous Players
- Labeled hear messages
- Making scores available for teams
- Run challenge

2 Organizing Committee

This document describes the rules that will be used at the RoboCup German Open 2014 3D Simulation League. Their goal is to provide for fair games and smooth execution of the competitions. The Organising Committee (OC) has the right to append or change these rules at any time within reasonable bounds. All teams will be notified of these changes as soon as possible. Teams can appeal to these changes or to the rules in general, however the final binding decision will be made by the OC.

- Klaus Dorer - klaus.dorer@hs-offenburg.de
- Stefan Glaser - stefan.glaser@hs-offenburg.de

3 Main Competition

3.1 Server changes

Communication messages will be labelled with the team name of the player that sent the message. Example: **(hear teamName 9 10 text)**

The simulator will include command line options (–scoreleft; –scoreright) to specify the current score of the game. Players will be informed of the current score in the initial message. Example: **(GS (unum 8) (team left) (sl 1) (sr 2) (t 0.00) (pm BeforeKickOff))**

3.2 Competition Format

The detailed format has to be decided once we know how many teams will show up.

3.2.1 Schedule

Our current schedule is planned to be as follows. Again, depending on the number of teams this might be adjusted.

Wednesday	April 2	Team set-up
Thursday	April 3	Group drawing and Round Robin
Friday	April 4	Round robin and Run Challenge
Saturday	April 5	Semi Finals and Finals

3.2.2 Round Robin

The current plan is as follows: For the round robins, all teams will play in a single group. Each team plays each other team once in each round robin. The results of the two round robins will be added. In the round robins, placing will be determined in the following order:

1. Points gathered. A win gives 3 points, a tie 1 point, a loss 0 points.

2. Goal difference (goals scored minus goals conceded) in this round.

3. Head to head game of this round.

4. Two extra halfs (only in cases where it matters for the semi-finals)

5. Coin toss

3.2.3 Finals

After the round robin a knock-out system is used. The first of the group plays the fourth and the second the third in the semi-finals. The winners of these matches will play against each other in the final, the losers will play a match to decide who wins the third prize. If a knock-out game ends in a tie, two extra halfs are played. If these end in a tie as well, a penalty shootout determines the winner.

3.3 Competition Platform

3.3.1 Hardware

TBA

3.3.2 Software

Operating System:	Ubuntu 12.10 (Quantal Quetzal)
Dependencies:	ODE 0.11.1, Ruby 1.9, Java 1.7
Simulator:	Simspark 0.2.3 + Rcsserver3D 0.6.7 (the release for Joao Pessoa)

The OC must be notified as soon as possible if additional libraries are needed. A recent Java Runtime will be available. When this is done too late, the OC may rule that installation of the requested items disrupts the competitions and turn down the request.

3.4 Referree

During each game a referree is appointed to endorce the rules laid out in this document. In situations that are not handled by the rules, the referree should decide based on his/her common sense. The referree can be a member of the OC or a volunteer, from a team other than the teams of the match, who has full knowledge of the rules as deemed by the OC. During a match only one representative of each playing team is allowed to approach the referree. Decisions of the referree are binding and cannot be appealed during a match. If there is any complain about a game or a decision this should be brought to the OC's attention as soon as possible, who will decide how to handle it after all games of the current round are finished. If the referree cannot decide in a situation, he can consult the OC who will give the final decision.

3.5 Match Preparation and Format

The matches will be started automatically by a competition managing system. Please provide start.sh and kill.sh scripts as required for the WM to be able to run and stop your agents. Also teams have to provide scripts start_penalty_goalie.sh to start the goalkeeper and start_penalty_kicker.sh to start the striker for penalty shootout. Teams will be given the opportunity to upload and test their agents on the competition system before the start of each round. When a round is started, it will no longer be possible to upload or make changes to the agents, until all matches of that round have been played.

A match is played by two teams of not more than eleven players. Each match consists of two halfs of five minutes each. After the first half the teams switch sides.

When a match has started and an agent shows clearly unnatural behavior or gets disconnected, the following rules apply:

- If this occurs in the first 30 seconds of the match, the match will be restarted up to 3 times. In the case of unnatural behavior, the team's representative is responsible of notifying the referree who will make the binding decision whether to restart the game on his own discretion.

- If the problem persists, the team's representative can ask the other team's representative for a 2 minute time-out to fix the problem. A fix may include to use a binary from the previous day.

- If the problem still persists, or if it occurs after the first 30 seconds of the match the game will continue.

3.6 Heterogeneous players

Each team has to use a minimum of 3 different player types and no more than 7 players from one player type. If only 3 different player types are used then a minimum of 2 players for each type must be used. The standard player type is counted identically to heterogeneous player types. Possible configurations for the different player types are: (7-2-2), (7-1-1-1-1), (4-4-3), (3-3-3-2), (3-2-2-2-2), etc. If teams do not comply with this rule, the server will automatically change the player type of the player that is connecting (and that is either the 8th player of a given player type or the first player that does not allow the '3 player types' rule to be fulfilled) to another player type that fits the rules.

The heterogeneous types that were used last year will also be used during the 2014 competition. A new set of player types will be made available 6 weeks before the competition. These player types will have changes in the humanoid structure that are identical to last year heterogeneous player types.

3.7 Game Play

1. Kickoff: Goals scored directly from the kick off are not accepted. Also, the agent performing the kick-off may not touch the ball again until it was touched by another player. In case of infringement, a kick-off is awarded to the opposing team.

2. Goalkeeper: The player with uniform number 1, if available and only this player, will be designated as the goalkeeper.

3. Handling the ball: Handling the ball involves a deliberate act of a player making contact with the ball with his hand or arm, as decided by the referee on his own discretion. Handling the ball is penalized with a free kick to the opposing team. The goalkeeper can not be guilty of a handling offense when his hands are within his own penalty area.

4. Obstructing the ball: Obstructing the ball involves use of a player's body, arms or legs to prevent progress of the game, which includes covering the ball, carrying the ball, holding the ball between arms or legs and lying in front of the goal in an attacking situation. Deliberately obstructing the

ball, as judged by the referee, for longer than 10 seconds is penalized with a free kick to the opposing team. Unintentional obstruction of the ball for longer than 10 seconds is ended by a drop ball by the referee.

5. 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 4 th 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.

6. 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.

7. Immobility: Players that have been immobile or fail to stand up for too long will be repositioned. The goalkeeper will be repositioned after 30 seconds of immobility, or after failing to stand up for 60 seconds; other players will be repositioned after 15 seconds of immobility, or after failing to stand up for 30 seconds.

8. 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 40 seconds to attempt to score. The goalkeeper of the defending team has to stay within his penalty area the whole of this time. If he leaves the penalty area it is counted as goal for the other team. When penalty shots are used to decide a tied game, each team gets five penalty shots. If after five shots both teams still have the same score, the 6th shot decides or the 7th shot decides. After that a coin is tossed.

9. Output: Agents should not print excessive amounts of data to standard out, standard error or to files; i.e. do not print data every time step. Also, during testing between rounds, refrain from outputting excessively, as it can strongly affect network performance.

10. Fair play: Games should be played according to fair and common sense understanding of soccer and to restrictions imposed by the virtual simulated world of the 3D soccer simulator. Circumvention of these is considered violating the fair play commitment and its use during the tournament games is strictly taboo. Violation of the fair play commitment play includes, but is not limited to, for example:

    - Using another team's binary in your team
    - Jamming the simulator by sending excessive commands per client

- Direct communication between players by using other communication means, such as inter- process communication

- Manipulating competition machines or restarting them intentionally

Any of these is strictly forbidden. Other strategies might be found violating the fair play commitment, after consultation with the OC. However, we expect it to be pretty clear what a fair team should be like. In particular, the destructive disruption of opponent agent operation or the gain of advantage by other means than explicitly offered by the simulator counts as not fair play. If you are in doubt of using a certain method, please ask the OC before the tournament starts. If a team is found to use unfair programming methods during the tournament, it will be immediately disqualified.

3.8 Fallback rules

The organization committee will do its best to make games possible with the rules suggested for Joao Pessoa. However, if any reason does not allow to run those rules generally smoothly we might fall back to older versions of the simulator. The final decision on if the non generally smoothly case is present is up to the organization committee.

The server version for Joao Pessoa will hoepfully be released early enough, but might contain bugs as any newly released software might do. If this is the case during competition, we will first try to remove the bug or work around it. In the most severe case such a bug might prevent us from playing sensible games with the new server version. As a last option we have to consider to use older server versions. You can help to avoid this case by testing the latest server version with your team as soon as it is out and report bugs to sourceforge, the technical committee or the mailing list.

4 Run Challenge

Our league has committed itself to be the first league that has running robots. To achieve this, we perform a challenge of single robots trying to run forward.

4.1 Requirements for Participation

Teams that want to participate have to provide the following:

- A start script with name 'startPlayerRunning.sh' that starts a single player of the team which runs forward as fast as it can. The script has to accept the server ip and a port to connect to example: startPlayerRunning.sh 127.0.0.1 3110

- No beams permitted. Commands including a beam will be entirely ignored by the server.

- The walk has to be 'human like'. No strange crawling or saltos or similar, judged by human.

As this is a pretty low minimum requirement I hope that all or most teams will participate.

4.2 Evaluation

The score of the team is evaluated as the sum of

- The speed (in m/s)

- The relative amount of time both legs are off the ground.

The speed is measured in a 10 seconds run. The time starts when the player crosses the start line or 2 seconds after the player was beamed (by the automated referee) to its start position at (-13.5; 0.0) 0.5 m behind the start line (which ever happens first). The speed is then the distance in only x-direction divided by the time to give m/s. If a player falls, this try stops and 2 meters are subtracted as a penalty from the player's current position (but at least 0 m overall distance). The time accounted in such a case will be the full 10 seconds. A player is decided to be fallen if the z part of the up vector is less than 0.6 or the z coordinate of the torso center is below 0.25.

The relative amount of time both legs are off the ground is determined by counting the cycles in which all (both) force sensors have a length of the force less than 0.01 divided by the number of available cycles (within the 10 seconds run). Both measures are averaged out in 30 trials for each participating team. The exact number may be changed when the amount of time available for the competition is finalized. The final sum is rounded to 3 digits. Equal scores will result in the same place.

A tool that will be used to measure the performance is available at:

http://robocup.hs-offenburg.de/html/downloads.htm.

4.3 Model Changes

Teams participating may optionally provide a changed robot model. The model has to be derived from the standard nao model and may contain the following changes:

- 3 additional hinge joints (with same limitations as current hinge joints) and at most 90 degrees working angle.

- Change of the location (anchor) of existing leg hinge joints (but not rotation axis), e.g. to move the knee higher or lower.

The following has to remain unchanged:

- Weight of the robot and its body parts. If a body part is split into two by a new hinge joint, the mass has to be split to the two parts in proportion to the size. If the feet are split (to have toes), all parts of each foot have to have a force resistance perceptor with name lfxxx or rfxxx for left or right foot parts respectively and xxx a number.

- No new body parts are allowed except for splitting up existing ones by a new hinge joint.

- Length of the legs, arms and torso

- Maximum size of the feet (feet may only shrink)

- Anything not explicitly mentioned to be allowed to change