Technical Challenges for the RoboCup 2010 Standard Platform League Competition

RoboCup SPL Technical Committee

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1   Introduction

There are three technical challenges that will be held at the RoboCup 2010 Standard Platform League Competition. These are:

- The Open Challenge (Section 2)

- The Passing Challenge (Section 3)

- The Dribbling Challenge (Section 4)

The team with the top score in a challenge will receive 25 points, each position thereafter will receive 1 less point; i.e. 1st = 25pt, 2nd = 24pts, 3rd = 23pts ... 25th = 1pts. In the case of a draw, each team will receive the average of the points allocated to these positions; e.g. if three team tie for 2nd, they will receive $(24 + 23 + 22)/3 = 23$ points. Teams not competing in a challenge will receive 0 points, also if a team competes but fails to score a point (or receive a vote) they will receive 0 points again. The team with the highest total score after all challenges is deemed the overall challenge winner.

All challenges will use the 2010 field and the 2010 rules will apply.

The challenges will be performed separately in three two hour time slots. In each time slot, five minutes are reserved for each team, *three minutes* of which will be used for the actual challenge. The remaining two minutes are reserved for setup and intermediate stoppages if the challenge requires them.

Ten minutes before each Technical Challenge two hour time slot starts, the teams have to provide the robots participating in the challenge to the Technical Committee (switched off).

Before each challenge, the robot(s) will be booted and put into the *penalized* state. For the start of the challenge they will be unpenalized, either by the GameController or manually by pushing the chest button. The GameController will configure the robots to team color *blue*.

Important Note: *Participation in at least 2 of the 3 challenges and receiving more than 0 points in both is required for a team to be considered as a pre-qualified team candidate. If a team fails in the challenges or does not participate at all, that team will not be considered for pre-qualification even if it does well in the soccer competitions.*

2 The Open Challenge

This challenge is designed to encourage creativity within the Standard Platform League, allowing teams to demonstrate interesting research in the field of autonomous systems. Each team will be given three minutes of time on the RoboCup field to demonstrate their research. Each team *should* also distribute a short, one page description of their research prior to the competitions. The winner will be decided by a vote among the entrants. In particular:

- Teams must describe the content of their demonstration to the technical committee at least *four weeks* before the competitions.

- The demonstration should be strongly related to the scope of the league. Irrelevant demonstrations, such as dancing and debugging tool presentations are discouraged.

- Each team may use any number of Aldebaran Nao robots. Teams must arrange for their own robots.

- Teams have three minutes to demonstrate their research. This includes any time used for initial setup. Any demonstration deemed likely to require excessive time may be disallowed by the technical committee.

- Teams may use extra objects on the field, as part of their demonstration. *Robots other than the Naos may not be used*.

- The demonstration must *not* mark or damage the field. Any demonstration deemed likely to mark or damage the field may be disallowed by the technical committee.

- The demonstration may *not* use any off-board sensors or actuators, or modify the Nao robots.

- The demonstration may use off-board computing power connected over the wireless LAN. This is the only challenge in which off-board computation is allowed.

- The demonstration may use off-board human-computer interfaces. This is the only challenge in which off-board interfaces, apart from the Game Controller, are allowed.

The winner will be decided by a vote among the entrants using a Borda count (http://en.wikipedia.org/wiki/Borda_count). Each participating team will list their top 10 teams in order (excluding themselves). The teams are encouraged to evaluate the performance based on the following criteria: technical strength, novelty, expected impact and relevance to RoboCup. At a time decided by the designated referee, within 30 minutes of the last demonstration if not otherwise specified, the captain of each team will provide the designated referee with their rankings. Each ranking is converted to points based on the scoring criteria mentioned in Section 1. Any points awarded by a team to itself will be disregarded. The points awarded by the teams are summed and the team with the highest total score shall be the winner.

3 The Passing Challenge

This second challenge is the same as the last year's passing challenge of the Standard Platform League. It is intended to encourage teams to develop passing and catching skills. In this challenge each team will be required to demonstrate successive passes back and forth between two robots.

The field is marked with two additional lines, which are invisible to the robots, parallel to the middle line, and tangential to the center circle, as shown in Figure 1. The ball is placed on a penalty kick mark. One robot is placed inside each penalty area.
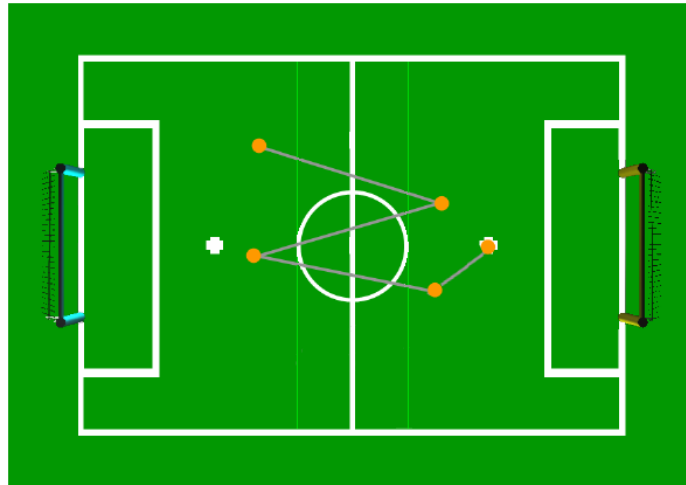

Figure 1: Setup and expectations for the Passing Challenge.

The robots will have 3 minutes to perform 3 successive passes. The trial ends without success, that is the challenge ends, if the ball or one of the robots leaves the field, or if the ball stops inside the middle area or one of the robots enters the middle area. The ball is expected to cross the middle area 3 times, as indicated by the example trajectory in Figure 1. The trial is considered successful if the receiving robot touches the ball after the third crossing.

Intermediate scoring for passing between robot 1 and 2 (robot 1 is the first kicking one):

- 1st touch of the ball to robot 2: 1 points

- 2nd touch of the ball to robot 1: 2 points

- 3rd touch of the ball to robot 2: 3 points

If a team completes the challenge successfully in less than 3 minutes, then the final placement among such teams will be based on how fast the challenge was completed.

4 The Dribbling Challenge

The dribbling challenge requires a combination of flexible ball manipulation and obstacle detection and avoidance skills. There will be three red robots on the field in their crouching goalie postures. The blocking robots will be placed on the field in such a way to prevent direct kicks towards the goal succeed; therefore, the dribbling robot needs to make sure that the path is clear before it attempts a kick. The dribbling robot will start from the front line of the penalty box of the blue goal and the ball will be placed on the cross mark in front of the robot. There is a total of three minutes for the robot to score a goal. The challenge ends with success if the dribbling robot is able to score without bumping into any of the stationary robots or the ball touching the blockers or going outside the field borders. Otherwise, the challenge ends without success. How much time the robot spent to score a goal will also be incorporated in the calculation of the final score.