

**Assignment 3: Goalie and Penalty Kick Tournament**  
**CS 393R: Autonomous Robots**  
**Due Date: Thursday, October 3, 2013**

Your task: Compete in the Penalty Kick Tournament. Each game will involve two robots. One robot will be take on the role of goalkeeper and the other robot the role of attacker.

Rules:

- Attackers will start at half field, goalies on the goal line, and the ball at the penalty cross
- Attackers may not shoot after the goalie has touched the ball
- Attackers may not enter the goalie box (i.e. at least one foot outside of the box or touching the edge)
- The goalie may not exit the goal box (i.e. at least one foot inside of the box or touching the edge)
- The goalie may not leave the goal until the attacker has touched the ball
- The attacking team may attach an object to the goalie's chest to aid detection, so long as it doesn't hinder the goalie's movement
- The ball must be completely over the line for it to count as a score
- The goalie may not stay in a blocking stance for more than 3 seconds.
- If no contact is made with the ball for 30 seconds or the game appears stuck, or no goal is scored within 2 minutes, the defending team wins that round.
- One rebound will be allowed - if the ball bounces off of the goalie and exits the goal box, then the attacker may re-kick it.

In each half of the game the attacker will get three tries. A tie in the semi-finals or finals will be followed by a "sudden death" round wherein the teams will alternate taking penalty kicks until one of the robots wins (after an equal number of tries).

Do not forget to write a short but professional memo (one memo from each team, co-authored by all team members), concisely but clearly describing what you did, what problems you encountered, how you overcame them, and how successful you were in the end. Also be sure to briefly describe the contributions that each team member made to the final outcome.

Tournament: The first round of the tournament will proceed with two pools of 5 teams each playing in a round robin format. The division of teams into pools will happen randomly. The two top teams in each pool will move on to compete in a single elimination tournament. All games will take place during class on October 3, and any remaining games will be played the following class period. Due to time restrictions, each team will be allowed one 3-minute time out in the tournament with the clock stopped. During this time you may deploy changes, reboot, or make any other adjustments you need to continue. If you need to make further adjustments, these must happen with the clock running.

Checklist:

Grades will be out of (and capped at) 12 points.

[ ] (0.5 point) Demonstrate goalie's ability to move and stay inside the goal or penalty box.

[ ] (4 points) Demonstrate goalie's ability to stop the ball when shot from a variety of locations and speeds, by using a Kalman filter to track the ball and its velocity.

[ ] (1 points) Demonstrate goalie's ability predict whether the ball is approaching its left side or right side and execute an appropriate block.

[ ] (0.5 point) Demonstrate attacker's ability to move and stay outside the penalty box.

[ ] (1 points) Demonstrate attacker's ability to take a penalty kick and a rebound.

[ ] (1 points) Demonstrate attacker's ability to dribble and shoot the ball in the goal.

[ ] (2 points) Clarity and quality of your memo. Email it (along with a compressed folder of your behaviors and motion files) to Peter and Jake by class on October 3.

[ ] (0-6 points) Tournament performance: 1 point will be awarded for each game won, 0.5 pts for a draw, and 0 pts in case of a loss.