

Vision Centric Robot Challenge (VCRC) 2012

V1.2 1-29-12 Official Version

Using computer vision as the main sensory modality of autonomous mobile robotics projects has the following advantages: (1) Low cost (compared to expensive laser scanners), (2) Richness of information (3) Low power consumption (compared to laser scanners), (4) Retrieving 3D information with stereo vision.

In order to promote research on computer vision and autonomous mobile robotics, we challenge college students as well as talented high school students with the following Vision-based robot competitions for the Robofest 2011-2012 season.

Team Divisions

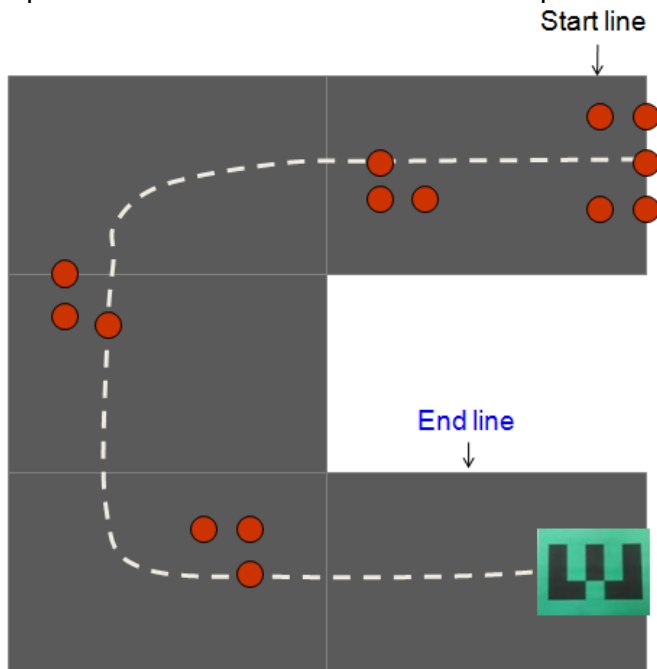
- Advanced High School: max. 3 team members
- College: Max 2 members per team, more complex obstacles to avoid

Challenge Synopsis

Follow a dashed line while avoiding “L” shape obstacle groups made of orange safety cones. When a digit number printed on green paper is detected at the end of the line, read the number d , turn around and come back to the starting point. Race time is measured when the robot hits the starting line and stop. If the robot displays the number d after stopping, the mission is completed. 3 minutes are given for each run.

Challenge Course Description

Unknown number of 5'x8' carpets will be used for the course. The exact length of the course is unknown. The exact color of the carpet is unknown, but it must be different from the color of the line, orange cone, or the dead-end green paper. Floor or ground color where carpets will be placed will be unknown. The light condition on the course is unknown and dynamic. The one digit number is chosen at random and should be placed after the robot starts. See a sample course below in Figure 1.



(Figure 1) A sample course with number 3 at the end

The line is made of bright masking tape of which the width is at least 2.5 inches. The gap between lines is at most 12 inches. 90 degrees will be the sharpest angle to turn. The dashed line must be at least a foot away from the edge of the carpets. The exact distances to form the “L” shape obstacle are unknown.

However, there will be enough space for L2Bots to spin around the obstacles. Here is the 12 inch safety cone information on the web at:

<http://www.homedepot.com/webapp/wcs/stores/servlet/ProductDisplay?storeId=10051&langId=-1&catalogId=10053&productId=100063670>

The dead end one digit number on a green letter size (8.5"x11") paper can be downloaded from the VCRC home page at www.robofest.net/collegiate. High school teams will be asked only 1~4. The number should be placed on the carpet. The orientation of the sign must be portrait. The angle of the sign from the floor can be between 0 to 90 degrees and the team can adjust before each run. The robot must completely pass the end line before turning around.

Competition Rules

- A robot has 2 chances to run. For each run, each robot has a maximum of 3 minutes for the race (without the number reporting time). If failed during a run, the robot's distance traveled will be recorded.
- The winner will be decided by (1) the number of successful perfect runs (2) the **best** time of the two run races (3) the **best** distance traveled of the two runs.
- For the successful line following, the robot must maintain all the wheels on the carpet.
- The robot must be **restarted** if any violation occurs. If you rerun, previous travel distance data will be reset. The timer does not stop while the robot is being returned to the start position by the player for the rerun. Therefore it is discouraged to restart if the robot is far away from the home base.
- Human player cannot have any interaction with the robot. For example, giving sound signals or hand gestures to the robot is not allowed.

Robot Requirements

- Must be autonomous (no remote control by human driver or remote computer is allowed)
- Any robot platform with any vision system such as L2Bot or iCreate is allowed to enter the competition.
- Any number of onboard cameras (webcam or camcorder) can be used. You may use any other sensors.
- Any programming language can be used.
- Width: must be less than 2ft
- Length: less than 3ft
- Height: maximum 5ft
- Weight: no limit

Prize: Winner Trophies; High school team members of the winning team receive \$2,000 LTU renewable scholarships.

Competition Schedule and Team registration

- May 19, 2012 at Lawrence Tech during World Championship
- June 9-10, 2012 at Oakland University during IGVC (www.igvc.org)
- To register teams, go to www.robofest.net and click on 2012 link

Questions

- To purchase or lease an L2Bot? Send an email to Dr. Chung at chung@LTU.edu

Misc. Info

- Go to www.robofest.net/collegiate for more info and possible rule updates
- The event is open to the public. Admission is free. Parking is free