Vision Centric Challenge 2011
Mini IGVC Autonomous Challenge

Autonomous Robotics Institute for Students and Educators / Scientists and Engineers
Lawrence Technological University, Southfield, Michigan

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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 (undergraduate and graduate students), as well as talented high school students with the following Vision Robot Competitions during Robofest 2010-2011 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 lane while avoiding orange safety cones. When yellow dead end sign is detected, turn around and come back to the starting point. 3 minutes are given for each run. Ranking will be based on (1) shortest time taken, then (2) longest distance traveled.

Challenge Course Description
Unknown number of 5x8 carpets will be used for the course. The exact color and length of the course is unknown. Floor or ground color where carpets will be placed will be unknown, but should be different from the color of the dashed line. The light condition on the course is unknown and dynamic. A bright light on the course *may* be turned on and off during the mission at unknown location. See a sample course below.
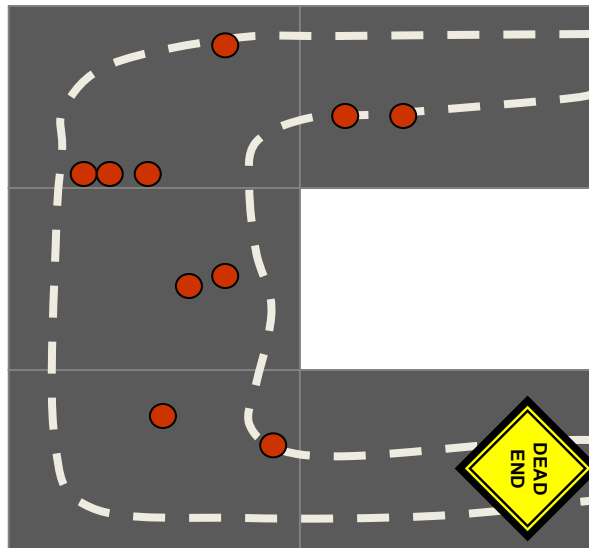
The minimum width of the lane is 2 feet. The line is made of bright masking tape of which the width is at least 2.5 inches. The gap between lines is at most 12 inches. 90 degrees will be the sharpest angle to turn. The dashed line must be at least a half foot away from the edge of the carpets.
The cone can be placed on the dashed line. There will be a minimum of 2 feet clearance, minimum passage width, between the dashed line and the cones or between cones.

Some cones in the center area will be placed after the robot starts by a judge. But the difficulty level of the obstacle configuration should be similar to all the teams. Here is the 12 inch safety cone info on the web at: http://www.homedepot.com/webapp/wcs/stores/servlet/ProductDisplay?storeId=10051&langId=-1&catalogId=10053&productId=100063670

The dead end sign on a letter size paper can be downloaded from the VCC home page at www.robofest.net/collegiate. The sign should be placed on the carpet. The orientation of the sign can be either portrait or landscape. 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 last cone (nearest to the dead end sign) before turning around.

Competition Rules
- A robot has 2 chances to run. For each run, each robot has a maximum of 3 minutes. The winner will be decided by the **best** time of the two runs. If failed during a run, the robot's distance traveled will be recorded.
- For the successful lane following, the robot must maintain at least one wheel inside the lane.
- 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. 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 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, since minimum width of the lane or clearance is 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 at the IGVC – Robofest competition.

Competition Schedule and Team registration
- May 7, 2011 at Lawrence Tech during World Championship
- June 4-5, 2011 at Oakland University during IGVC
- To register teams, go to www.robofest.net and click on 2011 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
- www.igvc.org