Robofest Vision Centric Challenge (VCC) 2014

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-based Robot Competition during Robofest 2013-2014 academic year.

Team Divisions
- College Division: max. 2 members per team, digit recognition required
- Advanced High School Division: max. 3 team members without digit recognition

Challenge Synopsis: Colored Cup Navigation
1. A judge will show either figure 1 or 2 to the robot camera. Then as an acknowledgement the robot is required to spin one round (at least 270 degrees).
2. A judge will give a digit number printed on white paper as shown in figure 3 to a team member. Team member is to show it to the robot in any way (angle and distance). Then the robot is supposed to spin one round again.
3. Now robot perceived all the information to perform the navigation mission. Timer begins now. If figure 1 was shown (Blue cup left) then the robot should navigate through the path in such a way that blue cups are always on the left side.
4. Since the number given was 2, the robot needs to return back home at the 3rd yellow cross-line while maintaining the left blue color rule.
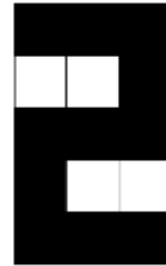
The whole scenario is shown in figure 4. 3 minutes are given for each run after showing the digit.
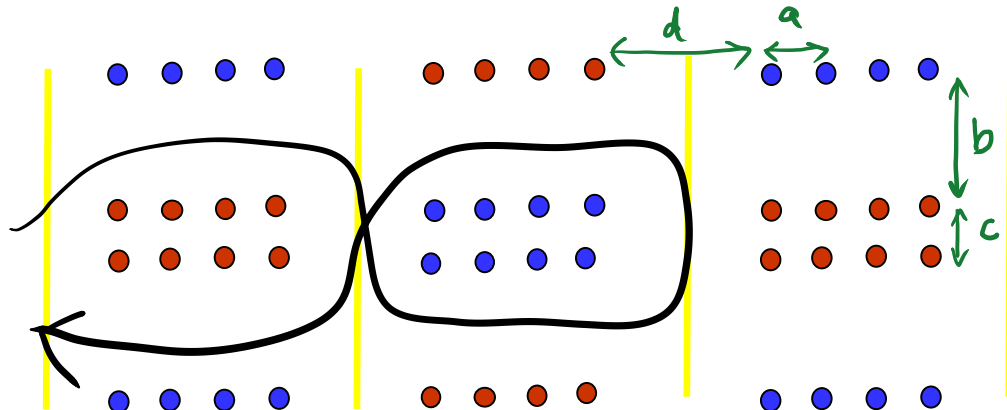

(Figure 1) Blue Cup Left
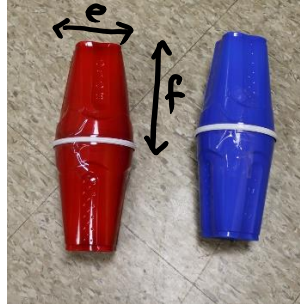
(Figure 2) Red Cup Left

(Figure 3) Digit 2

(Figure 4) A sample course with 3 groups of cups. Figure 1 and 3 were shown to start

Challenge Course Description

The color of the floor is unknown, but will not be blue, red, or yellow. Number of yellow lines that divides each cup group is unknown. The light condition on the course is unknown and may be dynamic. Table 1 shows course landmark dimension ranges. The yellow line is made of duct tape of which the width is at least 2.5 inches. The exact color of the cups are unknown. The digit number on a white letter size (8.5"x11") paper can be downloaded from the VCC home page at www.robofest.net/collegiate. The orientation of the sign must be portrait.

a	30cm ~ 50cm
b	61cm ~ 90cm
c	5cm ~ 10cm
d	120cm ~ 200cm
e	9cm ~ 14cm
f	10cm ~ 17cm

(Table 1) Range values for landmark items

Competition Rules

- There will be two rounds. Each round has different obstacle configurations and a digit number to use. Before starting each round, all the robots must be impounded. Players cannot modify programs during the impounding period. Each robot has a maximum of 3 minutes to run. If failed during a run, the robot's distance traveled will be recorded.
- The winner will be decided by (1) number of successful perfect runs (2) the best time of the two runs. (3) best distance traveled of the two runs
- The robot must be **restarted** if any violation such as touching the cups occurs. If you rerun, previous travel distance data will be reset. The course will be reset when restarted. 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 or visual 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 is allowed to enter the competition
- Any number of onboard cameras (webcam or camcorder) can be used. You may use any other sensors such as digital compass, distance sensors, and LIDAR.
- Any programming language can be used.
- Width: must be less than 2ft (61cm), since minimum width of the path is 2ft (61cm).
- Length: less than 3ft
- Height: maximum 6ft
- Weight: no limit

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

Competition Dates

- May 17, 2014 – World Championship 2014 at LTU (Practice course will be open May 16, 2014)

Questions: Contact Dr. Chung at chung@LTU.edu

- To purchase or lease an L2Bot
- To register (on-line or on-ground) classes to learn about vision centric robotics

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