

Opdrachtomschrijving practicum Microcontrollertechniek

De door ons gekozen opdracht is het maken van een “schoonmaakrobot” CHAP voor een wedstrijd van CCM. De uitdagingen die we hierbij aangaan zijn:

- Aansturing wielen
- Algoritme voor het vinden van de flessen (pathfinding)
- Precies detecteren flessen
- Stappenmotoren oppakken en wegstoppen van de flessen in een bierkrat

Omdat dit een grote opdracht is, is er afgesproken het moment van beoordeling te verplaatsen naar de laatste lesweek van blok 2.

De studenten die hier aan meedoen zijn:

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David Diks,
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De precieze opdrachtomschrijving is te vinden in de bijlage.

Bijlage

<http://www.ccm.nl/nl/trofee/ccm-trofee-2014>

Assignment description

Design and build a robot that can collect empty beer bottles and place them correctly in a beer box. The contest area will be 4 by 4 meter. In the contest area there will be 12 bottles scattered around. The robot has to collect 6 bottles and put them correctly in the 6 open slots in the collection box which will be already partly filled with 18 bottles (6 open slots). The robot must be working autonomously when it is in the contest area. If the robot gets stuck the teams are allowed to stop the robot and move the robot back to the start position (it is not allowed to “help” the robot while in the contest area). From the start position the robot can be restarted. The fastest robot that can fill the collection box with collected bottles correctly wins. Maximum duration of every round is 3 minutes. During the competition two teams will compete against each other on adjacent contest areas.

Questions

Questions can be sent to trofee@ccm.nl or be posted at the Facebook page of “CCM TROFEE”. On the Facebook page the answers to the contest questions and additional information is shared with the teams. Also photos and movies from the contests of previous years can be found on the Facebook page.

Element descriptions:

Robot

Height: max 1.8 m.

Width: max 0.8 m at start.

Length: max 0.8 m at start.

The robot must function autonomously when it is in the contest area. Interaction with the robot is only allowed when the robot is at the start location. When the robot gets stuck in the contest area it is allowed to stop the robot and move it back to the start location to restart. It is not allowed to manipulate bottles that are in the robot other than to remove them, a bottle removed from the robot by hand may not be used again.

Contest area

Dimensions: 4x4 m (distance between walls).

Floor: wood board tent floor covered with light colored short haired carpet.

Walls: wooden beams with width and height of approximately 120 mm fixed to the floor.

The robots are not allowed to get outside of the contest area walls. The start location is at one of the corners of the contest area and the collection box is positioned in opposite corner with the short side of the box against the wall that connects the start location and collection box location.

External disturbances

Lights: Illumination of tent and flash lights from cameras.

Rain: the contest area will be inside but can be wet due to weather conditions outside.

Sunshine: the tent will not have walls around the contest area.

Public: standing close to the contest area.

Bottles and collection box

Standard Dutch 30cl beer bottles (empty) will be used called De Nederlandse bierfles (DNb) also known as Pijpje (little pipe).

- Volume: 30cl
- Color: brown
- Height: 207 mm
- Mass: 254 gram

A standard Dutch 24 slots beer box for DNb 30 cl beer bottles will be used.

- Slots: 24

- Length: 400 mm
- Width: 300 mm
- Height: 220-250 mm

The bottles will be empty. There will be 12 bottles scattered around the contest area. 6 bottles will be standing and 6 lie down on the floor and all will be initially positioned at least 25 cm from the walls, starting location and collection box. The collection box will be already partly filled with 18 empty beer bottles (6 empty slots) at the start of each competition round.