Affiliated with TU/e technische universiteit eindhoven

Team Dare

Daring Autonomous Robots Eindhoven

eurobot

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The Netherlands

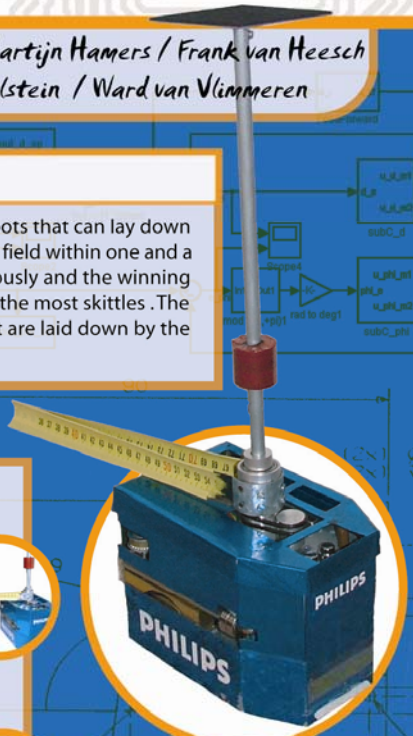
Contest

Goal: Build one or two autonomous robots that can lay down skittles on the opposite side of a playing field within one and a half minute. Two teams start simultaneously and the winning team is the team that has thrown down the most skittles . The robots may also upright the skittles that are laid down by the opponent team reducing their score.

History

Team members have previously participated at:

- Dutch Createch (2000)	1st place
- Eurbot (2001)	2nd place
- Dutch Robotwars (2002)	Semi-finals



Deployable side arm to take along the ball while passing the bridge

Flexible rotating arm to throw down skittles.

Ball canon to shoot down skittles from a distance (2x 120 W Canon motors)

Skittle pick up mechanism to pick up laying skittles

Laser skittle detection to avoid collisions with standing skittles

Specifications

* High performance drive units 180W
* Power supply:
  2.0 Ah 8.4 Volt (for the driving units)
  0.9 Ah 6.2 Volt (for the electronics)
* Custom Dual ATMega32 processor board
* Beacon detection system (IR)
* The ability to select strategies prior to start
* 2 x 16 character display for feedback
* In-system programmability from the outside
* Dimensions + weight:
  LxWxH: 180 x 120 x 160 3.5 kg
  LxWxH: 230 x 340 x 400 13 kg

Playing field

Controller

High speed manouvering requires complex motion control and makes the use of intelligent sensors such as cameras impractical. Therefore, a manouvering system has been developed that *only* requires data from two rotary encoders.
A novel MIMO-controller has been implemented in software on an ATMega32, together with a high level XY-trajectory controller. The MIMO-controller allows optimal tuning of speed, acceleration and precision, while the XY-trajectory allows for high level design of trajectories and strategies.
The design and development process of the controller has been examplory for hardware and software co-design, taking mechanical concepts, hardware architectures and software design choices into account from the start.

Eurobot

Eurobot is a yearly international competition for autonomous robots. The set-up of the contest is different every year, but there are some constants:

* All robots need to be completely autonomous, so no radio control; robots need to have their own "intelligence" aboard.
* The games always take place on a "table" of approximately 2 x 3 m.
* There are always two teams simultaneously on the table to play a match.
* The "robot" of each team usually consists of multiple robots.

It takes a lot of mechanical, electrical and software engineering know-how to realize all these things and moreover, to make them all work together. Therefore, it is a typical example of a multidisciplinary project.