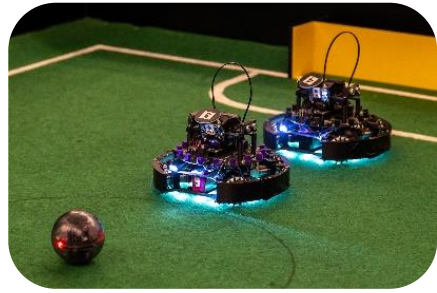


Experience 2023

We have a pretty successful year with a lot of improvements in all aspects of the robot.

We are happy with our overall performance and are looking forward to the Bordeaux Open and the following year, which will also be our last one unfortunately.



ROBOTRONICLGNU

Robotronic Germany 2v2 Lightweight



Website

Abstract

We are a Team of four students from the Lessing Gymnasium Neu-Ulm in Germany. Furthermore, we founded our Team.

in 2018 and first participated in the RoboCup Junior in 2019. Robotics is a big part of our daily life.

We meet on school days and even on weekends and in Holidays.

We started developing our robots in mid-2022 and had a first Prototype in late 2022. After final design

choices, our robots were ready for the South-Open in early 2023. From this point on, not much progress was.

made in the Hardware sector.

After a lot of coding, we managed to reach the second place.



Team

1. **Dario Woll:** Software; Calibration & StepUp Design
2. **Jonas Schaz:** Software; Ball Tracking & Mouse Sensor
3. **Elias Braun:** Hardware & Robot
4. **Noah Zeller:** Software; Compass & Camera

Software

Ball approach:

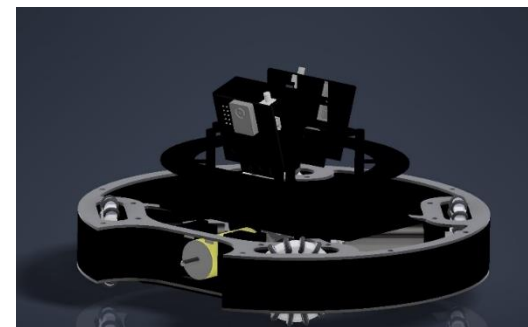
- ball is approached tangentially through imaginary circle around the ball.
- through distance to ball and distance to imaginary circle
- also, through the angle to a point behind the ball
- PID transfers a convex combination via distance to ball to motor formula.
- the closer we get, the slower we drive, to enhance the accuracy.

Ball detection and infrared light:

- sensor with shortest distance to ball represents angle to ball.
- each sensor integrates the balls pulsing for a short period of time.
→ distance to ball is estimated.
- each sensor is calibrated before each game to compensate hardware differences.
- calibration is stored and automatically improved over the course of the game.

Hardware

- everything is described from top to bottom.
- 2 **Pixy V2.1**
- **Infrared Seeker PCB**
- **Controller PCB** with a **Teensy 4.1 microcontroller**
- **Bluetooth** Module for communication
- everything is moved 1,5cm inside and covered by an 3D printed protector.
- **Kicker** consists of a bolt and coil.
- **Maxon DC Motors** and **VNH3SP30 driver chip** enable us high speed movement.
- **Omni wheels** enable us movement in all directions.
- circular **Line Detection PCB** with phototransistor and LED



Development

Due to the pandemic, we were not able to get much experience. In 2022 we had our first real RoboCup in the LightWeight International League. With this experience we started to design the 2023 Robot

The design of our robots aims to be as rigid as possible, while keeping the robot light. To achieve this goal, we used Carbon and 3D printed Parts in combination with thin circuit boards.

In combination with our Software, we can travel with high speeds to the ball and hit a goal.

We have a pretty successful year with a lot of improvements in all aspects of the robot.

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