Software Survey 2026

Team name

Team Robotedge

Which division(s) are you applying for? If your used software differs between divisions, please fill out the survey once per division.

Large Size (height < 190 cm, weight < 80 kg)

Is your software fully or partially OpenSource? If so, where can it be found?

Yes, it is on the Booster T1 website

Are you using any software developed by other teams? If so, list every component that you are reusing and the team that originally developed it.

The software is provided by the Booster T1

Are you using any datasets in your research? If you are using your own datasets, are they public?

No

Please list the scientific publications your team has made since the last application to RoboCup (or if not applicable in the last 2 years).

1. Potential-driven multi-learning particle swarm optimisation
Authors: Zhao, Weitao; Azizul, Zati Hakim; Woo, Chaw Seng; Kuang, Weijie; Li, Yafeng
Journal: Swarm and Evolutionary Computation
Year: 2025
Description: This research proposes a Potential-Driven Multi-Learning PSO (PDML-PSO) to enhance global search capabilities by classifying particles based on performance, which is highly relevant for optimizing complex robotic behaviors and movement strategies

2. Implementing Real-Time Retail Shelf Monitoring via YOLOv8 on a ROS-Based Mobile Robot
Authors: Dao Jing Hoong, Zati Hakim, Chia Jing Hui
Conference: RAAI 2025 Conference Proceedings (Accepted)

Year: 2025
Description: This paper details our development of real-time computer vision and ROS integration, forming the technical foundation for our current YOLOv8-based vision pipeline used in the Humanoid Soccer League.

Are there any other contributions you would like to share with the RoboCup community?

Which approach are you using to generate the robot walking motion?

Optimized Inverse Kinematics (IK) to achieve stable, agile movement and bipedal gait dynamics

Which approach are you using to generate other motions of the robot (e.g. kicking, standing up)?

Other motions, including kicking and autonomous self-righting (standing up from prone/supine), are handled through a dedicated motion control system and high-torque actuators

Do you have a kinematic or dynamic model of your robot? If so, how did you create it (e.g. measure physical robot, export from CAD model)?

23 Degrees of Freedom (6 per leg, 4 per arm, 2 head, 1 waist) with integrated feedback from dual-encoders and a 9-axis IMU for real-time balance.

What approaches are you using in your robot's visual perception?

YOLOv8-based object detection for real-time tracking of the ball and goals.

Are you planning with objects in Cartesian or image space? If you are using Cartesian space, how do you transform between the image space and cartesian space?

Utilize 3D spatial awareness provided by an Intel RealSense depth camera to map objects

Do you have some form of active vision (i.e. moving the robots camera based on information known about the world)?

The robot features a 2-DoF head (yaw/pitch) dedicated to field-scanning behaviors and

tracking.

What approach are you using to localize your robot?

We leverage our foundation in Simultaneous Localization and Mapping (SLAM), adapted for the humanoid pitch environment.

Is your team performing team communication? Which communication protocol are you using?

We utilize a decentralized team logic and communication layer to facilitate coordinated positioning and autonomous role-switching.

What approach are you using for navigation? Are you avoiding obstacles?

We use autonomous navigation frameworks optimized for high-speed soccer maneuvers and strategic field positioning.

How is the behavior of your robots structured? (e.g. Behaviour Trees)

Behaviour Trees

Are you simulating your robot? If so, which simulator are you using and for what purpose do you use simulations?

Booster Gym, an NVIDIA Isaac Sim based environment. The simulation is used for researching on Reinforcement Learning (RL) to develop more fluid, energy-efficient bipedal gaits and to optimize movement transitions with reduced computational and mechanical cost.

What operating system is running on your robot and which middleware are you using (for example Ubuntu 22.04 and ROS2 Galactic)?

Robot Operating System (ROS)

Is there anything else you would like to share that did not fit any previous question?