Software Survey 2026

Team name

HTWK Robots

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

Middle Size (height < 125 cm, weight < 25 kg);Large Size (height < 190 cm, weight < 80 kg)

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

Full software release last year after the robocup asia pacific:

https://github.com/NaoHTWK/Firmware-Salvador

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.

We are using the walking and get up motions provided by the booster robotics sdk.

We are also using the booster Yolo provided by the booster robocup demo

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

to train a new ball classificator we are using a inhome dataset. which is not released yet.

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

Bachelor Thesis of Felix Loos (german)

Von der Simulation aufs Spielfeld: Reinforcement Learning für dynamische Schussbewegungen im Roboterfußball

https://robots.htwk-leipzig.de/mainnavigation/publikationen

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?

Reinforcement Learning in the Isaac Sim

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

we trained an kicking motion with reinforcement learning in the isaac sim

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)?

the urdf model is provided by booster robotics

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

currently we are using 2 approches.

Booster Robotics Yolo and an in home line detection based which is not based on maschine learning.

Also we want to create our own maschine learning model for ball and field feature detection to replace the booster yolo.

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?

We transform from image space to the cartesian space using the depth perception of our dual lens cameras. With an ransac algorithm we calculate the groundplane and intercepting the rays of interessting pixels with the groundplane.

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

we have a static head movement for ballsearch. If the ball is found, we are focusing on the ball in the image space.

What approach are you using to localize your robot?

The system utilizes a Monte Carlo Localization (MCL) algorithm to estimate the robot's pose by fusing odometry data with visual feature observations against a static field model.

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

UDP

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

We have an obstacle detection based on depth perception and the booster Yolo robot detection. We are checking for open corridors to move towards to desiered direction

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

we are using an simple agent system where a list of agents is called. If an agent is responsible for the situation, no other agent is called and the agent makes the movement command.

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

to train new motions (e. g. walking, kicking) we are using a modified booster gym. Booster gym is an header of the isaac gym provided by Booster robotics.

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

we are using the preinstalled ubuntu from the k1/ t1 robots. Our Software is an single executable. Our Software communicating directly with the booster robotics sdk, zed2 or realsense api. To communicate with the new booster robotics camera we are using an ROS2 bridge, to avoid using ros in our firmware

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