RoboCup 2023 Submission Survey

Survey response 1

Software

Team Name

Barelang FC

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

Our software is partially open source; some of the robot software was published in our Git repo at https://github.com/BarelangFC

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

Yes, a kinematics model was implemented for the real robot, but we only used the dynamics in the URDF simulation model. We used the kinematics and dynamics parameters from the exported CAD model. However, for the weights parameter of each link, we directly measure from the actual robot.

Are you using Inverse Kinematics? If so what solution (analytic, (pseudo)inverse jabcobian, etc...) are you using?

Yes, we used the analytical method for the leg, but we are not using inverse kinematics for the arms.

Are you simulating your robot? If so what are you using simulation for?

Yes, we simulated our robot. We used a simulation model for research, including testing kinematics, localization, etc.

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

We used ZMP analytical controller, adopting the source code from Team UPennalizers at https://github.com/UPenn-RoboCup/UPennalizers

What approach are you using to generate motions for standing up?

We used prerecorded motion for standing-up motion.

What approach are you using to generate kicking motions?

We used prerecorded motion to generate kick motions.

Do you use any other motions than the previously mentioned? If so, what approaches are you using to generate them?

We do not use any other motions.

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

We collected the dataset ourselves, but it is not public yet.

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

We used YOLOv7 implemented on Jetson Xavier NX.

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 only used image space without transforming object position to cartesian space.

How is your robot localizing?

We used a particle filter approach by measuring visual landmarks on the field. However, we are currently trying grid-based localization that relies on only visual landmarks without odometry. We have tested this approach in the virtual environment. It still needs further investigation in the real environment.

Is your robot planning a path for navigation? Is it avoiding obstacles? How is the plan executed by the robot (e.g. dynamic window approach)?

We do not use path planning and obstacle avoidance.

How is the behavior of your robot's structured (e.g. Behavior Trees)? What additional approaches are you using?

Behavior control is based on State Machine.

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

Yes, we have an active vision. We move the robot camera using pan-tilt servos located on the head. The movement is used to track the ball's location based on the output of YOLO.

Do you apply some form of filtering on the detected objects (e. g. Kalman filter for ball position)?

We just processed data from the YOLOv7 object detection result without filtering.

Is your team performing team communication? Are you using the standard RoboCup Humanoid League protocol? If not, why (e.g. it is missing something you need)?

Yes, our team used team communication. However, we used ROS2 multiple-machine communication (message, service, action, etc.) instead of RoboCup Humanoid League Protocol. From our perspective, it is easy to debug and monitor the data using ROS2 communication.

Please list contributions your team has made to RoboCup

We have no contributions yet to the RoboCup Humanoid League community. Our contribution is participation at RoboCup 2017 Nagoya, Japan, RoboCup 2018 Montreal, Canada, and RoboCup 2019 Sydney, Australia.

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

Susanto, S., Pratama, T.T. and Analia, R., 2022. Real-time Coordinate Estimation for Self-Localization of the Humanoid Robot Soccer BarelangFC. Jurnal Integrasi, 14(2), pp.81-91.
Susanto, S., Priono, E. and Analia, R., 2021. Establishing ROS on Humanoid Soccer Robot-BarelangFC Software System. Jurnal Integrasi, 13(2), pp.113-121.
Susanto, S., Suroto, J. and Analia, R., 2021. The ROS: Kinetic kame for humanoid robot barelangfc. Jurnal Integrasi, 13(1), pp.68-77.

Please list the approaches, hardware designs, or code your team is using which were developed by other teams.

Our kinematics and gait planning is adopted from Team Upenalizers source code at https://github.com/UPenn-RoboCup/UPennalizers

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

Ubuntu 20.04 with ROS2 Foxy

Is there anything else you would like to share that did not fit to the previous questions?

No, all answers are enough to describe our robot software description.

If you have a description document of your software you would like to share, you may do so here.

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