Software Survey 2025

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 model 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 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 YOLOv8 implemented on Jetson Xavier NX, but have a migration plan to Rockchip SBC (Raxda ROCK 5B+)

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.

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 Behavior Tree

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.

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

Currently no, but have a plan to add some tracking algorithm for ball position

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 if we use ROS2 communication

Please list contributions your team has made to RoboCup

We have no contributions yet to the RoboCup Humanoid League community.

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

Hutagalung, D. P., Armadhika, A., Yo, W., Azzahra, S. R., Rezki, Y. L., & Jamzuri, E. R. (2024). Implementation and Performance Analysis of a Speech-Based Question Answering System on.

Mawaddah, N. I., Tamba, C. R. A., Hutagalung, D. P., Nainggolan, F. D., Lubis, E. M., & Jamzuri, E. R. (2024, January). Automatic Speech Recognition for Human-Robot Interaction on The Humanoid Robot Barelang 7. In ICAE 2023: Proceedings of the 6th International Conference on Applied Engineering, ICAE 2023, 7 November 2023, Batam, Riau islands, Indonesia (p. 15). European Alliance for Innovation.

Kurniawan, I., Breygin, N., Diputra, I. J., Erwandi, J. R., & Jamzuri, E. R. (2023, December). Barelang FC: An Adult-Size Humanoid Robot Simulation Model on The ROS and Gazebo. In 2023 3rd International Conference on Smart Cities, Automation & Intelligent Computing Systems (ICON-SONICS) (pp. 189-194). IEEE.

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 Upennalizers 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

If you have additional materials you would like to show, please link to them here.

No