

Software Survey 2026

Team name

Pumas

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?

<https://github.com/LIRA-UNAM/Pumanoids>

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.

None

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

Own datasets available at <https://github.com/LIRA-UNAM/Pumanoids>

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

List of publications can be found at <https://lira.unam.mx/publications/>

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

None

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

Deep Reinforcement Learning

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

Predefined sequence of positions

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)?

Model was provided by the manufacturer (Unitree and Booster)

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

Neural Networks (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?

Cartesian space. For ball, we use angles wrt center of the image and we assume the ball is at $z=0$. For other items, we estimate distance using the size in pixels.

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

Robot moves head to try to find goals based on the current estimation of position.

What approach are you using to localize your robot?

Particle filters and recognition of field landmarks.

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

We don't communicate robots.

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

For navigation we use simple behaviors such as following the ball. We use potential fields for obstacle avoidance.

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

Simple behaviors coordinated by a finite state machine.

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

We use the models provided by manufacturers in MuJoCo for training movements using DRL.

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

Ubuntu 20-ROS Foxy and Ubuntu 24-ROS Jazzy

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

No