RoboCup 2023 Submission Survey

Survey response 1

Software

Team Name
ZJUNlict

Is your software fully or partially OpenSource. If so, where can it be found:
We have not done related work before, which is what we lack. We plan to open source all hardware designs, software frameworks and algorithms this year. It is still in the development stage. It is expected that the framework will be open-sourced one month before next year's competition after the development is stable. You will find our open-source information on these websites. https://github.com/ZJUNlict

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)?
We use Solidworks for the export of kinematic models and we are not currently using dynamic models

Are you using Inverse Kinematics? If so what solution (analytic, (pseudo)inverse jabcobian, etc...) are you using?
We solve the inverse kinematics of the robot through an analytical method. We push it back through the coordinates of the ankle point relative to the hip joint and the angles of each steering gear on the leg. Finally, we complete the solution through the position and posture of the center origin of the robot body relative to the center between the two feet, and the rotation order of the posture

Are you simulating your robot? If so what are you using simulation for?
Our previous code is ros based, so we can easily use gazebo. However, in the process of use, we found that there is a large gap between gazebo and the real thing, and it is difficult to realize the migration from simulation to real thing. So at present, gazebo is not very helpful to us

What approach are you using to generate the robot walking motion?
We use the inverted pendulum model to generate the trajectory of the center of mass and the end of the foot. On this basis, we use inverse kinematics to complete the angle calculation of each joint.

What approach are you using to generate motions for standing up?
We used the method of demonstration teaching. First put the robot down on the ground and make the steering gear into passive mode, then manually lift the robot up and record the complete steering gear trajectory. After doing some fine-tuning of the trajectory on this basis, it can be directly applied in the game

What approach are you using to generate kicking motions?
The method we currently use is to set keyframes and then perform interpolation calculations. Such a method did not achieve good results, so we plan to improve it this year by using demonstration teaching methods

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

Which datasets are you using in your research? If you are using your own datasets, are they public?
At each competition, we filmed and generated a dataset in the competition field. All team members complete the labeling of the dataset. We are not currently using public datasets or making our datasets public.

What approaches are you using in your robot's visual perception?
We use the YOLO algorithm for object recognition. The object categories currently include balls, goal posts, circles in the field, and various types of corners. We expect robotics as a category for object recognition this year.

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 use a Cartesian coordinate system for task planning. we adopt the aruco marker and let robots perform an automatic detection and labeling. We use a white cloth printed with aruco tags, and the tag number and coordinates will be set for the robot to do camera calibration. When the camera detects the ball, it will convert the image coordinates into the local coordinates of the robot and then plan the task

How is your robot localizing?
We use a Monte Carlo method for localization. After setting the initial value, we use the detected landmarks and odometey information to update the particles to complete the positioning.

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)?
Currently, our recognition of robots is not very accurate, so there is no path planning or obstacle avoidance yet. In this year's implementation, we plan to do path planning after robot recognition.

How is the behavior of your robot's structured (e.g. Behavior Trees)? What additional approaches are you using?
We use decision trees for behavior planning, the current roles are forward, assister, defender and goalkeeper.

Do you have some form of active vision (i.e. moving the robots camera based on information known about the world)?
We will rely on decision trees for active vision. In addition, we will also determine the active vision behavior according to the degree of divergence of the particles in the Monte Carlo positioning

Do you apply some form of filtering on the detected objects (e. g. Kalman filter for ball position)?
currently not used

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)?
At present, we directly use our own positioning information for role selection, so there is no team communication

Please list contributions your team has made to RoboCup
none

Please list the scientific publications your team has made since the last application to RoboCup (or if not applicable in the last 2 years).
none

Please list the approaches, hardware designs, or code your team is using which were developed by other teams.
foot force design of Rhoban : https://github.com/Rhoban/ForceFoot

What operating system is running on your robot and which middleware are you using (for example Ubuntu 22.04 and ROS2 Galactic)?
v2019 : ubuntu 20.04 with ros1 v2022 : ubuntu 22.04 with zos (more details can be viewed in full tdp) https://github.com/ZJUNlict/zos

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

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

filecount - If you have a description document of your software you would like to share, you may do so here.
0