Survey response 26

Software

Team Name
ZJUDancer

Is your software fully or partially OpenSource. If so, where can it be found:
All open source. Link: https://github.com/ZJUDancer/

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 have a kinematic model of the robot. Generate by exporting from CAD models

Are you using Inverse Kinematics? If so what solution (analytic, (pseudo)inverse jabcobian, etc...) are you using?
We use Inverse Kinematics and using inverse Jacobian to solve the problem

Are you simulating your robot? If so what are you using simulation for?
We haven't used simulation yet. But we are considering using simulation in the future to train RL motion control models

What approach are you using to generate the robot walking motion?
Use 3D inverted pendulum to generate foot and CoM positions , and use inverse kinematics to get joint angles

What approach are you using to generate motions for standing up?
Set foot spacing and CoM height, and use inverse kinematics to solve joint angles

What approach are you using to generate kicking motions?
Set keyframes for the position of the foot and CoM in the kicking motion, then use third-order linear interpolation method to calculate the trajectory of the foot and CoM, and finally use inverse kinematics to solve the joint angle

Do you use any other motions than the previously mentioned? If so, what approaches are you using to generate them?
Having no other motions yet

Which datasets are you using in your research? If you are using your own datasets, are they public?
We use a self captured image dataset for training venue feature point recognition, which is currently not publicly available

What approaches are you using in your robot's visual perception?
Use YOLO to detect feature points in the field and use projection method to obtain the position of feature points relative to the camera

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?
Plan in Cartesian space. Using projection methods to transform between image space and Cartesian space. For specific details, please refer to the attachment

How is your robot localizing?
Localization is achieved through particle filtering. Update robot positioning by detecting feature points on the site and obtaining their relative positions to the robot. For specific details, please refer to the attachment

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 currently do not use path planning or navigation methods, nor do we have algorithms to avoid obstacles. But in the future, we are considering using RRT for path planning and DWA for local trajectory planning

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

Do you have some form of active vision (i.e. moving the robots camera based on information known about the world)?
Yes. We will detect the position of the ball on the field of view and move the camera to keep track of the ball, even if it remains in the center of view

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

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)?
Not yet. We are not very familiar with the standard RoboCup Humanoid League protocol

Please list contributions your team has made to RoboCup
We are not very clear about our contribution to the RoboCup competition. Because of the COVID-19, our technology has broken down, but we are trying to recover and further improve our technology

Please list the scientific publications your team has made since the last application to RoboCup (or if not applicable in the last 2 years).
Not yet. We have not published any papers in the form of the RoboCup team

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

What operating system is running on your robot and which middleware are you using (for example Ubuntu 22.04 and ROS2 Galactic)?
Using Ubuntu 20.04 operating system and ROS noetic as middleware

Is there anything else you would like to share that did not fit to the previous questions?
There is no other content. The specific content of the software section can be found in the attachment