
RoboCup 2023 Submission Survey

Survey response 1

Software

Team Name
FIBOT
Is your software fully or partially OpenSource. If so, where can it be found:
partially OpenSource: https://github.com/fibohumanoidlab/FIBOT_v1.0
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 to create robot models. After that, we export the models as URDF files to create the robot kinematics model.
Are you using Inverse Kinematics? If so what solution (analytic, (pseudo)inverse jacobian, etc...) are you using?
We use Algebraic Approach to find inverse kinematics for the robot's arm and head. Another approach for the robot's leg is CLOSED-FORM INVERSE KINEMATIC POSITION SOLUTION FOR HUMANOID ROBOTS from this paper: https://www.worldscientific.com/doi/epdf/10.1142/S0219843612500223
Are you simulating your robot? If so what are you using simulation for?
We use Matlab, Gazebo, and Issac Sim for robot simulation.
What approach are you using to generate the robot walking motion?
Now, we use a keyframe for each robot's joint. However, we plan to create the quintic polynomial trajectory to generate robot motion.
What approach are you using to generate motions for standing up?
Now, we use a keyframe for each robot's joint. However, we plan to create the quintic polynomial trajectory to generate robot motion.
What approach are you using to generate kicking motions?
Now, we use a keyframe for each robot's joint. However, we plan to create the quintic polynomial trajectory to generate robot motion.
Do you use any other motions than the previously mentioned? If so, what approaches are you using to generate them?
We create a trajectory to generate motion for scanning a ball (robot's head)
Which datasets are you using in your research? If you are using your own datasets, are they public?
Now, we using own dataset. However, we have plane to use new dataset to avoid overfitting. dataset : https://app.roboflow.com/human-x1nbw/human-ku1be/2 paper : https://iee-dataport.org/open-access/open-soccer-ball-dataset
What approaches are you using in your robot's visual perception?
We use YOLOv4: https://github.com/AlexeyAB/darknet This is YOLOv4 paper: https://arxiv.org/abs/2004.10934
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 plan to use Inverse Perspective Mapping (IPM), which transforms the image space into cartesian space.
How is your robot localizing?
We use a particle filter for robot localizing
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)?
Now, we do not have this part.

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

Do you have some form of active vision (i.e. moving the robots camera based on information known about the world)?
No, we don't have active vision. But, we try to tracking ball by moving robot camera based on the latest ball information.

Do you apply some form of filtering on the detected objects (e. g. Kalman filter for ball position)?
Now, we do not have this part.

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)?
We use the standard RoboCup Humanoid League protocol.

Please list contributions your team has made to RoboCup
Last year, we participated in helping organize the Robocup event and persuade people in our university to form new members for the competition the humanoid soccer league.

Please list the scientific publications your team has made since the last application to RoboCup (or if not applicable in the last 2 years).
Tammapon Numsarapatnuck. 2022. Humanoid Robot Balance Control Using Inverted Pendulum Model. Institute of Field Robotics. But, it not public as a research paper yet.

Please list the approaches, hardware designs, or code your team is using which were developed by other teams.
Now, we don't have approaches hardware design, or software that developed by other teams.

What operating system is running on your robot and which middleware are you using (for example Ubuntu 22.04 and ROS2 Galactic)?
We use Ubuntu 20.04 LTS and ROS2 Foxy.

Is there anything else you would like to share that did not fit to the previous questions?
Don't have yet.

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

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