

OPERATING SYSTEM

Ubuntu 14.04 LTS 64-bits
 Xenomai real-time framework



ROBOTICS MIDDLEWARE

Orocos 2.8
 ROS Indigo



SIMULATION

Gazebo dynamic simulation

TELEOPERATION

Joystick teleoperation:
 base, torso lifter, head and end-effector



ROS CONTROLLERS

Controllers implemented as ros_control plugins running in the real-time control loop

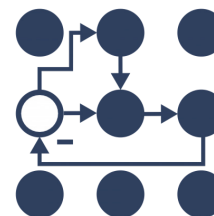
Supported control modes:

- Wheels: velocity control
- Lifting torso and head: position control
- Arm motors: position and effort mode

Joint trajectory controllers on groups of joints

QT GUI to move individual joints

Head Action Server to control the robot's gaze



UPPER BODY MOTION ENGINE

Path planning with self collision avoidance
 10 pre-programmed motions



EYE-HAND CALIBRATION

Calibration procedure including:

- Calibration tool
- Sequence of calibration movements
- Optimization software for camera pose estimation

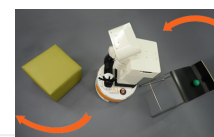
TEXT-TO-SPEECH

TTS software with one language and one voice



AUTONOMOUS NAVIGATION

Laser-based mapping and self-localization
 Navigation to a map point
 Obstacle avoidance



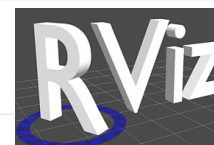
MOVEIT!

Off-the-shelf integration



ROBOT SENSORS VISUALIZATION

Rviz plugins for camera, lasers, sonars,
 IMU and force/torque sensor



WEB BASED INTERFACE

Robot actuators, sensors and software diagnosis
 Voice synthesis of sentences
 Execution of pre-recorded motions



DEMOS

Current control: arm gravity compensation
 Arm movements by learning-by-demonstration
 Example of tabletop grasping