

Bachelorarbeit

Informatik/Mathematik/Physik

“Implementation of modular joint control and sensors reading on the HeiCub humanoid robot using YARP interfaces“

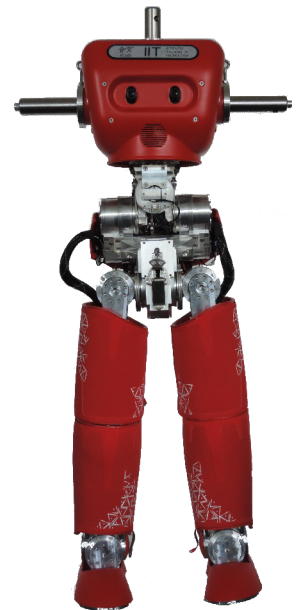
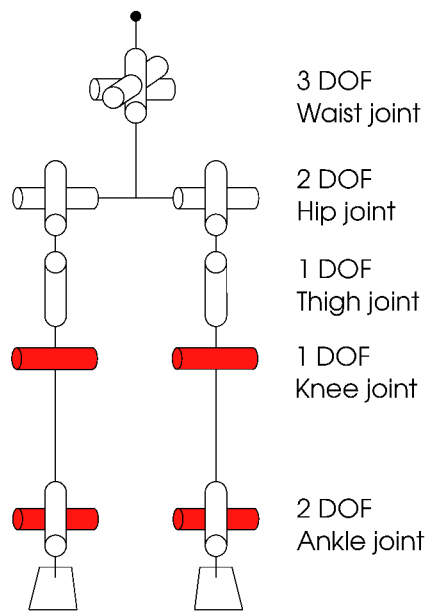
Hintergrund:

The HeiCub humanoid robot is a reduced version of the iCub humanoid robot, a child-size robot designed and built by iCub Facility department of the Fondazione Istituto Italiano di Tecnologia (IIT) in Genoa, Italy. It is a research platform that is spread among many institutes all over the world.

The robot is an open-source platform and all the mechanical design as well as software libraries are openly available on the web.

The robot was initially built to perform cognitive studies and consists in a full body humanoid robot with a head with embedded cameras, arms with dexterous hands and legs. In the recent version of the robot strong legs have been built in order to give walking capabilities to the robot. The version that is in Heidelberg at the research group ORB has only legs and torso, as it is meant to be used to carry out walking experiments within the European project KoroBot (<http://www.koroibot.eu/>).

The communications with the robot are performed via the middleware YARP (Yet Another Robot Platform, <http://www.yarp.it/>), entirely implemented with C++, which works on communication via „ports“. There are also other libraries related to the robot, as the iCub libraries and the WholeBodyInterface libraries, also in C++.



Projekt:

In this project we want to give the student the possibility to get familiar with one of the most advanced and distributed humanoid robots, by implementing C++ modules that allow to control the joints of the robot through YARP interfaces, using documented APIs. The WholeBodyInterface library already allows to control only certain joints instead of a whole part (e.g. all the joints of one leg), but it does not have interfaces to access lower level data (e.g. motor encoders raw data) that are useful to analyze the behaviour of the robot. The module that has to be developed within this project has to allow to control any joint or a combination of joints independently, with all the available control modes of iCub (position, position direct, velocity, torque, motor PWM). The commands have to be read from YARP ports. In addition the module should concurrently read data in real time from any of the accessible robot sensors that is specified by the user via a configuration file. The module has to run at specified thread rates. The module will be tested on the real robot.

Voraussetzungen:

Good knowledge of C/C++ is a fundamental requirement. Knowledge about mechanical systems and robotic hardware are appreciated but not required.

Kontakt:

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