ARMAR-III in a robot kitchen

The humanoid robot ARMAR-III has been designed to help in the Kitchen, e.g. bring objects from the fridge and fill the dishwasher. It has a total of 43 DoF. A mobile platform equipped with three laser scanners allows the robot to navigate the kitchen environment. The arms have 7 DoF each with 8 DoF five fingered hands. A force-torque sensor is available in each wrist. ARMAR-III uses the Karlsruhe Humanoid Head with 7 DoF. For vision, four digital cameras are integrated into the head. Each eye has a wide-angle and narrow-angle camera for peripheral and foveal vision, respectively. There are four PCs inside the mobile base, which run Linux as their operating system. The robot software was originally written in MCA but can also be controlled via the newer ArmarX framework (https://armarx.humanoids.kit.edu). High-level functionality, like object localization, navigation, grasping and planning are already implemented and available.

Key Features

- 5-finger pneumatically actuated hands
- Active head with foveated vision
- Force-control for contact detection
- Advanced grasping and manipulation
- Control architecture with memory and attention system
- Integrated humanoid robot system

Possible Applications

- Manufacturing tasks involving carrying heavy loads

Access information

Corresponding infrastructure	Karlsruhe Institute of Technology Institute of Anthropomatics and Robotics - High Performance Humanoid Technologies Lab (IAR H2T)
Location	Adenauerring 2, 76131 Karlsruhe, Germany
Unit of access	Working day

Technical specifications

Force-torque sensors	Two 6D force torque sensors from ATI Industiral Automation at the wrists
Laser Range-Finders	Three Hokuyo scanners of type URG-X003S in the mobile base
Depth Cameras	Asus Xtion Pro (RGB-D, 640×480@30PFS)
Motors	DC, Harmonic Drives
Color cameras	Point Grey Research Dragonfly (RGB, 640×480@30FPS, Stereo calibrated)
OS	Ubuntu Linux 14.04
Robotic Framework	ArmarX (previous framework MCA)
Total Weight	140kg
Bus system	EtherCAT (100Mbit/s)
Software	ArmarX
Network	Gigabit Ethernet (WLAN for plugless operation)
Computers	4 PCs inside (1 PC for external control)

Additional information

ArmarX: https://www.armarx.humanoids.kit.edu Additional Information available here, here and here.