On TAMS' PR2, MoveIt, and Integrated Grasping
Status Update

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Technical Aspects of Multimodal Systems

29. November 2016

Trixi - After the Upgrade

Fix "loose ends"

- C2 server freeze
- Rescue-boot from USB stick
- Broken DNS configuration

- Mixed up laser scanners
- Updatable system
- . . .

Exclude the right hand

Removing the right arm in software entailed a whole stream of
software changes. . .

What Works?

- The servers
- All the basic hardware drivers
- Virtually "green" robot diagnostics
- Startup-calibration without right arm

- Joint-per-joint calibration of the right arm
- `PointHead` and `LiftTorso` actions
- Teleoperation by Joystick
- MoveIt setup for the left arm

TODO

- The list is long! (21 open issues in CML gogs)
- Includes Xtion/Kinect2 integration, Head-NUC integration, Software integration of Shadow Hand, F/T-sensor, Navigation

Applications

VOCUS2[1]

- Cooperation with Simone Frintop's Group
- Video

HRI (Jinpeng Mi)

- Requires 2D-Navigation

Reinforcement Learning (Zhen Deng)

- Requires "Mannequin" mode

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[1] Simone Frintrop, et.al: Traditional Saliency Reloaded: A Good Old Model in New Shape, IEEE International Conference on Computer Vision and Pattern Recognition (CVPR), Boston, June 2015

MoveIt! in ROS Kinetic

New Features

- ▶ C++11
- ▶ Back to `RRTConnect` as default planner
- ▶ The CHOMP planner
- ▶ Synchronous updates to the `PlanningScene`
- ▶ Support for the PlanningArena Benchmarking suite
- ▶ Easy access to collision objects via `PlanningSceneInterface`
- ▶ Support for Optimization Objectives in optimizing planners
- ▶ Colored trajectories in RViz
- ▶ "STOP" button for trajectories in RViz
- ▶ Velocity generation for cartesian trajectory generator
- ▶ Safety-Check: Validate current state before execution
- ▶ `planGraspsAndPick`

The Current Manipulation Pipeline . . .

▶ provides forward projection

▶ supports testing of multiple hypothesis

▶ decomposition into trajectories for multiple hardware controllers

▶ reasoning about the attached object

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▶ does not allow *backtracking with partial solutions*

▶ relies on *on specific simple gripper*

We want . . .

▶ a robust pipeline   ▶ support for complex grippers