ROSCON 2013 Lightning Talk

Motion retargeting pipeline

Marcus Liebhardt
Yujin Robot

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Motion retargeting pipeline History

- Started 12/2010 as a master thesis project at PAL Robotics

- First usage for online motion retargeting for upper body teleoperation used with REEM (18 DOF)
- Future intended use cases
  - Motion recording for content creation
  - Motion teaching for motion learning

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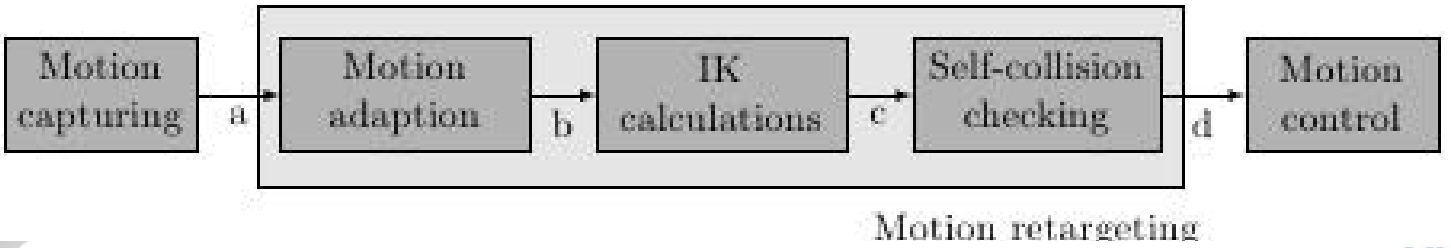
Motion retargeting pipeline
Some details

- Goals
  - Similar human motions should result in similar robot motions
  - Needs to work for different users and different robots
- Why *retargeting* and not *mapping*?
  - *Retargeting* emphasizes the mapping between significantly different kinematic structures (e.g. human → robot)
- What it does
  1. Motion adaption: Input motion (stream of body poses consisting of multiple end point poses) is adapted to the robots kinematic structure using the human's and robot's body proportions (e.g. arm length, shoulder width)
  2. Inverse kinematics: Computing joint positions for the adapted end effector poses



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Motion retargeting pipeline Current development

- Ongoing development happening at PAL Robotics
  - Past: Integration of IMU data for head and hands motion
- Part of the motion pipeline in ROCON
  - Used for motion creation for later use in content creation
  - Implemented on Robosem (1 DOF torso, 2 x 2 DOF arm, 1 DOF head)
  - Motion recording and replay available (uses rosbag)
  - Next steps: easy configuration for different robots, recording of robot-agnostic motions, usage of an online database, integration in content creation

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Motion retargeting pipeline Resources

- Documentation
  - http://www.ros.org/wiki/reem_teleop/
- Code:
  - https://github.com/pal-robotics/reem_teleop

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