# Human Motion Retargeting for Robot Bimanual Manipulation Tasks

Programming by Demonstration (PbD) is a promising way for teaching robots new skills by observing and interpreting human demonstrations. Recently, large-scale human motion databases and datasets have been established to provide accurate recordings of human and object motions in various scenarios that can serve as a source for learning robot skills. To do this, a retargeting of human motion to the target robot system is needed. Such retargeting, also known as the correspondence problem between different embodiments, should take specific kinematics and dynamics constraints of the robot into account while preserving as much of the characteristics of the demonstrated motion as possible. Recent approaches to solve the correspondence problem distinguish between solutions in the task and configuration space. However, the comparison between approaches is difficult.
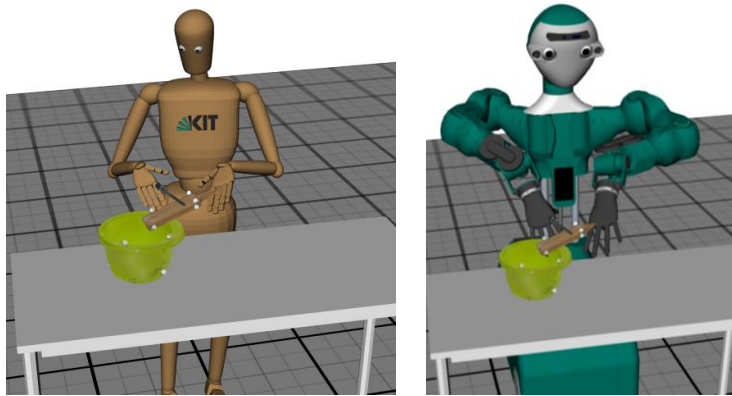
In this project you will research related work to develop of a framework for evaluating the result of human motion transfer, for example in the context of feasibility and human-likeness for different humanoid robots. In particular, methods for retargeting demonstrated bimanual manipulation tasks should be addressed. This includes implementing and evaluating various motion retargeting methods in the task space. In addition, metrics for the aforementioned evaluation of the quality for resulting robot motions should be implemented and evaluated using single short motions as well as sequences of motions.

Good knowledge in C++ is required for this work. You will work with the following tools:

- KIT Whole Body Human Motion Database: motion-database.humanoids.kit.edu
- MMM-Framework (C++):
        mmm.humanoids.kit.edu

Contact: André Meixner
(andre.meixner@kit.edu)