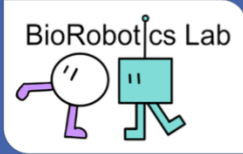


Optimization and Biomechanics for Human Centred Robotics KIT BioRobotics Lab



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Master's Thesis:

Robotic touch - Close-proximity human-robot interaction with geriatric users

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Background

Human-centred robots may play an important role in the future to address the worldwide shortage of personnel in healthcare and elderly care. For this, robots have to learn how to behave and move in close proximity to humans and in particular how to touch humans. Previous research has demonstrated that interpersonal touch among humans has positive effects on physical and mental health, but we still have to understand whether robotic touch can replicate these benefits. In the **HEIKA-Project Perception of Robotic Touch in Geriatric Healthcare (PerRoT-G)** in collaboration with Heidelberg University and the Bethanien Hospital in Heidelberg, we are exploring the effect of robotic interactions and touch on geriatric patients during different types of activities (scratching, massaging, guiding etc.) using humanoid robot platforms.

Scope of the thesis

The objective of this Master's thesis is to implement on the wheeled humanoid robot TiagoPro by PAL Robotics (see picture) several different motions that lead to direct interactions and touch with patients. Motions include approaching a person, scratching a person's arm, massaging a person's back, and moving forward while holding the hand of the person. The tasks of this thesis include:

- Setting up TiagoPro model and implementing motions in a simulator
- Implementing motions on the real robot and testing them in the lab
- Evaluation of robotic touch situations in experiments with geriatric patients in the Bethanien hospital

Other (non-physical) interactions during the same experiment include multimodal communication with the patient.

Required knowledge

This thesis requires understanding of mechanical and robotics concepts (Robotics 1 or similar), computer vision, programming knowledge. Biomechanics and ROS knowledge is helpful.

