

Title:

Modeling Spatio-Temporal Variability in Human-Robot Interaction with Probabilistic Movement Primitives

Abstract:

The task of physically assisting humans requires from robots the ability to adapt in many different ways: to changes in space of the human movement, to changes in the speed of the human, to changes in the environment, etc. In this work, methods have been designed to teach robots how to interact with humans and how to adapt to different circumstances. The approach presented here is based on Imitation Learning and Probabilistic Movement Representations. In particular, this work uses the concept of a Mixture of Interaction Primitives to learn interactions from multiple unlabeled demonstrations and to deal with nonlinear correlations between the interacting partners. Furthermore, a method to compute reactions to human movements executed at different speeds has been developed. A number of experiments with a lightweight robotic arm have been conducted to evaluate the presented methods.