# Intelligent Human-Robot Interface Design


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The use of automation, and more specifically the use of robots, is increasing in industry and recently also in people's daily life activities. The presence of personal robotics in our homes should lead to important societal changes in upcoming years, with personal robots assisting our aging societies in health care, therapy and rehabilitation but also serving as entertainers and household staff. However, current robotic technology is still limited. Fully autonomous robots, capable of performing new tasks in complex and unstructured, unknown and changing environments like our homes do not exist so far. Humans are highly flexible and can easily adapt to changing conditions, but they are far less accurate and reliable compared to robots. Hence, it is advantageous for robots and humans to collaborate, with each benefitting from the specific capabilities of the other. A critical component of successful human-robot collaboration is the interface, and this is particularly problematic for learning robots.

This work focuses on two research directions related to interface design aiming to increase the efficiency of human-robot collaboration: 1) understanding the design of the human-robot interface for robots with learning capabilities and 2) developing and testing novel intuitive human-robot interfaces based on state-of-the-art technological advances.

In Part A different aspects related to interface design for learning robots were investigated. The focus was on how the interface design influences the user interaction with a robot with behavior which evolves over time in a changing environment. In Part B, a more practical approach of interface development was taken. Novel interfaces and algorithms were created using recent advances in the field of sensors and in particular the release of cheap RGB-D sensors like the Microsoft Kinect.