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Forschungspraxis

joint optimization of communication and control for time-delayed teleoperation

Using a teleoperation system with haptic feedback, the users can thus truly immerse themselves into a distant environment, i.e., modify it, and execute tasks without physically being present but with the feeling of being there. A typical teleoperation system with haptic feedback (referred to as a teleoperation system) comprises three main parts: the human operator OP)/master system, the teleoperator (TOP)/slave system, and the communication link/network in between [43]. During teleoperation, the slave and master devices exchange multimodal sensor information over the communication link.

This work aims to develop an adaptive teleoperation system that can cope with varying network conditions, while still guaranteeing the best possible performance. The proposed approaches rely on the systematic comparison of the system performance for different joint communication/control solutions. A preliminary plan of this thesis is:

1) develop multiple solutions which combine haptic codec with stability-ensuring control schemes

2) propose a dynamic switching strategy between different combination solutions under different network quality of service in order to guarantee the best possible teleoperation quality.

3) define different quality metrics to evaluate teleoperation quality based on the developed strategies.

Prerequisites

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Advisors

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