DC1: Kinaesthetic compression, control, and communication for Touch-enabled Tactile Internet

Application deadline: 28-02-2023 | Date of enrolment: 1-9-2023

Project description

This project focuses on haptic communication for local processing and controlling of haptic data in teleoperation systems, aiming at optimizing the transmission strategy for networked teleoperation while ensuring system stability and high fidelity. Due to the limited network resources, it is essential to investigate signal representations and develop corresponding compression schemes that exploit the properties and conceptual limitations of haptic information.

This position focuses on kinesthetic data processing. High-fidelity teleoperation systems with kinesthetic feedback require joint design of haptic data processing and system control to deal with communication unreliabilities in the network. Integration of different haptic communication and system control schemes introduces different amounts and kinds of artefacts to the teleoperation system. Therefore, it is essential to investigate different combinations of control and communication schemes to reveal characteristics of the resulting artefacts and achieve better teleoperation performance. The research topics include but not limited to objective performance metrics identification, designing of novel kinesthetic communication schemes, enabling perceptually transparent and stable switching between different kinesthetic communication modes.

Eligibility Conditions

- Master's degree in electrical/computer engineering, mechatronic engineering or within a relevant area.
- The candidates are eligible if they have not resided in Germany for more than 12 months within the past 36 months.

Required Skills

- Profound knowledge on signal processing, robotics, and control theory.
- Experience in haptic technology and/or haptic applications.
- Excellent knowledge of English (written and spoken).
- Knowledge of digital audio and image processing, machine learning, and embedded system design is a plus
- Be able to work well and communicate expert knowledge in an interdisciplinary team.

How to apply:

Please send your application to Prof. Eckehard Steinbach eckehard.steinbach@tum.de and Dr. Xiao Xu xiao.xu@tum.de.

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