HYBRID SOCIETIES

Session (1): Beyond Transparency in Telerobotics - Model-Augmented-Haptic-Telemanipulation combines advanced control methods, haptic augmentation, and shared-autonomy to enhance telepresence in space and terrestrial applications

Date

Wednesday,
July 20, 2022

Lecturer

Thomas Hulin

Affiliation

Institute of Robotics and
Mechatronics, DLR German
Aerospace Center

ABSTRACT

Telerobotics is a powerful tool to combine the benefits of robotic manipulation with human mental abilities and manipulation strategies. Modern bilateral teleoperation systems provide haptic feedback that enables a human operator to perceive interaction forces and-more importantly-to intuitively control the forces applied by a teleoperated robot on its environment. Certain telerobotic applications, including telerobotics in space, however pose particularly demanding challenges to the system and the human, e.g. in terms of varying delays, packet loss, and limited bandwidth, as well as high reliability, precision, and task duration requirements. To enable telemanipulation for such demanding applications, we research model-augmented haptic telemanipulation (MATM), which aims to amalgamate advanced control methods, haptic augmentation, and shared-autonomy. This approach has already been shown in several terrestrial applications to not only enable teleoperation with high demands, but also to increase accuracy and reduce workload during teleoperation.

This talk provides an overview of the telerobotic missions in which DLR has been involved and addresses the technology developments related to MATM. On this basis it introduces the concept of MATM and shows examples for terrestrial applications that benefit of MATM. It also illustrates selected details on the control-concepts for haptic devices and for stable teleoperation.

TECHNISCHE UNIVERSITÄT
CHEMNITZ

DFG

HYBRID SOCIETIES

Session (2): Re-thinking Lab Experiments in Engineering Psychology: A Personal Journey toward Replicability and Immersion

Date

Wednesday,
July 20, 2022

Lecturer

Benedikt Leichtmann

Affiliation

Robopsychology Lab, Linz Institute of Technology, Johannes Kepler University Linz

ABSTRACT

Laboratory experiments are among the most widely used research methods to study human behavior in human-technology interaction. However, laboratory experiments as a research method have also been the subject of criticism throughout history in psychology. They are often considered artificial and not very comparable to real-world situations, as well as error-prone due to the special social situation with power imbalance. Moreover, laboratory experiments have also recently come under criticism in the context of the replicability crisis in the behavioral sciences, as they are often characterized by only moderately large sample sizes and power.

This presentation is a personal reflection on the use of laboratory experiments, with their advantages and disadvantages, based on stages of my own research activity and research at the LIT Robopsychology Lab at Johannes Kepler University Linz as case studies. Based on these considerations, I would like to highlight two key points in this presentation that I personally find particularly relevant in laboratory studies. 1) One key point are reflections from the reform movement following the replicability crisis, and 2) the possibility of using innovative research environments such as Virtual Reality and research-based games and art with the goal of creating a higher degree of immersion and relevance for study participants.

TECHNISCHE UNIVERSITÄT CHEMNITZ

DFG

HYBRID SOCIETIES

Session (3): Tactile Sensing for Robots with Haptic Intelligence

Date

Wednesday,
July 20, 2022

Lecturer

Katherine J. Kuchenbecker

Affiliation

Max Planck Institute for Intelligent Systems

ABSTRACT

The sense of touch plays a crucial role in the sensorimotor systems of humans and animals. In contrast, today's robotic systems rarely have any tactile sensing capabilities because artificial skin tends to be complex, bulky, rigid, delicate, unreliable, and/or expensive. To safely complete useful tasks in everyday human environments, robots should be able to feel contacts that occur across all of their body surfaces, not just at their fingertips. Furthermore, tactile sensors need to be soft to cushion contact and transmit loads, and their spatial and temporal resolutions should match the requirements of the task. We are thus working to create tactile sensors that provide useful contact information across different robot body parts. However, good tactile sensing is not enough: robots also need good social skills to work effectively with and around humans. I will elucidate these ideas by showcasing four systems we have created and evaluated in recent years: Insight, ERTac, HERA, and HuggieBot.

TECHNISCHE UNIVERSITÄT CHEMNITZ

DFG

HYBRID SOCIETIES

Session (4): Past, present, and future: A social psychological perspective on social robots

Date

Thursday,
July 21, 2022

Lecturer

Friederike Eyssel

Affiliation

CITEC Center for Cognitive Interaction Technology, Department of Psychology, University of Bielefeld

ABSTRACT

What make robots social and which psychological factors contribute to user perceptions of robots as social agents? We have tried to address these issues (and more!) by means of experimental psychological research conducted in the Applied Social Psychology Lab at CITEC, Bielefeld University. In my presentation, I will combine a personal account of my journey into the field of human-robot interaction (HRI) with a psychological perspective on developments in social robotics and HRI. To do so, I will shed light on the psychological underpinnings of the perception of robots as social agents, point to issues of measurement and provide an outlook on open issues to consider in future HRI research.

TECHNISCHE UNIVERSITÄT CHEMNITZ

DFG

HYBRID SOCIETIES

Session (5): Impulse Workshop on career paths after completing a PhD

Date

Thursday,
July 21, 2022

Lecturer

Anna Royon-Weigelt

Affiliation

Center for Science and Research Management (ZWM)

ABSTRACT

The impulse workshop aims to give attendees an overview of career opportunities after completing a PhD: (1) in science, (2) outside academia, and (3) in science and academic management. It also aims to identify further information and training needs to plan additional event formats on career development (e.g., more extensive workshops, coachings etc.).

TECHNISCHE UNIVERSITÄT CHEMNITZ

DFG

HYBRID SOCIETIES

Session (6): B(l)ending Realities

Date

Thursday,
July 21, 2022

Lecturer

Frank Steinicke

Affiliation

Human-Computer Interaction, Department of Informatics, University of Hamburg

ABSTRACT

The fusion of mixed reality (MR) and artificial intelligence (AI) will revolutionize human-computer interaction. MR/AI technologies and methods will enable scenarios with seamless transitions, interactions and transformations between real and virtual objects along the reality-virtuality continuum indistinguishable from corresponding real-world interactions. Yet, todays immersive technology is still decades away from the ultimate display. However, imperfections of the human perceptual, cognitive and motor system can be exploited to bend reality in such a way that compelling immersive experiences can be achieved. In this talk, I will review some mixed reality illusions, which bring us closer to the ultimate blended reality.

TECHNISCHE UNIVERSITÄT CHEMNITZ

DFG