InterAC @ AIRoV 2024

Invited Talks:

1. Univ.-Prof. Dr. Dongheui Lee, TU Wien, Institute of Computer Technology

Title: Human Intention Reading Robots

Robots are becoming increasingly integrated into our lives, interacting with us and assisting us in various tasks. To ensure effective interaction and collaboration between humans and robots, it is essential that they understand our intentions and anticipate our actions. In this talk, I will introduce some of the approaches we developed. Our team developed an efficient and robust transformer-based model to detect and anticipate Human-Object Interactions (HOIs) from videos. This enhanced anticipation empowers robots to proactively assist humans, resulting in more efficient and intuitive collaborations. We showcase the effectiveness of our approach through benchmark using VidHOI dataset and experimental results in a real robot.

2. Univ.-Prof. Dr. Elmar Rueckert University of Leoben, Cyber-Physical-Systems

Title: Visual and Tactile Robot Learning

Robot Learning focuses on the ability to learn complex skills through learning from demonstration, via self-improvement aka Reinforcement Learning, and most recently as well, via contrastive learning. Latest fundamental achievements in deep learning enabled researchers to utilize complex sensory data such as tactile receptor data, RGB video streams or depth camera measurements.
In this talk, I will present our latest results in that direction with respect to tasks in robot grasping and manipulation, world model learning, representation learning and robot navigation in dynamic environments.

3. Ass.-Prof. Dr. Astrid Weiss, TU Wien, Informatik

Title: "The Human Touch" - Exploring Human Perception of Robots and Closing the Loop in Human-Robot Interaction

Understanding and predicting people's reactions to robots is a multifaceted challenge prevalent across diverse contexts, including service robotics, social robotics, and collaborative/industrial robots. In this talk I want to highlight the complexity of this issue, emphasizing the significance of use case development. The challenge lies in effectively translating user requirements into robot designs that align with human expectations and needs. Furthermore, replicating study results poses a hurdle, demanding a nuanced approach due to the variability in human responses. Beyond controlled environments, predicting real-world consequences adds another layer of complexity, requiring comprehensive considerations of societal, ethical, and practical implications. Addressing these challenges is pivotal for the successful integration of robots into various domains, but also for the research field of Human-Robot Interaction.

Contributed Talks (15 min + 5 min questions):

- Encouraging Exercise in Dementia Patients: A Reproduction Study with Robot Pepper as Dance Therapist (ID: 3)
- SCARAB - Autonomous Demand-Oriented Waste Disposal with Mobile Robot (ID: 15)
- Workspace Registration and Collision Detection for Industrial Robotics Applications (ID: 32)
- Improving 2D-3D Dense Correspondences with Diffusion Models for 6D Object Pose Estimation (ID: 34)
- GP FastSLAM - Simultaneous Localization and Mapping using Gaussian Process Robot Kinematics (ID: 35)
- Enhancing Transparent Object Pose Estimation: A Fusion of GDR-Net and Edge Detection (ID: 36)
- Unsupervised Learning of Effective Actions in Robotics (ID: 38)
- New Forms of Human-Robot-Collaboration (ID: 39)
- Artificial trust-based task allocation method in multi-human-robot teams (ID: 40)

Poster Pitches (2 mins):

- Reinterpretation of the Non-Slippage Impact Direction for Elastic Contact Transitions (ID: 11)
- Automated Electric Vehicle Charging System: A Robotic Approach for Seamless Plug Connection with Deep Neural Networks (ID: 12)
- Towards Affordance-Based Explanations of Robot Motion Planning (ID: 13)
- LiDAR-IMU calibration on a ground vehicle (ID: 18)
- Intelligent Data Monitoring: A Combination of Rule-Based and Machine Learning Approach (ID: 26)
- Towards an Accepted Service Robot for Retail 4.0 (ID: 30)
- Adversarial Framework for Monitoring Unannotated Anomalies of Key Performance Indicators in Robot Applications (ID: 31)
- A Combined Approach for Robot-based Disassembly and Testing of Electric Vehicle Battery Packs (ID: 33)
- Chance & Curiosity: How Does Action Noise Exploration Compare to Curiosity-Based Intrinsic Rewards? (ID: 37)
- Optimizing Performance of Robots with Closed Control Architecture: Deep Learning-Enhanced Model-Based Control (ID: 41)

Tuesday, March 26, 2024

Chair: Andreas Mueller

- 13:30-13:35. **Welcome**
- 13:35-14:35. **Invited Talk 1**
- 14:35-15:35. **Invited Talk 2**
- 15:35-16:00. **Coffee Break**
- 16:00-16:20. **Contributed Talk:** Encouraging Exercise in Dementia Patients: A Reproduction Study with Robot Pepper as Dance Therapist (ID: 3)
- 16:20-16:40. **Contributed Talk:** SCARAB - Autonomous Demand-Oriented Waste Disposal with Mobile Robot (ID: 15)
- 16:40-17:00. **Contributed Talk:** Workspace Registration and Collision Detection for Industrial Robotics Applications (ID: 32)
- 17:00-17:20: **Poster Pitches**
- 17:30 **Poster Session + Buffet**

Wednesday, March 27, 2024

Chair: Mohamed Aburaia

- 9:00-10:00. **Invited Talk 3**
- 10:00-10:20. **Contributed Talk:** Improving 2D-3D Dense Correspondences with Diffusion Models for 6D Object Pose Estimation (ID: 34)
- 10:20-10:40. **Contributed Talk:** GP FastSLAM - Simultaneous Localization and Mapping using Gaussian Process Robot Kinematics (ID: 35)
- 10:40-11:10. **Coffee Break**
- 11:10-11:30. **Contributed Talk:** Enhancing Transparent Object Pose Estimation: A Fusion of GDR-Net and Edge Detection (ID: 36)
- 11:30-11:50. **Contributed Talk:** Unsupervised Learning of Effective Actions in Robotics (ID: 38)
- 11:50-12:10. **Contributed Talk:** New Forms of Human-Robot-Collaboration (ID: 39)
- 12:10-12:30. **Contributed Talk:** Artificial trust-based task allocation method in multi-human-robot teams (ID: 40)
- 12:30-12:40. **Workshop Best Paper Award** Announcement.