Achyuthan Unni Krishnan

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Research Interests

My research is primarily focused on developing interfaces for human-robot interaction. This involves (1) developing robot control interfaces that are intuitive and efficient to use, (2) developing visual and control assistance to improve reliability and transparency of human-robot collaboration, (3) human physical and cognitive workload estimation for providing optimal assistance for remote control.

Education

Worcester Polytechnic Institute (WPI), Worcester MA, US *2020-Present*
PhD in Robotics Engineering
Advisor: Jane Li

Worcester Polytechnic Institute (WPI), Worcester MA, USA *2018-2020*
M.S in Mechanical Engineering

Amrita University, Coimbatore, India *2012-2016*
B.Tech in Mechanical Engineering

Publications

Journal Articles

[J4] T.C. Lin, **A.U. Krishnan,** and Z.Li, “Perception and Action Augmentation for Teleoperation Assistance in Freeform Tele-manipulation", Submitted to ACM Transactions on Human-Robot Interaction (THRI), 2023.

[J3] T.C. Lin, **A.U. Krishnan,** and Z.Li, "The Impacts of Unreliable Autonomy in Human-Robot Collaboration on Shared and Supervisory Control for Remote Manipulation", IEEE Robotics and Automation Letters(RAL), 2023.

[J2] T.C. Lin, **A.U. Krishnan,** and Z. Li, "Perception-Motion Coupling in Active Telepresence: Human Behavior and Teleoperation Interface Design", ACM Transactions on Human-Robot Interaction (THRI), 2023.

[J1] T.C. Lin, **A.U. Krishnan,** and Z. Li, "Intuitive, Efficient and Ergonomic Tele-Nursing Robot Interfaces: Design Evaluation and Evolution", ACM Transactions on Human-Robot Interaction (THRI), 2022.

Refereed Full Conference Papers

[C6] A.U. Krishnan, T.C. Lin, and Z. Li, "Human Preferred Augmented Reality Visual Cues for Remote Robot Manipulation Assistance: from Direct to Supervisory Control", Accepted by IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2023.

[**C5]** T.C. Lin, **A.U. Krishnan,** and Z. Li, "Comparison of Haptic and Augmented Reality Visual Cues for Assisting Tele-manipulation", International Conference on Robotics and Automation (ICRA), 2022.

[C4] A.U. Krishnan, T.C. Lin, and Z. Li, "Design Interface Mapping for Efficient Free-form Tele-manipulation", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2022.

[C3] T.C. Lin, **A.U. Krishnan,** and Z. Li, "How People Use Active Telepresence Cameras in Tele-manipulation", International Conference on Robotics and Automation (ICRA), 2021.

[**C2]** T.C. Lin, **A.U. Krishnan,** and Z. Li, "Shared Autonomous Interface for Reducing Physical Effort in Robot Teleoperation via Human Motion Mapping", International Conference on Robotics and Automation (ICRA), 2020.

[**C1]** T.C. Lin, **A.U. Krishnan,** and Z. Li, "Physical Fatigue Analysis of Assistive Robot Teleoperation via Whole Body Motion Mapping", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2019.

Preprints

[**C1]** R. Nagpal, **A.U. Krishnan,** and H.Yu, “Reward engineering for object pick and place training”, arXiv preprint arXiv:2001.03792 (2020).

Theses

[**T1]** M.S Thesis

A.U. Krishnan, “Nursing Robot Teleoperation via Motion Mapping Interfaces”, Department of Mechanical Engineering, Worcester Polytechnic Institute, 2023

Work Experience

Robert Bosch Engineering, Coimbatore, India *2016-2018*
Associate Design Engineer, Diesel Exhaust Systems

Worcester Polytechnic Institute, Worcester, MA, USA *2021-2023*
Teaching Assistant, RBE501 Robot Dynamics

Awards

Best Poster Award - WPI Graduate Research Innovation Exchange (GRIE), USA *2020*

Academic Service

Conference Paper Referee

International Conference on Intelligent Robots and Systems (IROS) *2021-Present*
International Conference on Robotics and Automation (ICRA) *2021-Present*

Technical Skills

Programming: Python, Matlab, C, C++, C#

Libraries: OpenCV, Pandas, Tensorflow, Pytorch

System and Software: ROS, Unity, OpenAI

Design and Simulation: CATIA, Pro E, Inventor, SolidWorks