

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 PhD in Robotics Engineering <i>Advisor: Jane Li</i>	<i>2020-Present</i>
Worcester Polytechnic Institute (WPI) , Worcester MA, USA M.S in Mechanical Engineering	<i>2018-2020</i>
Amrita University , Coimbatore, India B.Tech in Mechanical Engineering	<i>2012-2016</i>

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 Associate Design Engineer, Diesel Exhaust Systems	<i>2016-2018</i>
Worcester Polytechnic Institute , Worcester, MA, USA Teaching Assistant, RBE501 Robot Dynamics	<i>2021-2023</i>

Awards

Best Poster Award - WPI Graduate Research Innovation Exchange (GRIE), USA	<i>2020</i>
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Academic Service

Conference Paper Referee

International Conference on Intelligent Robots and Systems (IROS)	<i>2021-Present</i>
International Conference on Intelligent Robots and Systems (IROS)	<i>2021-Present</i>
International Conference on Biomedical Robotics and Biomechatronics	<i>2024-Present</i>

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