

ACHYUTHAN UNNI KRISHNAN

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Education

Doctor of Philosophy 2020 – 2025
Robotics Engineering
Worcester Polytechnic Institute (WPI) MA, USA
• **Focus:** Human-Robot interaction, User interface design, Augmented Reality
• **Thesis:** Perception and Action Assistance for the Remote Control of Robotic Manipulation

Master of Science 2018 – 2020
Mechanical Engineering
Worcester Polytechnic Institute (WPI) MA, USA
• **Focus:** Humanoid robots, Robot teleoperation
• **Thesis:** Nursing Robot Teleoperation via Motion Mapping Interfaces

Bachelor of Technology 2012 – 2016
Mechanical Engineering
Amrita University Coimbatore, India
• **Focus:** Mechanical Design, Machine Learning
• **Thesis:** Fault Detection in Motorcycle Suspension Systems

Work Experience

Dopl Technologies, Bellevue, WA, USA
Lead Robotics Engineer 2024 – Present
• Developed a telerobotic ultrasound system with integrated haptic feedback for remote diagnostic applications.
• Worked on automated robotic motions that improved sonographer performance and reduced operator workload.
• Captured and annotated expert demonstrations to serve as dataset for robot automation training.

Robert Bosch, Coimbatore, India
Associate Design Engineer 2016 – 2018
• Designed pumping solutions for diesel exhaust treatment systems in commercial vehicles.
• Worked on sensor integration for level sensing applications in coolant pumping systems.

Skills

Languages and Development Tools: Python, Matlab, C++, ROS, OpenCV, Tensorflow, Pytorch
Specializations: Human-Robot interaction, Robot teleoperation, Reinforcement and Deep learning

Projects

Assisted bi-manual control interfaces for Teleoperation
Interface Design, Human State Estimation, Python 2022 – Now
• Developed bi-manual teleoperation interfaces for two Kinova Gen3 arms to perform nursing tasks such as object manipulation and surveillance.
• Optimized assistance availability based on operator physical fatigue, reducing task completion times by 11% and physical workload by 28%.

Realtime Human Cognitive Workload Estimation
Human-Computer Interaction, Python, Unity 2023
• Created a real-time cognitive workload estimator and intent inference system using gaze motion and pupil tracking.
• Optimized robot assistance availability using gaze metrics.

Perception Assistance for Remote Manipulation Interfaces
Augmented Reality, User Interface Design, Python 2021 – 2022
• Implemented Augmented Reality cues to notify users of robot state, autonomy intent and workspace information while teleoperating.
• Reduced control and cognitive effort by 50% and 30% respectively.

Reward Engineering for Autonomous Pick and Place Actions
Motion Planning, Reinforcement Learning, Tensorflow 2019
• Implemented several reward designs using distance and motion heuristics to optimize robot motion efficiency in OpenAI gym pick and place environment.
• Achieved a 40% improvement on baseline in training efficiency.

Publications

Human Preferred Augmented Reality Visual Cues for Remote Robot Manipulation Assistance: from Direct to Supervisory Control. 2023
IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)
• Presented design methodology to improve teleoperation with AR cues.

Design interface mapping for efficient free-form telemanipulation. 2022
IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)
• Discussed designs to improve efficiency and precision of teleoperation.

Scholarships

Dr. Glenn Yee Tutition Award 2025
WPI
• Excellence in Robotics Research and Academic Achievement Award.