ACHYUTHAN UNNI KRISHNAN

AUK

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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 Motorcyle 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, C#, 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 – 2024
- 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 Tution Award
WPI   2025
- Excellence in Robotics Research and Academic Achievement Award.