Harshitha Belagavi Rajaprakash

HarshithaBR | rajaprak@usc.edu | +1 323-620-3175 | HarshithaBR

.

Education

PhD, Computer Science

University of Southern California, Los Angeles [Aug 2025]

Master of Science in Computer Science (GPA : 3.95/4)

University of Southern California, Los Angeles [Aug 2023 - May 2025]

Courses: Analysis of Algorithms ;Robotics ; Machine Learning ; Deep Learning for Robot Manipulation ; Robotic Perception; Applied Natural Language Processing; Research Methodology and Analysis for User Studies

Bachelor of Engineering (Computer Science and Engineering) - (GPA : 4.0/4) (1st Rank, Gold Medallist)

University Visvesvaraya College of Engineering, Bangalore University, Bengaluru [Aug 2017 - July 2021]

Skills

Languages: Python (Libraries : PyTorch, pandas, numpy, scipy, scikit-learn, OpenCV), Java, javascript, Node.js, React.js

Software: Unity, Mujoco, IsaacGym, ROS, SQL

Areas of Interest

Robotics, Robot Perception, Robot Learning, Computer Vision, Assistive Robotics, Human Computer Interaction, XR Technologies, Machine Learning.

Work Experience

Research Assistant, GLAMOR Lab, University of Southern California, LA April 2025 - Present

- Working at Grounding Language in Actions, Multimodal Observations and Robots (GLAMOR) Lab at University of Southern California (USC) with **Professor Jesse Thomason**.
- Working on multi-robot collaboration and task scheduling
- Working on building robots that are capable of intuitive Human Robot Collaboration.

Research Assistant, SAIL Lab, University of Southern California, LA Feb 2025 - May 2025

- Working at Signal Analysis and Interpretation Laboratory (SAIL) Lab at University of Southern California (USC) with **Professor Shri Narayanan**.
- Working on behavioral coding for children with autism by leveraging multi modal inputs to understand behaviors from interactions and perform temporal localisation and activity segmentation.

Research Assistant, SLURM Lab, University of Southern California, LA Jan 2024 - Feb 2025

- Working at Sensing, Learning, and Understanding for Robotic Manipulation (SLURM) Lab at University of Southern California (USC) with **Professor Daniel Seita**.
- Building a solution to enable robotic assistance for dressing patients, by achieving maximum coverage of the arm via robot learning from segmented point clouds and human pose, and a heuristic powered by CNN model to incorporate state of the garment.
- Worked on robotic manipulation in contact-rich scenarios and leveraging trajectory optimization for planning. Compared and analyzed the performance with respect to traditional Inverse Kinematics.

Research Assistant, Indian Institute of Science, Bangalore, India Nov 2022 - Aug 2023

- Worked at Indian Institute of Science, CPDM, Intelligent, Inclusive Interaction Design (I3D) Lab under the guidance of **Professor Pradipta Biswas**.
- Built a MR application for tele-operated remote welding by mapping the coordinates defined for welding movement to the robot coordinates. Conducted a comparative study of the MR application with its VR counterpart.
- Built a MR based Assistive Assembly Process Instruction tool in collaboration with Collin's Aerospace, where various object detection models were trained and evaluated to detect and track the intricate components. Curated a custom dataset with real and generated synthetic images to improve the detection confidence score by 4%.
- Studied the swimming effect of Holograms in MR applications deployed on Hololens, with different angles of perceiving the scene, and compared and analyzed various anchoring methods to effectively stabilize the holograms.

Developer Associate, SAP Labs India July 2021 - Oct 2022

– Built reuse services in Data Privacy and Protection that enables businesses to be compliant with GDPR regulations using Springboot, Java, Node.js. Led devops activities in the team, by ensuring deployment ready code-base at the end of the sprints, sanitization of the code base through scans and new data centre deployments and release of services.

Developer Associate Intern, SAP Labs India Feb 2021 - July 2021

– Worked on various reuse services(including Personal data Manager and Data Privacy Integration) built to archive and handle data of end users, analysed various consumption scenarios along with supporting customer incidents.

Projects

Caregiving and Assistive Robotics - PhyRC Challenge, USC
Developing a solution to enhance robotic assisted dressing. Achieved a high score of 39/50 in the competition's evaluation

Plant manipulation, USC
Retrieval of a target by a robotic arm leveraging trajectory optimisation to plan the waypoints. Compared the achieved results with Inverse Kinematics and achieved improvement of 2+% success rate of the end effector reaching the target using our optimiser, in a collision sensitive approach.

IROD - Object detection, IISc Bangalore
Designed a novel model for object detection for Indian Road Dataset. Benchmarked the model against state of the art models(MRCNN, DRN, FCN, etc) on IROD and Cityscapes Datasets. It is an ensemble CNN model integrating encoder-decoder and dilated convolution branches with a dynamic fusion mechanism, achieving a 12.91% F1 score improvement over state-of-the-art models for semantic segmentation.

Instructive Assembly Process Application, IISc Bangalore
Development of an application to initially identify different components of an Assembly Process using Computer Vision and then display instructions to the user on how Assembly must be carried out through Mixed Reality at IISc, Bangalore

XR interface in Remote Welding Scenarios, IISc Bangalore
Development and Comparison of remote welding through Mixed reality interface and Virtual reality application. Development of the Application for Hololens and used Regression Model to map the coordinates from Mixed Reality space to Robot workspace.

Publications(3 ongoing)

HAND Me the Data: Fast Robot Adaptation via Hand Path Retrieval
Matthew Hong , Anthony Liang , Kevin Kim, Harshitha Rajaprakash, Jesse Thomason , Erdem Bıyık , Jesse Zhang Link

I-ROD: An Ensemble CNNs for Object Detection in Unconstrained Road Scenarios
Abhishek Mukhopadhyay, **Harshitha BR**, Prashant T Gaikwad, Imon Mukherjee, Pradipta Biswas, Signal, Image and Video Processing Journal, Springer, October 2024 Link

Investigating Swimming Effect of Holograms in Mixed Reality
Subin Raj, **Harshitha B R**, Amaresh Chakrabarti, Pradipta Biswas, International Conference on Pattern Recognition(ICPR 2024) , July 2024 Link

Harnessing Learn Rate Schedule for Adaptive Deep Learning in LoRaWAN-IoT Localization
R. Swathika; S. M. Dilip Kumar; N. N. Srinidhi; **B. R. Harshitha** , IEEE Access, May 2024 Link

Development and comparison studies of XR interfaces for path definition in remote welding scenarios
Ananthram Rao M C; Subin Raj; **Harshitha B R**; Aumkar Kishore Shah; Naveen R Talawar; Vinay Krishna Sharma; Sanjana M; Himanshu Vishwakarma; Pradipta Biswas, Multimedia Tools and Applications, November 2023 Link

Multiple Multicast Architecture for XMPP based Applications
Harshitha B R, Niyati B Mehta, Shivangi Rai, Deepti , S M Dilip Kumar, S Sheela, 3rd International Conference for Emerging Technology (INCET), IEEE, 2022 Link

IoT-enhanced Extensible Messaging Presence Protocol:A Multiple Multicast Architecture for Diverse Applicatio
B R Harshitha, S Sheela and S M Dilip Kumar, IC-ICIC-2023; International Conference on "IOT, Communication, Intelligence and Computing", 2023 Link

Achievements

1. Secured highest points in PhyRC Challenge(Assistive Dressing) organised by EMPRISE Lab, Cornell; proceeded to Phase 2
2. Secured 1st Rank and 3 Gold Medals, Batch of 2021, UVCE, Bangalore University.
3. Awarded "Best Student Award", Batch of 2021, UVCE, Bangalore University.
4. First place in SAP-CSR Hackathon by developing app to get measurements for prosthetics using CNN, OpenCV, Mediapipe