

# Sreeharsha Paruchuri

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## EDUCATION

### Carnegie Mellon University, School of Computer Science

Master of Science in Robotic System Development (MRSD)

Current Positions Held: Editor for the MRSD Newsletter

Current Relevant Courses: Advanced Computer Vision, Generative Artificial Intelligence, Robot Autonomy

May 2026

Pittsburgh, PA

### International Institute of Information Technology (IIIT-H)

Bachelor of Technology (Honors) in Electronics and Communication Engineering

Junior/Final year CGPA: 9.02/10; Deans Merit List; Undergraduate Research Award

Teaching Experience: CS7.503 Mobile Robotics, CS9.434 Music Mind and Technology, EC5.205 Introduction to Coding Theory

Relevant Coursework: Mobile Robotics, Statistical Methods in A.I., Topics in Applied Optimization, Data Structures and Algorithms

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Jul 2022

Hyderabad, India

## EXPERIENCE

### Tata Consultancy Services

Pre-Doctoral Research Fellow - Multimodal Learning and Reinforcement Learning

Jul 2022 - Jul 2024

Kolkata, India

- Led the project to enhance the navigation capabilities of **audio-visual** Embodied Artificial Intelligence agents with a novel, sound-agnostic reward to train an **online Reinforcement Learning policy** that decreased path length by 21%
- Developed the **exploration and navigation algorithms** that led to an improvement of 60% in metrics over the baseline, which led to our globally ranked fourth at Habitat Open Vocabulary Mobile Manipulation Challenge at NeurIPS '23
- Created and evaluated uncertainty-based rewards for a Reinforcement Learning policy that resulted in significant improvements to Object-Centric Scene Exploration methods, enhancing efficiency in multi-room rearrangement tasks.

### Robotics Research Center (RRC), IIIT-H ([Link](#))

Research Assistant - Computer Vision and Motion Planning

Dec 2019 – Jun 2022

Hyderabad, India

- Spearheaded development of the computer vision and navigation stack to simulate, build, test, and deploy (**Sim2Real**) an **autonomous robot** for washroom sanitization; represented my university and finished runners-up out of over 140 teams ([Link](#))
- Researched and adapted **monocular** and **stereo vision depth estimation** algorithms for **real-time SLAM** and **3D scene understanding**, integrating them into large codebases and enabling trajectory visualization using Open3D and RViz

### Cognitive Science Research Center, IIIT-H

Research Assistant - Information Retrieval and Computational Social Science

Dec 2020 – May 2022

Hyderabad, India

- Applied **statistical machine learning** in tandem with concepts in Music Information Retrieval to analyze lyrical regularities in individuals' music listening history as an early indicator of mental illness; Published our results at INTERSPEECH 2021 ([Link](#))
- Scraped data from X (formerly Twitter), Reddit, and Wikipedia to link music-sharing trends on social media platforms with the mental health of individuals during COVID-19 and movements such as #blm; Published our results in a medical journal ([Link](#))

### Bosch Research and Technology Center

Software Development Engineering Intern - Computer Vision

May 2021 – Aug 2021

Bangalore, India

- Fused Laser, Camera, and Odometry data to boost online **Multi-Object Tracking** performance by 11% IoU on outdoor datasets
  - Augmented difficult-to-obtain real-world LiDAR datasets using **synthetic data** obtained from generative models and physics engines, thus improving the performance of **3D object detection** networks
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## PROJECTS

### Augmented Reality and Robot-Assisted Knee Surgery | [Computer Vision](#) ([Link](#))

Smith + Nephew | Sep 2024 - Present

- Gathered and analyzed requirements from user studies, market competition, and sponsors to inform system development
- Conducted experiments to inform our trade studies on the robot manipulator and **AR headset** subsystems

### Neural-Assisted Depth Disparity Estimation | [Computer Vision](#) and [TinyML](#)

Hackathon | Nov 2022 – Jan 2023

- Finished in the top 25 teams internationally in developing an algorithm respecting onboard compute constraints to improve the **real-world depth estimation** accuracy of the OAK-D Pro while adhering to rigid frames-per-second constraints
- Designed and thoroughly validated a pipeline using the DepthAI API to efficiently process raw data streams from the camera

### Image Segmentation using Foundational Models | [Computer Vision](#)

CMU | Oct 2024 - Nov 2024

- Implemented **2D-to-3D segmentation** pipeline using S.A.M. and camera geometry, generating dense 3D point clouds from 2D masks

### Metaphor Generation | [Natural Language Processing](#) ([Link](#))

NVIDIA Singapore | May 2021 - Jul 2022

- Aided in a project to generate metaphor datasets to increase Large Language Models' robustness in dealing with semantically grounded data. Analyzed metaphors on website-scale data and their efficacy in communication during COVID-19

### Research Paper Implementations | [Computer Vision](#) and [Robotics](#)

IIIT-H | Aug 2020 – Jul 2022

- Implemented classical algorithms such as GrabCut, Bag of Visual Words, Lucas Kanade Tracking and Bundle Adjustment
  - Implemented learning methods such as Semantic Inpainting, Photo-Enhancement, and Recommender Systems
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## SKILLS

Programming Languages: Python, C/C++, MATLAB, Racket, Swift, JavaScript, GoLang, Dart, Bash

Application Software: PyTorch, TensorFlow, Jax, OpenCV, Scikit-Learn, ROS, Docker, NVIDIA Omniverse, Unity3D, MongoDB, WandB