

# Vaidehi Som

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## EDUCATION

**University of Pennsylvania, U.S.A**

Aug'22 – May'24

*Master of Science in Robotics Engineering (Specializing in Artificial Intelligence and Computer Vision)*

**Indian Institute of Technology (IIT) Jammu, India**

Aug'17 – Jun'21

*Bachelors in Mechanical Engineering*

## TECHNICAL SKILLS AND COURSEWORK

**Languages:** C++, Python

**Frameworks:** PyTorch, Keras, ROS, Gazebo, CARLA

**Developer Tools:** Linux, CMake, Git, VS Code

**Libraries:** NumPy, Matplotlib, OpenCV, Open3D, Sklearn, Eigen

**Graduate Coursework:** Deep Learning, Machine Perception, Machine Learning, Control and Optimization

**Online:** [C++ Nanodegree from Udacity](#), [Robotics Software Engineer Nanodegree from Udacity](#), [Controls for Mobile Robotics](#), Pursuing [Photogrammetry I II](#) and [Mobile Sensing and Robotics](#)- Cyrill Stachniss

## WORK EXPERIENCE

**Research Assistant- Generalizing over unseen tasks** | *Reinforcement Learning, Perception*

Oct'22 – Present

*Dr. Dinesh Jayaraman, PAL Group (GRASP Lab), University of Pennsylvania* [Code](#)

- **Robot learning** based on minimal **3D visual data** for unseen robot tasks for homes
- Breaking long horizon tasks into smaller ones for applying goal learning policies
- Implementing, training and deploying **goal based offline RL** for sub-tasks segmented by **VIP**

**Mobile Robotics Software Engineer** | *C++, ROS, Startup, Automated Guided Vehicle*

Aug'21 – Jun'22

*Addverb Technologies, Noida, India*

- Deployed automated mobile robot which uses **LIDAR**, **IMU**, and QR codes for navigation
- Implemented **motion (Pure pursuit, Lyapunov)** controller packages for **navigation** stack
- Improved odometry with calibration, controllers, and **IMU** infused data using **Kalman filter**
- Reduced testing time by 50% by automating odometry calibration and sensor testing

**Research Intern- Cycle GANs for biometric conversion** | *Deep Learning, Computer Vision*

May'20 – Dec'20

*IIT Jammu, National Institute of Informatics, Japan and the Government of India* [Code/Report](#)

- Conceptualized from start to end- AI-driven biometric privacy using modified **cycle GANs**
- Implemented **encoders-decoders**, compared different matching algorithms, implemented **image augmentation** techniques, heatmap, used **latent vectors**, and prepared datasets

**Research Intern- Behavioral cloning for SDCs** | *Deep End-to-End learning, Computer Vision*

May'19 – July'19

*Dr. Virendra Singh, IIT Bombay* [Certificate/Report](#)

- Developed deep learning model for self driving car based on **behavioral cloning** and for object detection using CNN
- Compared usage of end to end learning for **object detection** vs **path following**. Performed data augmentation

## DEEP LEARNING AND COMPUTER VISION PROJECTS

**Trajectory prediction and Dynamic Obstacle avoidance for SDC** | *PINN, LSTM, Deep Learning*

Nov'22 – Present

- Implemented **social LSTM**, **OLSTM** and **GRU** for pedestrians trajectory prediction [Report/Code](#)
- Implemented **Physics informed Neural Nets** and **MPC** for **motion planning** [Report/Code](#)
- Used **Lifelong A\*** and pedestrian's trajectory as dynamic obstacles for planning obstacles

**Gesture Recognition controlled Robotic Arm** | *Deep Learning, Computer Vision, Python, ROS, Gazebo*

Jun'20 – Dec'20

- Implemented **CNN**, **non-max suppression**, **cross-entropy** loss, and detected hand landmarks [Video/Report](#)
- Detected key-points from **video input** using Intel-RealSense Camera, were used to define various gestures
- **Simulated** robotic arm using ROS and Gazebo to perform pick up tasks. Enhanced arm movements using gesture inputs

**Mobile Robot: Simulation and SLAM** | *ROS Navigation stack, C++, AMCL, EKF, Gazebo*

May'21 - Jun'21

- **Simulated** ball chasing robot, detection via colors. Designed URDF model and arena [Code/Video](#)
- Implemented localization using **AMCL**, **gmapping** for 2D and RTABMap for **3D mapping**
- Deployed SLAM and Navigation using **Dijkstra** algorithm and simulated pick and place operation

**SLAM projects**

- Implemented **2-view** and **multiple view stereo** algorithms to convert multiple 2D viewpoints into 3D reconstruction [Code](#)
- Recovering 3D transformation between two views using **RANSAC**, Pose recovery and 3D reconstruction [Code](#)
- Augmented Reality with AprilTags using both **PnP** and **P3P algorithm** [Code](#)
- Implement **ES-EKF** to localize self driving car in simulation

## HONORS

**Prof. Sudhir K. Leadership Award** | *Leadership award*

Apr'21

- Awarded for exceptional initiatives taken, leadership shown and contributions made towards student activity [Link](#)