

# Vaidehi Som

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## EDUCATION

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

Aug'22 – May'24

*Master of Science and Engineering in Robotics (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, ROS, Gazebo, PyDrake

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

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

**Graduate Coursework:** Machine Perception, Deep Learning, 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

## EXPERIENCE

### Research Assistant, PAL Group (GRASP Lab) | *Reinforcement Learning, Perception, ROS*

Oct'22 – Present

*Dr. Dinesh Jayaraman, University of Pennsylvania*

- **Robot learning** based on minimal **3D visual data** for unseen robot tasks for homes
- Collecting data- joint positions, camera feed- for policy training using ROS communication with Kinova 7dof robotic arm
- Train and deploy a policy trained using **Behavioral Cloning**

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

Aug'21 – Jun'22

*Addverb Technologies, Noida, India*

- Worked with automated mobile robot using **LIDAR**, **IMU**, and QR codes for navigation
- Implemented **motion (Pure pursuit, Lyapunov) controller** packages and **lower level driver** for **navigation** stack
- Improved odometry with calibration, controllers, and **IMU** infused data using **Kalman filter**

### Research Intern | *Deep Learning, Computer Vision, Python*

May'20 – July'20

*Dr. Harkeerat Kaur, IIT Jammu*

- Conceptualized from start to end- AI-driven biometric privacy using modified **cycle GANs** [Report](#)
- Implemented **encoders-decoders**, compared different matching algorithms, implemented **image augmentation** techniques, heatmap, used **latent vectors**, and prepared datasets
- In collaboration with the National Institute of Informatics, Japan and the Government of India

### Research Intern | *Deep End-to-End learning, Computer Vision, Python*

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

## PROJECTS

### 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 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 [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

### Dynamic obstacle avoidance for self driving car | *Python, CARLA, LSTM, MPC*

Nov'22 – Present

- Implementing **LSTM** and **conformal prediction** for pedestrians and cars dynamic **trajectory prediction**
- Using the prediction, planning car's **optimal path** using MPC

### Multi View Geometry

Dec'19

- Compute camera pose and **3D point cloud** from images using **Structure from Motion**, **Bundle adjustment**
- Camera localization using **PnP**, **point triangulation**, **non linear refinement**

### Others

- Implemented drivable space estimation in 3D, lane estimation from car using the output of semantic segmentation NN
- Implement **ES-EKF** to localize self driving car in simulation

## HONORS

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

Apr'21

- 1 of 2 students from IIT Jmu selected for initiatives and contributions made in leadership towards student activity [Link](#)