

# SHRUTHEESH RAMAN IYER

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Graduate student at the CSE Department, UC San Diego. Interested in robot perception and navigation. Research and internship experience in the fields of autonomous navigation, visual odometry and SLAM and robot teleoperation.

## EDUCATION

### University of California, San Diego (UCSD)

SEP 2021 – JUN 2023(EXP)

Graduate Student | M.S. in Computer Science & Engineering | **GPA: 4.0/4.0**

Graduate Teaching Assistant : DSE250A - Beyond Relational Models | Faculty - Alin B. Deutsch  
PSYC60 - Introduction to Statistics | Faculty - Eric T. Steiner

### R.V. College of Engineering, Bangalore (RVCE)

2016 – 2020

CGPA : 9.6/10.0 | Bachelor of Engineering in Computer Science & Engineering

## RESEARCH & PROJECTS

### Cognitive Robotics Lab, Contextual Robotics Institute, UCSD

#### Generalized Framework for Robot Tool Improvisation | Advisor: Henrik I. Christensen

OCT 2021 – PRESENT

- Research project to develop a framework for robot tool improvisation using simple machines
- Working on the perception pipeline to identify objects and affordances

### Robert Bosch Centre for Cyber-Physical Systems, Indian Institute of Science

*Intern & Technical Associate*

#### Visual Odometry for Navigation | Advisor: Raghu Krishnapuram

OCT 2019 – APR 2021

- Research project to explore the challenges and applications of Visual Odometry
- Compared deep learning based feature extractors and traditional features for indoor and outdoor navigation tasks
- Published a comprehensive survey on advancements in monocular visual odometry. Used research findings to design an application for visual odometry in Advanced Driver Assistant System (ADAS). Publication under review

#### Teleoperation of Humanoid Robot | Advisor : Bharadwaj Amrutur, Raghu Krishnapuram

APR 2020 – JAN 2021

(Collaboration with Hanson Robotics and Tata Consultancy Services R&D)

- Research project to develop a teleoperated humanoid robotic nurse as part of ANA Xprize Avatar challenge which aims to deploy real-time senses in remote environments. <https://aham-avatar.org/>
- Worked on tracking human arm movements on the robot using optical trackers and VR technology. Developed an in-house data glove with finger tracking and haptic feedback for hand teleoperation
- Contributed to the entire teleoperation architecture including networking and inverse kinematics & control

### Project Jatayu, RVCE

*Computer Vision Head and Team Lead*

#### Unmanned Aerial Vehicles with Project Jatayu

AUG 2017 – AUG 2020

- Created drones with Project Jatayu, the flagship autonomous unmanned aerial vehicle (UAV) team of the RVCE
- Enabled perception in noisy and poorly-lit environments by developing image and video processing protocols for drone footage, and compared ANNs for object recognition and localization
- Designed communication pipeline for transmission of data packets between UAV and the ground station
- Led the team in the AUVSI Student Unmanned Aerial Systems Competition 2019 (SUAS 2019), Maryland, USA

### LightMetrics Pvt. Ltd.

*Research Intern*

#### Neural Network Pruning

MAY 2019 – AUG 2019

- Worked in the research and development section of the organization to compare the performance of various techniques for compressing neural networks for real-time performance on edge compute
- Implemented both filter-based and activation-based pruning algorithms in Keras and PyTorch and evaluated their performance in terms of the speed, accuracy, and size of the neural networks
- Applied to object detection models to achieve 6× speed-up and 12× size reduction with no significant decrease in accuracy

- Implemented a pipeline to extract textual and numeric data from public financial filings of firms for an academic project which seeks to develop a new measure of Disclosure Quality
- Developed all stages of the data science pipeline from web scraping to cleaning to analysis and visualization
- Developed textual analysis methods at low level using regular expressions and contextual level using SciPy

## SKILLS

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- *General Programming* in C/C++, Python, R, MATLAB, JAVA
- *Robotics development* using ROS, with C/C++ and Python
- *Simulation Environments*: familiar with Coppelia, Gazebo, Bullet and AirSim
- *Computer Vision* using OpenCV with Python and C/C++, familiar with FFMPEG for low-level tasks. Experienced in SfM, Visual Odometry and Multi View Geometry
- *ANN Development* with frameworks like Pytorch, Keras, Tensorflow
- *Data analysis and Machine learning* using Python, R and MATLAB, with tools including Numpy, Pandas, ggplot
- *Robotics Hardware*: working with including Raspberry Pi, Arduino, Pixhawk and Yaskawa Motomini

## RELEVANT COURSEWORK

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### M.S.

- Intro to Robotics
- Computer Vision I
- Sensing and Estimation
- Computer Vision II

### B.E.

- *Programming*: Introduction to C/C++ Programming, Object Oriented Programming with JAVA
- *CS Theory*: Design and Analysis of Algorithms, Data Structures, Theory of Computation, Graph Theory
- *CS Systems*: Operating Systems, Computer Networks I & II, Microcontrollers and Embedded Systems
- *CS Applications*: Data Science and Machine Learning, Computer Vision, Computer Graphics, DBMS
- *Mathematics*: Probability and Statistics, Calculus I & II, Linear Algebra, Partial Differential Equations

### Online Certification

- Self-Driving Car Specialization by University of Toronto on Coursera
- Autonomous Mobile Robots, AMRx by ETH Zurich on edX
- Deep Learning Specialization by DeepLearning.AI on Coursera (Ongoing)

## CONFERENCES & PUBLICATIONS

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1. **Shruthesh Raman Iyer**, Sowmyarani CN, Ramakanthkumar P., "A Survey on Monocular Visual Odometry for Autonomous Vehicle Navigation", *International Journal of Advanced Science and Technology (IJAST)*, Vol. 29, No. 9s, Apr 2020, pp. 570-584. Link : [sersc.org/journals/index.php/IJAST/article/view/13155](https://sersc.org/journals/index.php/IJAST/article/view/13155)
2. Parinith R. Iyer, **Shruthesh Raman Iyer**, Raghavendran Ramesh, Anala M.R., and K.N. Subramanya, "Adaptive Real Time Traffic Prediction Using Deep Neural Networks", *IAES International Journal of Artificial Intelligence (IJ-AI)*, Vol. 8, No. 2, June 2019, pp. 107-119, ISSN: 2252-8938. Link : [ijai.iaescor.com/index.php/IJAI/article/view/17497/pdf](https://ijai.iaescor.com/index.php/IJAI/article/view/17497/pdf)

## SOCIETIES & COMMITTEES

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### Project Jatayu, RVCE

AUG 2017 – AUG 2020

#### Team Lead and Head of Computer Vision Subsystem

- Successfully planned and constructed custom unmanned aerial vehicles for autonomous tasks
- Successfully led a team of over 30 members at the AUVSI Student Unmanned Aerial Systems Competition 2019(SUAS 2019), held in Maryland, USA where we secured 27<sup>th</sup> rank among 75 participating teams

### RV QuizCorp, RVCE

AUG 2016 – AUG 2020

#### Coordinator

- Host and organizer of Under The Peepal Tree (UTPT) in 2018, 2019 & 2020, one of Asia's largest quiz festivals
- Organized and participated in inter and intra-college quizzes with 100+ participants