

Nara Guru Narayanaswamy

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Education

University of California San Diego

MS in Electrical and Computer Engineering (Intelligent Systems, Robotics & Control)

Sep 2023 - Present
California, USA

Courses: > *Advanced Computer Vision* > *Visual Learning* > *Machine Learning for Robotics*
> *Sensing & Estimation in Robotics* > *Digital Image Processing* > *Statistical Learning*

Birla Institute of Technology and Sciences, Pilani

BE in Electrical and Electronics Engineering

Jul 2019 - Jul 2023
Hyderabad, India

Technical Skills

Programming languages : Python, C++, C, C#, Matlab

CAD : SolidWorks, Fusion360

CV&ML : Pytorch, Jax, OpenCV, Numpy, pandas, scikit-learn

Misc : ROS, Issac Gym, Unity, Gazebo, Git, Linux

Experience

Graduate Student Researcher

UC San Diego

Oct 2023 - Present
California, USA

- Working on implementing large scale Instructable Motion Prior Policy on **A1 quadruped** to accommodate **50+ skills**.
- Utilising **Nvidia Isaac Gym** to train low-level **PPO** policy using **curriculum learning** for end-to-end control.

Software Development Intern

Orangewood Labs

Feb 2023 - July 2023
Noida, India

- Built a **ROS** and **Unity** based **motion planning** pipeline for automating industrial spray painting with a **6DOF cobot**.
- Using **Discriminative Correlation Filters** to track robot end effector, cut the cobot calibration time from **1hr to 5min**.

Research intern

CNRS-AIST Joint Robotics Lab

July 2022 - Dec 2022
Tsukuba, Japan

- Developed a 2.5D software platform for autonomous indoor locomotion of **Aliengo quadruped** utilizing **Visual SLAM**, featuring smooth autonomous transition between the supported **multi-modal gaits** such as trot and walk.
- Developed composite COG **Motion planner** on robot centric elevation maps obtained from **Point cloud data**





Research Assistant

BITS-Pilani

Jan 2022 - May 2022
Hyderabad, India

- Fabricated **Quasi-Direct Drive actuator (QDD)** robotic leg and worked on optimising the jumping trajectory utilising **offline RL** by utilising **RNN-based** model of physical actuators, streamlining the **Sim to Real** transition.

Selected Projects

- Text to 3D with Gaussian Splatting** [4/2024 - Present] : Enhanced the **Gaussian Dreamer** framework by using **Surface-Aligned Gaussian Splatting** for mesh construction and uplifting 2D **diffusion models** to 3D using Variational Score Distillation. Addressed 3D Multi-Face challenges using advanced diffusion models like **MV-Dream**, **Zero-shot**, and using **Shape-E** for 3D pointcloud prior.
- Visual Inertial SLAM**  [2/2024 - 3/2024] : Implemented Visual-Inertial SLAM (VI-SLAM) using **Extended Kalman Filter (EKF)** for robust navigation and mapping in robotics, integrating data from synchronized **IMU** and **stereo camera** measurements for accurate **pose estimation** and environment reconstruction.
- Robotic Localization & Mapping, Advanced Sensor Fusion**  [1/2024 - 2/2024] : Implemented 2-D localization and mapping utilizing **LiDAR**, **IMU**, and wheel encoder data, employing techniques such as odometry estimation, **ICP**, and **loop closure detection** with **GTSAM** for robust environment representation.
- Autonomous Mobile Manipulator**  [8/2020 - 12/2020] : Developed autonomous robot using **ROS Navigation** stack, with a robotic arm. Implemented motion-planning software with **6D Pose estimation** for pick-and-place operation.
- Autonomous Lane-Follower, Behavioral Cloning**  [5/2020 - 7/2020] : Trained a **Alexnet model** with custom dataset to control the custom built mobile robot's angular velocity for lane following.

Publications and Patent

- N Guru, F Kanehiro, "Vision-Based Software System for Indoor Quadrupedal Locomotion: Integrated with SLAM, Foothold Planning, and Multimodal Gait" in IEEE SII 2024, Vietnam.
- N Guru, Abhishek S, "Development of a QDD Actuator based Robotic Leg for jumping application" in AIR 2023.
- Patent: 202311042626**, "Portable device and system for single point strain analysis in sheet metal forming," Dr. Kurra Suresh, Mr. Guru Narayana Swamy, Mr. Pankaj Wankhede, Mr. Sriram Kodey, Ms. Amrita Priyadarshini.