Narendhiran Saravanane

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May 2024 graduate seeking full-time opportunities in Robotics & AI.

Experience

Brainchip, California, USA | *Solutions Architect Intern* (Robotics & RL Specialist) – Remote — May 2023 - Aug 2023

- Developed and deployed **RL** pipeline for robotic systems, integrating **physics engines** (**ROS**) to solve real-world problems.
- Drove advanced solutions, optimizing robotic platform performance under uncertainty through **AI-driven control systems**.

NICE Lab – Stretch RE1, Arizona, USA | *Research Volunteer* (Prof. Zhe Xu) — Jan 2023 - Present

- Develop and evaluate differential control synthesis algorithms for multi-agent systems (Optimal Control & MPC).
- Conduct perception and RL research with the Hello Robot, focusing on causal inference and counterfactuals for RL.

Indian Institute of Technology Bombay, India | *Robotic Software Engineer Intern* – Remote — May 2020 - July 2020

- Led an 8-person team to develop a fiducial-marker-based **localization** model for an unstable camera feed.
- Optimized the localization model using V-rep for real-time camera feeds, achieving a calibration error of 0.5%.
- Designed a rule-based visual scripting framework for configuring auto-evaluators through B0RemoteAPI for evaluation.
- Incorporated a **unit testing** framework with automated test cases to validate the auto-evaluator model.

e-Yantra – Autonomous Mobile Bot, Bihar, India | *Robotic Engineer (Co-Founder and Team Lead)* — Aug 2019 - Feb 2020

- Led a 4 member team of IIT Patna's student autonomous robot team to National (India) Finalist Status (99.7 percentile).
- Built a robot from scratch possessing vision, picking, placing, and autonomous decision-making (A* | Dijkstra) capabilities.
- Integrated IR, proximity sensors for perception & including encoder motors, Servos for autonomous actions | Used **CNC**.

Education

4.0/4.0 **MS in Robotics and Autonomous Systems**, *Arizona State University* | Arizona, USA — May 2024

7.5/10 **BTech in Mechanical Engineering**, *Indian Institute of Technology Patna* | Bihar, India — Aug 2022

Achievements: Finalists in International Robotic Competition (eYRC) & Bachelor's Capstone Project in Mech. Dept.
3 International Conferences: American Control Conference '24 | I-4AM Indian Institute of Science '22 | Delivered 2 talks
Courses: Linear Algebra | Sequential Decision Making | RL | ML | UAVs | Perception | Optimization | Controls | PDE

Skills

Programming Python, C/C++, C#, embedded C, Java, Catkin, CUDA, CMake, Matlab, Git, Bash, LaTeX, Vim, PCL, I2C
Robotics ROS 1/2, V-Rep, Gazebo, Ansys, MoveIt, MuJoCo, FEA, CFD, Arduino, AtMega 2560, Sensor Fusion, PLC
Software Linux, Tensorflow, Pytorch, Docker, OpenCV, ZeroMQ, B0RemoteAPI, CorelDraw, Solidworks, Fusion360
Certifications Robotics Software Engineer, Udacity Nanodegree – (2023) | Self-Driving Cars, University of Toronto – (2023)

Projects

Home-Delivery Bot — Dec 2022 - April 2023

Service bot

- Developed an Gazebo environment (**ROS**) & implemented a robot integrated with **feedback control** for state dynamics.
- Implemented SLAM and sensor fusion (Rotary Encoder, Odom & IMU) techniques for navigation & deployed AMCL.

IEEE Paper – *Control Systems Society Conference* (Paper Accepted) — Jan 2023 - Jan 2024

Distributed Differentially Control Synthesis for Multi-Agent Systems

- A distributed RHC approach for multi-agent systems with privacy by adding noise and maintaining MTL specifications.
- Utilized Kalman filter equations and **MILP** to encode MTL specifications as constraints.

Visual Tracking UAV - *Mambo Drone* — Jan 2023 - April 2023

Robotics Systems - Aerial Vehicles

- Developed a high-performance, **low-level flight control** algorithm with an integrated **Kalman Filter** for an Drone.
- Successfully integrated an advanced image processing module for various capabilities in a real-world Mambo drone.

Meta's Research Enhancement – *Object Goal Navigation* — Jan 2023 - April 2023

Perception in Robots (ROS)

- Integrated **YOLOv7** and performance enhancements led to a 7% success rate boost in object navigation per path length.
- Collaborated on a deep RL model, leveraging On Policy. Integrated **RRT** to path planning replacing Fast Marching.

Dc-GANs (Deep Convolutional Generative Adversial Network) – *Fashion MNIST* — Nov 2022 - Dec 2022

Machine Learning and Artificial Intelligence

- Developed a DcGAN architecture & successfully trained within 50 epochs to generate of realistic synthetic images.
- Attained an impressive DcGAN loss rate of 0.014 for the generator model.

Robotic Arm – *Singularity Analysis* — Nov 2022 - Dec 2022

Modeling and Control of Robots

- Applied Inverse Kinematics techniques to analyze the behavior of a 6-DoF robotic arm in the Singularity Space.
- Implemented **Trajectory Planner** for a Kinova Gen3 robotic arm, optimizing the trajectory within the Trajectory Space.