# NARENDHIRAN SARAVANANE

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Result-driven graduate with 2+ years of work exp. seeking full-time roles (May '24) in Robotics & AI

## EDUCATION

**MS in Robotics and Autonomous Systems (Honors)**, *Arizona State University* | AZ, USA GPA: 4.0 / 4.0 May 2024
**B.Tech in Mechanical Engineering**, *Indian Institute of Technology Patna* | Bihar, India GPA: 7.5 / 10 Aug 2022

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

## EXPERIENCE

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

- Implemented 3D models and ROS-joints controlled through **DQN neural** model operated on AKD1000 Chip.
- Crafted an Tensorflow-based **AI-controlled robot** entirely from the ground up and expedited development by 40%.
- Engineered the model's transition from TF to BrainChip's MetaTF framework, enriching customer acquisition.

**Indian Institute of Technology Bombay,** *Robotic Software Engineer Intern* | Remote (India) May 2020 - Aug 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, achieved a calibration error of $\leq 0.5\%$.
- Orchestrated design, combined rule-based script and unit tested to validate **auto-evaluators** with 95% coverage

**e-Yantra,** *Robotic Engineer (Co-Founder and Team Lead)* | India Aug 2019 - July 2020

- Coordinated a 4-member team to National Finalist Status (Top 0.3%), built a multi-tasking robot from scratch.
- Optimized robot's **pathfinding** algorithm & actions, reduced execution time by 22%, enabled faster navigation.
- Integrated IR, proximity sensors for perception & encoder motors, Servos for autonomous actions | Used CNC.

**ABU Robocon 2020,** *Robotic Engineer (Team Member)* | India Jan 2019 - Feb 2020

- Directed team efforts, achieved top 15 (national) in ABU Robocon Stage 1 through innovative robot design.
- Engineered a 3-wheeled omni-drive system, achieved precise movement in any direction for the Pass Robot.
- Modelled throwing hand compliance with pneumatics parameters using the Catapult mechanism and deployed.

## SKILLS

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|---|---|
| Languages | 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

**LLMs operated Autonomous Car Agent (Carla Simulator)** - *Capstone Master's Project* Nov 2023 - May 2024

- Achieved $\sim$ 99% accuracy with minimized hallucinating LLM's response & enhanced collision avoidance system.
- Trained using a custom-generated dataset (500GB), coupled with LLM reasoned autonomous decision-making agent.

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

- Integrated YOLOv7 and performance enhancements led to a 7% success rate boost in object goal navigation.
- Engaged with a **deep RL model**, leveraged **On Policy** and **Actor-critic** algorithm. Integrated RRT to path planning.

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

- Devised a DcGAN **neural** architecture & successfully trained within 50 epochs to generate realistic synthetic images.

**Home-Delivery Bot** | Robotics Software Engineer, *Udacity Nanodegree* (Scholarship Scholar) Dec 2022 - April 2023

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

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

- Distributed RHC approach for multi-agent systems with privacy and maintained MTL specifications.
- Utilized Kalman filter equations and MILP optimization to encode causal MTL specifications as constraints.

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

- Developed a high-performance, **low-level flight control** algorithm with an integrated Kalman Filter.

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

- Utilized Applied Inverse Kinematics to analyze a 6-DoF robotic arm, achieved a 99.9% singularity avoidance.
- Implemented **Trajectory Planner** for a Kinova Gen3 robotic arm, optimized the trajectory within the Space.