Nishanth Adithya Chandramouli

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Education

Worcester Polytechnic Institute (WPI) — Worcester, MA
M.S. in Robotics Engineering — Aug 2025 – Present
Relevant Coursework: Foundations of Robotics, Motion Planning

SASTRA University — Tamil Nadu, India
B.Tech. in Mechanical Engineering (Honors, Top 10%) — Jul 2019 – Jun 2023
GPA: 8.47/10.00

Technical Skills

Programming:	Python, C++, MATLAB, Mathematica, HTML, CSS
AI/Robotics:	ROS 2, TensorFlow, MoveIt, OpenCV, SolidWorks, Fusion 360, ANSYS, Creo, Gazebo, RViz, Isaac Sim

Research Experience

Directed Research, Perception and Autonomous Roboti cs Lab (PeAR) — WPI — Aug 2025 – Present
Advisors: Prof. Nitin Sanket, Prof. Connor McCann

- Investigating co-design of mechanical shells and autonomy stacks for soft quadcopters.
- Designing and testing multiple shell prototypes varying in elasticity, damping, and fracture toughness.
- Developing ROS 2 pipelines integrating stereo vision, VIO, and sensor fusion for onboard autonomy.

Research Associate, Robotics Lab — IIT Madras — Sep 2023 – Jul 2025
Advisor: Prof. Sandipan Bandyopadhyay

- Analyzed kinematics/dynamics of parallel manipulators (3-RRR, SRSPM, RRU-3RSS); reduced FK polynomial degree from 12 to 4.
- Designed multi-objective path planning for 6-6 SRSPM using NSGA-II, incorporating singularity-free tubes for feasible trajectories.
- Developed real-time collision detection for dual UR5s and SRSPM using spheroid-based link modeling (350 μs runtime).
- Formulated Safe Working Zone (SWZ) algorithms allowing hemispherical workspace coverage of SRSPM.

Relevant Publications

1. *A semi-analytical approach towards determining the largest collision-free sphere in R3 inside the effective regular workspace of a 6-6 Stewart platform manipulator for a given orientation workspace.* Mechanism and Machine Theory. DOI: 10.2139/ssrn.5405137

2. *Multi-objective path planning for the 6-6 Stewart platform manipulator using the singularity-free tube.* Proceedings of the 3rd International and 15th National Conference on Industrial Problems on Machines and Mechanisms (IPRoMM), Jamshedpur. https://nishanthadithya.github.io/images/projects/ipromm/paper107−5.pdf

3. *Modelling and prediction of delamination during the end-milling of glass fibre reinforced polymer composites using response surface methodology and least squares support vector machine* Pigment & Resin Technology DOI: 10.1108/PRT-10-2024-0108

Projects

Reinforcement Learning for Autonomous Drone Stabilization — Aug. 2025 – Present

- Implementing RL framework for autonomous navigation using DQN, PPO, and SAC agents in Python.
- Designing environment models in Isaac Sim with dynamic obstacles and physics-based constraints.
- Developed custom reward functions balancing efficiency, obstacle clearance, and trajectory smoothness.

Semantic Segmentation using Self-Attention weighted U-Net — Aug. 2025 – Sep. 2025

- Developed an enhanced U-Net architecture with a self-attention mechanism to improve classification accuracy.
- Preprocessed and augmented image datasets to improve model generalization and reduce overfitting.
- Trained and validated the model using PyTorch, achieving improved Intersection-over-Union (IoU) and Dice coefficient scores compared to baseline models.

Human Activity Recognition with Hybrid CNN-BiLSTM Model — Apr. 2024 – June 2024

- Built a hybrid CNN-BiLSTM model integrating convolutional feature extraction with temporal sequence learning.
- Conducted ablation studies and computational complexity analysis to identify performance bottlenecks.
- Optimized for real-time deployment with adaptive optimizers (Adam, RMSprop) and undersampling strategies, reducing training time.