NITHISH KUMAR

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EDUCATION

University of Michigan, Ann Arbor, USA
Master of Science in Robotics GPA: 3.6/4.0
Relevant Coursework: Robotics Systems Lab; Math and Programming for Robotics; Autonomous Vehicles; Human-Robot Interaction; Self-Driving Cars; Ethics for AI and Robotics; Statistical Inference, Estimation, and Learning

Anna University, Chennai, India
Bachelor of Mechanical Engineering CGPA: 9.04/10
Relevant Courses: Robotics Systems; Kinematics & Dynamics; 3D Printing; Control Systems, Sensors, and Actuators

WORK EXPERIENCE

Fluent Lab, University of Michigan, Ann Arbor Sep 2025 - Dec 2025
Research Assistant | Advisor – Prof. Christoforos Mavrogiannis
- Modified MuSHR race car hardware and control architecture to integrate ReloPush, a planning framework for object rearrangement in cluttered environments using non-holonomic mobile robots.
- Improved system robustness for real-world manipulation and navigation tasks under constrained motion dynamics.

MAVRIC Lab, University of Michigan, Ann Arbor Jan 2024 - Aug 2024
Research Assistant | Advisor – Prof. Dawn Tilbury
- Investigated and benchmarked local path-planning algorithms including TEB, DWA, APF, MPPI, and RHMPC.
- Developed a robust MPPI-based local planner for UGVs with real-time sensor fusion in Unreal Engine.
- Designed a Human-Robot Interface (HRI) enabling dynamic trajectory tuning and manual override during local minima and obstacle encounters.

National Institute of Technology, India Feb 2023 – May 2023
Project Intern | Advisor – Prof. M. Sridevi
- Implemented a deep learning–based end-to-end lane detection system on Linux using OpenCV, CUDA, PyTorch, TensorFlow, and Keras.
- Achieved 93% lane detection accuracy across diverse road and lighting conditions.
- Conducted comparative evaluation with classical and learning-based lane detection methods with systematic data logging.

Venus Industries, Kundrathur, India Feb 2022 - Mar 2022
Quality testing Intern | Supervisor – Mr. R. Chandran
- Applied quality management and waste reduction principles in manufacturing workflows.
- Gained hands-on experience with AutoCAD, firmware flashing, and inspection of a 6-DOF collaborative robot equipped with a 3-axis force–torque sensor.

PROJECTS

Improving Data Processing with OCR for MoveMore Program Sep 2024 – Dec 2024
- Collaborated with a pro bono clinic supported by the American Heart Association (UM–Flint).
- Integrated Microsoft Azure Document Intelligence for OCR-driven data extraction, achieving 93% accuracy.
- Designed a user-friendly UI for database management, streamlining documentation and enabling personalized exercise planning. rate

Robotics Systems Lab | Armlab and Botlab Jan 2024 – Apr 2024
- Implemented block detection using RGB-LiDAR and depth estimation with OpenCV.
- Applied kinematics for motion planning and autonomous grasping using a 5-DoF ReactorX200 robotic arm.
- Developed an MBot with wheel encoder–IMU odometry, 2D LiDAR mapping, particle-filter localization, A* global planning, and SLAM-based navigation.

Group-Based Model Predictive Control (G-MPC) in Python Aug 2023 – Dec 2023
- Designed a novel personal-space formulation for robots navigating among dynamic human groups.
- Applied DBSCAN-based social group detection with adaptive MPC for socially compliant navigation.

Autonomous Underwater Vehicle (AUV) Aug 2023 – Dec 2023
- Derived linearized motion models for efficient control design.
- Designed and tuned PID controllers for individual subsystems.
- Implemented Dijkstra's, A*, and explored Multiple Traveling Salesman Problem (MTSP) formulations.

BAJA SAEINDIA - Team: Traxion Offroading May 2020 - May 2023
Suspension Team Lead — Advisor - Dr. Sakthivel, Dr. Sivaramapandian
- Led and mentored team members in 4WD off-road buggy vehicle architecture (2020–2022).
- Played a key role in integrating portal gears and multi-link suspension, improving torque delivery and ground clearance (2023).

SKILLS

Robotics Simulation: ROS, SLAM, Sensor Fusion, Motion Planning, Perception, Navigation
CAD & CAE: SOLIDWORKS, CATIA, CREO, Fusion 360, ANSYS, ADAMS, Lotus Shark
Simulation & Tools: Unreal Engine, IPG CarMaker, Automation Studio, FluidSIM
Programming:C, C++, Python, MATLAB/Simulink, OpenCV, HTML/CSS, Git
Soft Skills: Strong communicator, collaborative, solution-oriented, adaptable
Interests: Embedded Systems, Autonomous Systems (UGV/AUV), Robot Manipulation, Safety Systems, Collaborative Robots, PLCs

PAPER PUBLICATIONS

1. Senthamarai Kannan, C., Rangan, P., Nithish, K., Amanullah, S., Akash, K., and SP, H.P., 2022. "Spider Bot – A Quadruped Robot for Data Gathering." *Journal of Engineering Science and Technology Review*, 15(6), pp. 15-19.