NITHISH KUMAR

734-590-0748 | nithishk@umich.edu

ACADEMIC QUALIFICATION

University of Michigan – Ann Arbor **August 2023 – April 2025**
Master of Science in Robotics **GPA:** 3.7/4.0
Coursework: Robotics Systems Lab, Math and Programming for Robotics, Autonomous Vehicles, Human-Robot Interaction

Anna University, Chennai, India **August 2019 - May 2023**
Bachelor of Mechanical Engineering **CGPA:** 9.04/10
Relevant Courses: Robotics Systems, Kinematics & Dynamics, 3D Printing, Control Systems, Sensors and Actuators, CAD.

Udacity, Online **March 2023**
Nanodegree - AI Programming with Python | Credential: https://confirm.udacity.com/NALTDNS3

CERTIFICATIONS: **CSWA - Additive Manufacturing** | Credential: C-THGRM9XQY7, **CSWA - Mechanical Design** | Credential: C-ELZK58TWNY**, CSWPA- Drawing Tools** | Credential: C-RQH3K6FP7S

SKILLS

Technical Software: SOLIDWORKS, ADAMS, Lotus Shark, CREO, Fusion 360, ANSYS, Unreal Engine, Automation studio, FluidSIM, IPG Carmaker.
Interest: Sensors Integration, Safety Systems, Perception & Navigation, Path Planning, SLAM, Autonomous Systems, UGV, AUV.
Programming: C, C++, Python, MATLAB, HTML/CSS, OpenCV, ROS (Robot Operating System), Git

EXPERIENCE

MAVRIC Lab, University of Michigan – Ann Arbor **January 2024 - Present**
Research Assistant | Advisor – Prof Dawn Tilbury

- Design, implement and test Adaptive Human Intervention for UGV navigating uncertain and complex terrain.
- Investigated three local path planning methods for generating trajectories: TEB, DWA and APF.
- In progress of identifying challenges in each path planning methods and incorporating the techniques in Unreal Engine.

National Institute of Technology, India **February 2023 – April 2023**
Project Intern | Advisor – Prof. M. Sridevi

- Implemented a deep learning-based end-to-end lane detection system using LaneNet for multiple lane detection.
- Evaluated the performance of the system in various road conditions and scenarios.
- Compared the proposed system with traditional lane detection methods and other deep learning-based approaches.

Venus Industries, Kundrathur, India **February 2022 - March 2022**
Quality testing Intern | Supervisor – Mr. R. Chandran

- Developed expertise in quality management principles and waste reduction strategies.
- Acquired hands-on experience in vendor system operations, precision tools for tolerance checking, AutoCAD, and data analysis.

PROJECTS

Robotics Systems Lab | Armlab and Botlab, Ann Arbor, United States **January 2024 – March 2024**

- Implemented a block detection using RGB-Lidar camera and depth estimation using OpenCV, then apply Kinematics for motion planning and autonomous grasping of detected blocks using a 5-DoF ReactorX200 Robot Arm.
- Developing an MBot using wheel encoders and an IMU to estimate odometry. Next, 2D lidar mapping, particle filter localization using the A* algorithm, and local navigation using SLAM.

Group-Based Model Predictive Control (G-MPC) in Python, Ann Arbor, United States **August 2023 – December 2023**

- Implemented Novel personal space formula for a robot navigating in a workspace containing dynamic agents.
- Considered Adaptive Personal Space model for extracting Social Groups using DBSCAN algorithm.

Autonomous Underwater Vehicle (AUV), Ann Arbor, United States **August 2023 – December 2023**

- Used linearized equations to represent the AUV's motion across several subsystems for control.
- Designed and tuned PID controller for each subsystem separately.
- Explored Dijkstra's and A* algorithm and worked on Multiple Travelling Salesman Problem (MTSP)

BAJA SAEINDIA - Team: Traxion Offroading, Chennai, India **May 2020 - May 2023**
Suspension Team Lead | Advisor - Dr. Sakthivel, Dr. Sivaramapandian

- Worked in a team of 25 highly motivated students, designing, manufacturing and inspection of an offroad 4WD buggy, to compete in SAE BAJA competition in India. Mentored new members and guide them technically and oversaw their progress.
- Designed and simulated double wishbone suspension to achieve maximum stability. (2020-2022)
- Contributed to the installation of Portal Gear and multi-link suspension by providing more torque and ground clearance. (2023)

PAPER PUBLICATIONS

- 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.
- Prashanna Rangan R, Nithish K, Vishnu Chandran R, Arul Kumar M, **Design and Analysis of a 3-Finger Adaptive Gripper**, International Journal of Engineering Research & Technology (IJERT) ETEDM – 2022, 10(8), pp. 224-230
- Nithish K, Prashanna Rangan R, Jagan Shrinivasan R, Arul Kumar M, **Vision based Eggshell Crack Detection System for Segregation**, International Journal of Engineering Research & Technology (IJERT) ETEDM – 2022, 10(8), pp. 231-234.