Nathan Shankar

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EDUCATION

The University of Manchester — Manchester, United Kingdom

- **Master of Science - Robotics** — September 2023 - September 2024

Achievements: •Received the Global Futures Scholarship 2023. •Elected as the Course Representative for the year 2023-2024 in a cohort of 60 students. •Active member of the ROBOSOC Society.

Courses: Software for Robotics, Robotic Systems, Robotic Manipulators, Cognitive Robotics and Computer Vision, Autonomous Mobile Robots Foundations of Machine Learning, Robotic Systems Design Project

Vellore Institute of Technology, — Vellore, India

- **Bachelor of Technology – Electrical and Electronics Engineering - GPA: 9.49/10** — June 2019 - August 2023

Achievements: • Salutatorian of the Graduating Class. •Academic Excellence in AY '22 and '23. •Raman Research Award. •Best Paper Award in an IEEE Conference.

Relevant Courses: Robotics, Control System, Internet of Things

EXPERIENCE

Bodhi Labs Software Services Pvt Ltd. — Bangalore, India

- **Intern (Full-time)** — December 2022- April 2023
  - o Spearheaded the assembly and configuration of a semi-autonomous table-tennis robot, encompassing both mechanical assembly and intricate electronics setup.
  - o Engaged in extensive brainstorming sessions aimed at resolving challenges encountered by clients within existing deployments, fostering innovative solutions.
  - o Conducted rigorous testing protocols on the robot, ensuring adherence to safety standards and addressing potential hazards to enhance user experience.
  - o Demonstrated proficiency in Arduino programming to enhance the functionality of the robot, collaborating seamlessly with cross-functional teams to seamlessly integrate application endpoints into the robot's firmware.
  - o Helped develop promotional content for the table-tennis robot, showcasing the physics involved in playing table-tennis.

Students for The Exploration and Development of Space (SEDS India) — India

- **Projects Manager** — September 2021 – September 2022
  - o Facilitated lectures and tutorials on advanced topics including State Estimation, Path Planning, Trajectory Optimization, SLAM, and Computer Modeling and Geometry, contributing to the academic enrichment of students.
  - o Provided guidance and support to student chapters affiliated with SEDS India, aiding in the establishment of their project teams and offering assistance throughout the project lifecycle.
  - o Led a rover team within one of the student chapters, overseeing its management and coordination for participation in prestigious events such as the University Rover Challenge and International Rover Design Challenge.
  - o Delivered strategy and conducted primary design work for the rover for a hypothetical mars soil excavation using cutting-edge robotics technology. Developed my ability to efficiently work in teams and delegate work to others.
  - o Proposed and implemented the rover design, improved it to reduce costs, quality, and manufacturability.
  - o Prepared and presented design reviews of the Rover using Solidworks. Performed dynamic simulations on the design. Learned ROS and Gazebo Simulation. Worked on URDF creation for simulation.

IEEE Circuits and Systems — Vellore, India

- **Projects Head** — September 2020 - September 2021
  - o Fostered a culture of innovation and creativity within the project team, encouraging members to explore novel ideas and approaches to problem-solving.
  - o Supervised projects related to signal processing, including the design and implementation of algorithms for data acquisition, filtering, and analysis using MATLAB or Python.
  - o Learned about PCB designing and simulating circuits using sensors and Arduino, worked with simulations on Proteus and Tinkercad.

PROJECTS

- **Leo Rover:** (Nov ’23 – Feb ‘24) [GitHub]

  • Worked in a team of 4 to program a fully autonomous robot capable of self-navigating an unmapped terrain and retrieving an object of interest.

  • Implemented the autonomous navigational capabilities for the robot.

  • Worked on SLAM, sensor integration, electrical subsystem, and control dashboard for the rover.

- **Biped Robot:** (Jan ’24 - ongoing) [Website]

  • Individually working on a 13 DOF Biped Robot to understand the kinematics involved in simulating a human like movement.

  • Working on eliminating the use of encoders to understand alternate ways to estimate robot movement.

  • Integrates voice recognition technology coupled with natural language processing for intuitive verbal commands and responses.

- **Investigation of the Integral term gains on different curves for a PI Controller:**

  • Researched the effect of the integral term of the proportional-integral controller to check for the stability of a mobile robot.

  • Implemented a heading and wheel controller using C++ and Arduino.

  • Conducted data analysis of the deviation errors using Pandas and NumPy.

- **Autonomous Self-Driven Car using Raspberry Pi and Arduino UNO**: (Jan ’21 - March’21) [GitHub]

  • Learned about kinematic and dynamic vehicle modeling and implemented the Kinematic Bicycle Model using Python.

  • Designed a longitudinal controller using PID and the Stanley lateral controller. Learned about the method of least squares, Linear, Extended and Unscented Kalman Filtering.

  • Implements computer vision algorithms for lane detection, object recognition, and traffic sign detection using Raspberry Pi's camera module.

  • Utilizes Arduino Uno microcontrollers for low-level motor control and sensor interfacing, ensuring rapid response times and accurate maneuvering.

- **Navigation Algorithms**: (Jan ’21 - March’21) [GitHub]

  • Learned about the theory and working of A* and RRT algorithms.

  • Designed a GUI where the start, end and obstacles can be set, and the implemented algorithm can plan the path to be taken.

  • Explored potential applications of the navigation algorithms beyond traditional path planning, such as in autonomous vehicles, robotics, or video game AI, by investigating adaptability and scalability.

SKILLS SUMMARY

- Languages: Python, C++, C#, HTML, Matlab and Simulink
- Frameworks: Scikit, TensorFlow, Ignition Gazebo, OpenCV, Pytorch(Basic), ROS2 Humble, Choregraphe, Webots
- CAD Softwares: SolidWorks, AutoCAD, FreeCAD
- Platforms: Linux, Windows, Arduino, Raspbian, MIT App Inventor, Unity, Proteus, Tinkercad
- Soft Skills: Leadership, Team Player, Writing, Public Speaking, Time Management, Attention to Detail

CERTIFICATIONS

- Interfacing with the Raspberry Pi
- Introduction to TensorFlow
- Launching into Machine Learning
- The Raspberry Pi Platform and Python Programming for the Raspberry Pi
- Introduction to the Internet of Things and Embedded Systems
- Introduction to Programming with MATLAB
- Principles of Management
- Technical Support Fundamentals
- How Google does Machine Learning

LANGUAGES

- English - Full Working Proficiency (IELTS ’22 - 8.0(overall))
- Hindi - Native
- Tamil - Native
- German - Basic
- French - Basic