

Rohan Panicker

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EDUCATION

University of Washington, Seattle

September 2023 - June 2025

- Master of Science in Mechanical Engineering with concentration in Robotics, Controls and Artificial Intelligence.
- **Coursework:** Artificial Intelligence, Control Theory, Deep Learning.

MIT World Peace University, India

July 2017 - July 2021

- B.Tech in Mechanical Engineering.
- **Coursework:** Mechatronics, Matlab/Python, Kinematics and Dynamics, Data-Structures and Algorithms.

SKILLS

- Programming Languages : Python, Rust, C, C++, Matlab and Simulink, CUDA.
- Libraries and Frameworks: ROS, ROS2, Numpy, SciPy, flask, OpenCV, Pytorch, GStreamer, Pandas, Isaac Gym, PyBullet, MuJoCo
- Software development tools: Git, Jira, Docker, Kubernetes, CMake, AWS
- Embedded Systems: Raspberry Pi, NVIDIA Jetson, STM32F4 series, NXP LPC5500 series, ODROID XU4.
- Technical Skills : Signal Processing, Statistical Modelling, Cluster Analysis, Data Analysis and Visualization

WORK EXPERIENCE

Robotics Co-op

Amazon Robotics

September 2024 - Present

- Collaborated with a multidisciplinary team to develop innovative solutions for integrating state of the arts robotics into Amazon's warehouse, enhancing inventory management and inspection processes.
- Developed robot-agnostic software for data collection, visualization, leveraging AWS.

Summer Intern

Global Health Labs

June 2024 - September 2024

- Created a **600ms delay** statistical method for ROI cropping and analysis of test-kit images on an embedded camera.

Graduate Student Researcher

Robotics Learning Lab

September 2023 - June 2024

- **Accepted** paper for the **ICRA 2024** workshop on dynamics learning for off-road autonomy.
- Conducted field testing, data collection and created Out Of Distribution (OOD) detection methods for off-road autonomy involving a MuSHR wheeled robot and a Unitree-A1 quadruped.

Embedded Software Engineer

TATA Advanced Systems Limited (TASL)

June 2022 - July 2023

- Used model predictive control after deploying YOLOv8 for object detection and tracking, reducing object tracking latency by **65%**.
- Solved object occlusion tracking problem by using a bayesian filter and a PID controller, improving accuracy by **13%**.
- Actively led system and sensor selection for project RAJAK, **saving \$2000** by eliminating expensive third party solutions.
- Boosted gimbal stabilization accuracy by **80%** using Kalman filter-based sensor fusion between optical flow data and IMU values.
- Implemented an end to end perception pipeline for Thermal Imaging and LiDAR using OpenCV and GStreamer.

Control Systems and Perception Engineer

Research and Development Establishment Engineers lab

July 2021 - February 2022

- Created a dataset using Motion Capture of human gait locomotion for designing a control system of a lower limb exoskeleton.
- Integrated fuzzy logic for gait switching into a Raspberry Pi for motor-controlled gait assistance, during walking and stooping.
- Led a team of four in developing a **budget-friendly adjustable ankle exoskeleton** that reduces energy expenditure by **17%**.

PROJECTS

- **Reinforcement Learning for Quadruped Locomotion and Manipulation**
 - Trained 1024 agents in parallel on Isaac Gym for locomotion and handstand using **PPO** and **SAC** with curriculum learning.
 - Collected real and simulated failure data with domain randomization and trained an LSTM to **predict failures** in advance.
- **3D Mapping for indoor autonomous navigation**
 - Improved 3D point cloud mapping **speed by 25%** by merging the NDT and ICP point cloud registration algorithm with EKF.
 - Fixed the temporal data mismatch from the 2D-LiDAR and inertial odometry by using error propagation using prior covariance.
- **TinyML and Object detection and tracking using STM32**
 - Used CIFAR-10 dataset for image classification on a STM32F429 using the X-Cube-AI library, achieving **78% accuracy** at **25 FPS**.

PUBLICATIONS

- Han, T., Talia, S., **Panicker, R.**, Shah, P., Jawale, N., & Boots, B. (2024). Dynamics Models in the Aggressive Off-Road Driving Regime. *arXiv preprint arXiv:2405.16487*.
- Sensor fusion between IMU and 2D LiDAR Odometry based on NDT-ICP algorithm for Real-Time Indoor 3D Mapping. *TechRxiv*.
- Tripathy, Shivam & **Panicker, Rohan** & Shrey, Shubh & Naik, Rutvik & Pachpore, Swanand. (2020). Voice Controlled Upper Body Exoskeleton: A Development For Industrial Application.

ACHIEVEMENTS

- **Silver Medalist** at the Nanotechnology, Sciences and Application competition held by IIT Madras in 2020.
- Achieved **3rd rank in Asia** in the SpaceX Hyperloop Pod Competition at the preliminary round 2018.