

MULLAINATHAN V. H.

Robotics & Automation Engineer | M.Sc. Intelligent Automation

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LinkedIn

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PROFILE

Robotics and automation engineer with hands-on experience in **industrial robotics, autonomous systems, motion planning, machine vision and intelligent manufacturing**. Experienced in developing robotic and automation systems from **modelling, simulation and algorithm development through hardware integration, experimentation and validation**. Strong interdisciplinary background combining robotics, mechanical systems, software, sensing and artificial intelligence, with research and industry experience across autonomous navigation, robotic inspection and manufacturing automation.

EDUCATION

M.Sc. Intelligent Automation – Double Degree

2025–2027

University of Skövde, Sweden (2026–2027)

ESILV – École Supérieure d'Ingénieurs Léonard-de-Vinci, Paris, France (2025–2026)

Relevant areas: Autonomous Systems, Industrial Robotics, AI, Machine Vision, Visual Anomaly Detection, Robot Modelling & Simulation, Predictive Maintenance, Systems Engineering and Virtual Product Realization.

B.E. Robotics and Automation Engineering

2022–2025

PSG College of Technology, Coimbatore, India

CGPA: 8.40/10

Relevant areas: Robot Kinematics & Dynamics, Control Systems, Industrial/Mobile Robotics, Machine Vision, Modelling & Simulation, Embedded Systems and PLC/SCADA.

Diploma in Mechatronics

2019–2022

PSG Polytechnic College, Coimbatore, India

94.92%

EXPERIENCE

Robotics & Automation Intern – AiDEAH Data Works

Apr – Aug 2026

Robotic 3D Laser Scanning & Dimensional Inspection

Chennai, India

- Developed an automated non-contact inspection demonstrator integrating a **UR5**, Micro-Epsilon scanCONTROL 30x0 2D laser profile scanner and EtherCAT rotary stage.
- Generated scan trajectories from **STEP/B-Rep CAD geometry** considering stand-off, reachability, collision avoidance and robot configuration.
- Implemented timestamped transformations for 3D point-cloud reconstruction, filtering and geometric feature extraction; integrated OpenCASCADE-based CAD processing for dimensional measurement.

Research Intern – DRDO-CAIR

Dec 2024 – May 2025

Centre for Artificial Intelligence & Robotics / Autonomous Navigation & Terrain Modelling

Bengaluru, India

- Developed terrain-aware **A*/Hybrid A*** planning for tracked vehicles using vehicle geometry, turning radius, slope and mobility constraints.
- Processed LiDAR terrain data into Digital Elevation Models and investigated geospatial terrain-risk/permafrost modelling using remote-sensing data.

Summer Intern – ISRO, U R Rao Satellite Centre

May – Jun 2024

Flexible Sheet Deployment & Unroll Mechanism

Bengaluru, India

- Worked on design and analysis of a controlled flexible-sheet deployment mechanism for space applications, focusing on mechanical architecture, dynamics and deployment reliability.

Project Intern – Thedush Robotics

Oct 2021 – May 2022

LiDAR-Based Autonomous Mobile Robot

Coimbatore, India

- Contributed to an AMR using ROS Noetic and RPLiDAR; supported LiDAR/RViz workflows, mechanical assembly, sensor integration and autonomous-navigation experimentation.

PROJECTS

CURRENT & RECENT PROJECTS

2025–Present

Collaborative Coffee-Serving Robotic System – ASSAR

Universal Robots / Multi-Robot Coordination / Industrial Automation / HMI

- Currently developing an automated coffee-serving system at **ASSAR Industrial Innovation Arena, Skövde**, using two **UR10 collaborative robots** for coordinated coffee preparation, cup handling and serving operations.
- Developing the integrated workflow for robot coordination, object handling, sensing, industrial communication and interaction with a customer ordering interface.

AI for Visual Anomaly Detection

Python / PyTorch / CNNs / Industrial Computer Vision

- Developed image-classification and anomaly-detection workflows using datasets including **MVTec AD** and **PlantVillage**.
- Implemented image preprocessing, model training, inference and performance evaluation using PyTorch.

Dual-Robot Automated Milling Cell

MATLAB / Robot Kinematics / Trajectory Planning / Manufacturing Automation

- Modelled coordinated RPP and RPR robotic manipulators for automated workpiece positioning and machining.
- Implemented Modified DH modelling, forward and analytical inverse kinematics, Jacobian analysis and fifth-order polynomial trajectory generation for multi-pass machining.

Hydraulic Aileron Actuator System

MATLAB / Simulink / Simscape / Stateflow / Systems Engineering

- Developed requirements, system architecture and simulation integrating hydraulic actuation, mechanical dynamics and feedback/PID control.
- Implemented Stateflow-based operational and fault-management logic and performed preliminary system validation.

NASA C-MAPSS – Turbofan Remaining Useful Life Prediction

Python / Machine Learning / LSTM / Predictive Maintenance

- Developed a predictive-maintenance workflow for estimating **Remaining Useful Life (RUL)** from multivariate run-to-failure sensor data.
- Performed preprocessing and feature engineering and compared classical regression approaches with LSTM-based sequence modelling.

ArUco-Based Autonomous Navigation & Manipulation

Python / OpenCV / Raspberry Pi / Mobile Robotics

- Developed vision-guided autonomous navigation using ArUco landmarks for relative-pose estimation.
- Integrated line following, obstacle avoidance and an onboard manipulator for physical obstacle removal.

Niryo Ned2 Automated Pick-and-Place

Python / ROS / Collaborative Robotics / Material Handling

- Developed an automated material-handling application using a physical **Niryo Ned2 6-DoF collaborative robot**.
- Implemented Cartesian pose teaching, pick-and-place sequences, vacuum-gripper operation, conveyor control and safe-motion routines.

ROBOTICS & AUTOMATION PROJECTS

2022–2025

Bomb Detection & Safe Disposal Rover

ROS 2 / Mobile Manipulation / Sensor Integration / Embedded Systems

- Developed a six-wheel double-bogie mobile-manipulator platform for remote inspection and handling of hazardous objects in collaboration with **Coimbatore City Police**.
- Integrated a robotic manipulator with cameras, NLJD, vapour/VOC sensing, IMU, localization sensors and specialized inspection and disposal tools.

ISRO Robotics Challenge – Autonomous Rocker-Bogie Rover

Mobile Robotics / Manipulation / Mechanical Design / System Integration

- Designed and integrated rover subsystems including a **5-DoF robotic manipulator**, locomotion hardware and mechanical assemblies.
- Contributed to system integration and testing; the team achieved **7th place nationally among 300+ participating teams**.

Smart E-Bin – Vision-Based Waste Segregation

YOLOv5 / Computer Vision / Automation / Mechanical Design

- Developed a vision-assisted automated waste-segregation prototype using YOLOv5-based object detection.
- Combined computer vision, automated sorting concepts and CAD-based mechanical development.

Personalized 3D-Printed Insoles for Flatfoot Correction

Computer Vision / Geometry Processing / CAD / Additive Manufacturing

- Developed a digital workflow for customized corrective insoles using image-based measurements, geometric processing and CAD.
- Integrated the workflow with additive manufacturing; the work subsequently developed into a journal manuscript.

TECHNICAL SKILLS

Robotics & Autonomous Systems

ROS 2, ROS, robot kinematics, forward/inverse kinematics, motion planning, trajectory generation, autonomous navigation, LiDAR, SLAM, Nav2, robot manipulation and collision avoidance.

Programming & Software Development

Python, C++, MATLAB, C, SQL, Git and Linux.

Artificial Intelligence & Computer Vision

PyTorch, TensorFlow, machine learning, deep learning, CNNs, LSTM, visual anomaly detection, reinforcement learning, OpenCV and ArUco.

Modelling, Simulation & Systems Engineering

MATLAB/Simulink, Simscape, Stateflow, Gazebo, RViz, model-based engineering, requirements engineering, system architecture and experimental validation.

CAD, Digital Engineering & Manufacturing

SolidWorks, PTC Creo, Fusion 360, Siemens NX, STEP/B-Rep, OpenCASCADE, mechanism design, additive manufacturing and point-cloud processing.

Industrial Automation & Embedded Systems

PLC, SCADA, HMI, microcontrollers, sensor integration, EtherCAT, UART, I²C and SPI.

RESEARCH PUBLICATIONS

- **Comparative Analysis of Single-Phase MOSFET- and IGBT-Based Inverters**
International Journal for Multidisciplinary Research (IJFMR), 2024.
- **Redundant Manipulators and Singularity Avoidance**
International Journal of Creative Research Thoughts (IJCRT), 2023.
- **A Novel Workflow to Fabricate Personalized 3D-Printed Insoles for Flatfoot Correction**
Manuscript under review.
- **Engineering A* for Autonomous Tracked Vehicles**
Research work in progress, DRDO – Centre for Artificial Intelligence and Robotics (CAIR).
- **Permafrost Mapping through Multi-Source Geospatial Modelling**
Research work in progress, DRDO – Centre for Artificial Intelligence and Robotics (CAIR).

LEADERSHIP & ACTIVITIES

Project Lead – DaVinciHive UAV Association

2025–2026

Dassault UAV Challenge – UAV design, sensing, autonomous trajectory concepts and mission planning.

Secretary – Robotics & Automation Engineering Association, PSG Tech

Coordinated technical workshops, peer-learning activities, guest sessions, association meetings and RoboGlitz 2025.

Student Coordinator / Core Member – KANĀ Makerspace

Supported multidisciplinary robotics projects, prototyping, fabrication and student-team activities.

Secretary – Mechatronics Association, PSG Polytechnic College

2024–2025

2021–2022

ACHIEVEMENTS & AWARDS

- **Winner – IBM Hackathon**
Paris, France, 2025.
- **Top 8 Finalist – Drone Defense Hackathon**
Adopt AI Summit, Grand Palais, Paris, France.
- **7th Place / National Finalist – ISRO Robotics Challenge 2024**
Ranked 7th nationally among 300+ participating teams.
- **Finalist – Pneumo’23**
Pneumatic automation competition organized by ASME PSGCT in association with FESTO.
- **Best Outgoing Student Award – B.E. Robotics and Automation Engineering**
PSG College of Technology, 2025.
- **Diploma Alumni Achievement Award – Best Performer**
PSG Polytechnic College, 2022.
- **Governor Award – Bharat Scouts and Guides**
Coimbatore, India, 2019.

LANGUAGES

Tamil	Native	English	C1 / Professional Working Proficiency
German	A1	French	Basic