DEVADAS VIJAYAN SHEELA

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Summary

Master's student in Electromobility with over two years of research-oriented experience in robotics and artificial intelligence. Experienced in designing and evaluating robotic systems, conducting simulation-based and experimental studies, and translating methods from scientific literature into reproducible robotics and AI workflows.

Education

Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) Expected May 2026
M.Sc. Electromobility — GPA: 2.0/5.0 *Erlangen, Bavaria*

- Coursework: Robotic Frameworks (ROS), Robotics, Robot Mechanism and User Interface, Machine Learning, Python, MATLAB, Human-computer Interaction, Automotive Engineering, Mechatronics.

TKM College of Engineering Jun 2014 – May 2018
B.Tech. Mechanical Production Engineering *Kollam, Kerala, India*

- Coursework: Computer programming, Mechanics of solids-Fluids,Thermodynamics, CAD,

Experience

University of Technology Nuremberg (UTN) Sep 2025 – Present
Student Research Assistant, Robotics & AI *Nuremberg, Germany*

- Assisting the UTN PhD research team in the development of AI and robotics-based tools for autonomous systems.
- Benchmarking AI-based bin-packing and grasping algorithms for robotic manipulation using Franka Emika robot.
- Supporting benchmarking of 3D bin-packing optimization problems and evaluating algorithm performance.

Factory Automation & Production Systems (FAPS) Jul 2024 – Present
Research Assistant, Robotics & Automation *Erlangen, Germany*

- Converted CAD assemblies into URDF models for robotic simulation using Isaac Sim, MuJoCo, and Gazebo.
- Conducted autonomous navigation experiments on assistive robots using Navigation 2 stack and VLA models.
- Supported simulation-based development for robotic grasping by exploring reinforcement learning (RL) techniques and evaluating their performance.

Fraunhofer Institute Jul 2024 – Jan 2025
Student Research Assistant, Robotics & Autonomous System *Ingolstadt, Germany*

- Developed an object detection pipeline for drones equipped with an Intel RealSense depth camera using YOLOv3, OpenCV, and Python in VS Code.
- Supported drone flight tests and recorded experimental results as part of an interdisciplinary research team.

MATLAB Laboratory at FAU Mar 2024 – Jul 2024
Student Assistant / HiWi / Teaching Assistant *Erlangen, Germany*

- Supported FAU's MATLAB course covering differential equations, static truss analysis, Fourier-based signal processing, and dynamic system simulation (e.g., crane models).
- Provided hands-on support during lab sessions by explaining MATLAB concepts and assisting students with exercises.

Thesis

Project Thesis May 2025 – Dec 2025

Title: Isaac Sim–Based Multibody Dynamic Simulation of a Human-Centered Assistive Robot and its Autonomous Navigation in Indoor Environments
Factory Automation & Production Systems (FAPS), Germany

- Developed a custom URDF robot model from the CAD file and implemented vision-based autonomous navigation.
- Designed and simulated assistive robot with multibody dynamics in Isaac Sim replicating the real world physics.
- Tools and Technologies: ROS 2, Navigation2 Stack, Isaac Sim, Fusion 360, ZED depth camera.

Master's Thesis Dec 2025 – Present

Title: Vision–Language–Action–Guided Navigation and Reinforcement Learning–Based Pick-and-Place for a Custom Assistive Robot
Factory Automation & Production Systems (FAPS), Germany

- Developing a VLA-guided autonomous navigation and reinforcement learning–based pick-and-place pipeline in Isaac Lab.
- Tools and Technologies: ROS 2, Vision–Language–Action (VLA), Reinforcement Learning (RL), Isaac Lab.

Technical Projects

Hardware Prototyping for Robotics and AI Integration

- Built autonomous robotic prototypes using Arduino, ESP32, motor drivers, and 3D-printed mechanical components.
- Integrated Jetson Nano with ZED Mini for stereo depth perception and edge AI experimentation.

JetBot Autonomous Navigation System

- Deployed ROS 2 and the Navigation2 (Nav2) stack on NVIDIA JetBot for autonomous navigation and localization.
- Validated simulation-to-hardware workflows using Gazebo, teleoperation, and remote SSH-based debugging.

Image Segmentation for Robotic Grasping

- Implemented interactive image segmentation using SAM-2 to generate binary masks for robotic grasping tasks.
- Integrated Python, PyTorch, and OpenCV to support vision-based object selection and manipulation pipelines.

Machine Learning and Deep Learning Projects

- Developed machine learning and deep learning models for regression and classification using Python.
- Built end-to-end ML pipelines with data preprocessing, evaluation, and visualization using scikit-learn and pandas.

Skills

- **Robotics & Autonomous Systems:** Mobile robotics, autonomous navigation (Nav2), SLAM and localization, robotic manipulation and grasping, assistive robotics, simulation-to-real transfer
- **Perception & AI:** Object detection (OpenCV, YOLO), semantic segmentation, Vision–Language–Action (VLA), reinforcement learning, stereo and depth cameras (ZED, Intel RealSense)
- **Simulation & Software Tools:** ROS 2, NVIDIA Isaac Sim, Isaac Lab, Gazebo, CARLA, Linux (Ubuntu), Windows, Git, GitHub, Visual Studio Code
- **Engineering & Research:** Experiment design for robotic navigation, CAD-to-URDF/USD workflows, 3D bin-packing optimization, hardware–software integration, technical documentation