DEVADAS VIJAYAN SHEELA

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Summary

Master's student passionate about robotics and autonomous systems. I enjoy turning CAD models into intelligent autonomous robots using simulators. Focused on building expertise in autonomous navigation and robotic system integration while accelerating my learning curve to become a skilled robotics engineer.

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,Algorithms of Python, MATLAB, Human-computer Interaction, Automotive Engineering, Mechatronics,
- On Going Project Thesis: **"Isaac Sim-Based Multibody Dynamic Simulation of a Human-Centered Assistive Robot and its Autonomous Navigation in Complex Indoor Environments"**

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,
- Final Project: **"Design and Fabrication of a Multi-Utility Hybrid Electric Vehicle"**

Experience

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

- Assisting the UTN PhD research team in developing AI- and robotics-based tools for autonomous systems.
- Supporting benchmarking of 3D bin-packing optimization problems and evaluating algorithmic performance.
- Contributing to the development of quadruped robot systems inspired by ANYmal (ANYbotics) in ROS1, including locomotion and control modules.
- Helping in solving autonomous navigation problems and integrating robotic software components using **ROS 2**.

Fraunhofer Institute Jul 2024 – Jan 2025
Student Research Assistant *Ingolstadt, Germany*

- Developed an object detection algorithm for drones equipped with an Intel RealSense depth camera using YOLOv3, OpenCV, and **Python** on the **VS Code** platform.
- Conducted testing using recorded ROS bag data, followed by full execution during real-time flight. Managed version control with **Git** and documented the pipeline.
- 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*

- Completed a MATLAB course covering key engineering topics such as differential equations, static truss analysis, signal processing using Fourier transforms, and dynamic system simulation (e.g., crane models).
- Provided hands-on support to students during lab sessions by explaining MATLAB concepts and assisting with exercises.

Apollo Tyres Ltd. Nov 2018 – Feb 2019
Graduate Apprentice – Mechanical Maintenance *Kerala, India*

- Gained hands-on experience in preventive and breakdown maintenance of major tyre-plant machinery.
- Worked extensively with curing presses, pumps, compressors, pipelines, and hydraulic/pneumatic systems as part of the maintenance team.
- Supported shift-based mechanical maintenance operations, including manpower coordination and material allocation tasks.
- Maintained plant machinery and documented maintenance activities using the **SAP PM Module**.

Projects

FAPS – Institute for Factory Automation and Production — *Isaac Sim, ROS 2, ZED 2i*

- Developing URDF files from 3D CAD models in **Autodesk Fusion 360** for simulating an assistive robot in **NVIDIA Isaac Sim**.
- Setting up the **ZED 2i stereo depth camera** in simulation for real-time 3D perception and visualization in **RViz**.
- Integrating the robot with **ROS 2** for autonomous navigation and depth-based control using the **Nav2** stack.
- Published project insights on LinkedIn with an interactive demo link: [LinkedIn]

Hardware Prototyping for Robotics and AI Integration — *Arduino, ESP32, Jetson Nano, ZED Mini, 3D Printing*

- Built a **line-following robot** using laser-cut chassis, IR sensors, and Arduino-based motor control with PID tuning.
- Converted a toy car into an autonomous platform using **ESP32**, TB6612 motor driver, and **3D-printed mechanical mounts**.
- Mounted **Jetson Nano + ZED Mini** for real-time stereo depth and edge AI experiments.
- Designed, soldered, and debugged custom PCB circuits using voltage regulators, diodes, and logic ICs.

JetBot Autonomous Navigation System — *ROS 2, Nav2, Gazebo, SSH*

- Deployed the **ROS 2 + Nav2 stack** on NVIDIA JetBot for autonomous navigation and path following.
- Configured secure **SSH key-based access** for remote robot control and debugging.
- Executed full **teleoperation** using keyboard and joystick inputs in real and simulated Gazebo environments.
- Developed a **digital twin** environment linking real hardware with Gazebo for synchronized testing.

Machine Learning and Deep Learning Projects — *Python, scikit-learn, Jupyter*

- Built 10+ ML/DL projects implementing **gradient descent**, regression, and classification algorithms.
- Executed model training and evaluation on **Iris and MNIST** using accuracy, precision, and confusion matrices.
- Used **scikit-learn, pandas, matplotlib** to build reproducible ML pipelines and visualizations.
- Explored feature scaling, regularization, and overfitting prevention techniques.

Skills

- **Languages:** English (C1), German (A1)
- **Programming Languages:** Python (Advanced), C/C++ (Basic)
- **Robotics & Embedded Hardware:** Circuit design, soldering, embedded programming, PCB assembly, drones, 3D printing, CNC machining
- **Simulation Environments:** NVIDIA Isaac Sim, Gazebo, MATLAB, CARLA
- **Frameworks & Libraries:** ROS 2, SLAM Toolbox, Nav2, OpenCV, scikit-learn
- **Development Tools:** Git, Visual Studio Code, PyCharm, Qt Creator, Ubuntu
- **CAD & Mechanical Design:** Autodesk Fusion 360, SolidWorks
- **Robotics Concepts:** Depth cameras (ZED 2i, Intel RealSense), mechatronics, autonomous navigation, localization and mapping, teleoperation