

Raj Manoj Bag

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Robotics Engineer specializing in ROS2, real-time system integration & automation for industrial robotic platforms | Seeking immediate Contract/Fulltime roles | Open to relocation | Job-Seeker Visa

Education

Srh Berlin University, *MS in Automation, Robotics & 3D Manufacturing* | Berlin, Germany GPA: **2.2** Sep 2025
Savitribai Phule Pune University (skncoe), *B.E in Mechanical Engineering* | Pune, India CGPA: **9.41** Aug 2022

Finalists: Mobility/Medical Goes Additive, VDI Competition & Bachelor's Capstone Project in Mechanical Department
Core Engineering: Design of Machinery | Strength of Materials | Theory of Machines | Control Systems | Mechanical Design
Robotics : Robot Kinematics | Motion Planning | Optimization | Machine Learning | Perception | Autonomous Systems

Experience

Automation Technician | Industrial 3D Printing Lab, *SRH Berlin University* Jan 2025 - Sep 2025

- Commissioned and operated multiple **industrial robotic** and **additive** manufacturing systems.
- Analyzed machine and process data to diagnose faults and improve **system stability**.
- Performed **preventive maintenance**, functional validation and troubleshooting of electromechanical subsystems.
- Documented system behavior and operational procedures to support repeatable manufacturing workflows.

Trainee Engineer | Konstruktion & Anlagenkomponenten, *Eclate Industries* May 2019 - Jun 2019

- Operated **CNC** and **VMC** machining systems including part setup, machining supervision and quality inspection.
- Created and modified **G-code** and **M-code** programs for customized machining operations.
- Validated machining programs and optimized workpiece alignment to improve manufacturing precision.

Skills

Robotik IGUS ReBeL Cobot 6 DOF, FANUC, ABB, Turtlebot3
Programming Python, C/C++, CMake, Matlab, Git, LaTeX, I2C
Tools ROS 1/2, R-viz, Gazebo, URDF/Xacro, ros2_control, MoveIt, FEA, CFD, Arduino, TCP/IP, MQTT
Software Linux, Tensorflow, Pytorch, OpenCV, CATIA V5, Solidworks, Fusion360, Ansys
Certifications Matlab/Simulink | CATIA V5 | ROS2 Developer | SMSCP lvl-1, Siemens | Industrial Automation
Languages English (fluent) | Deutsche (B1-B2) | Marathi (Mother-tongue)

Master-Thesis

Real-Time ROS2 Control Architecture for Robotic Additive Manufacturing Jun 2025 - Sep 2025

- Designed and implemented a ROS2-based control architecture for an **igus ReBeL 6-DOF robotic arm** integrated with a custom **extrusion system**.
- Developed custom ROS2 controller **nodes** for trajectory streaming, communication with robot firmware & extruder.
- Implemented **buffering & synchronization** logic to mitigate **USB** latency between robot controller & extrusion system.
- Successfully produced validated robotic 3D printed components using coordinated motion and material deposition.

Projects

Smartphone-Controlled Robotic Arm Teleoperation via MQTT Dec 2024 - April 2025

- Developed teleoperation interface for an **igus 6-DOF robotic arm** using an MQTT smartphone control application.
- Implemented **joint-space** and task-space control algorithms in **C++** and **Python**. Validated **pick&place** operations.
- Designed **MQTT** communication pipeline for real-time command streaming between mobile device & robot.

LiDAR Based Obstacle Avoidance Simulation April 2025 - June 2025

- Implemented LiDAR based obstacle avoidance using **IR-SIM** integrating control logic & autonomous navigation.
- Developed real-time decision algorithm adjusting robot velocity & steering from LiDAR distance thresholds.
- Simulated autonomous **navigation** with dynamic obstacles demonstrating **sensor-driven** motion control.

Self-Collision Safe Robot Simulation ROS2 & Gazebo – Udemy April 2025 - June 2025

- Built a complete **URDF** robot model and simulation environment using ROS2, Gazebo and **RViz** tools.
- Integrated **ros2_control** framework enabling realistic **joint control**, **trajectory** execution and robot motion planning.
- Implemented self-collision detection algorithms ensuring safe robot motion within simulated robotic workspace.

Automated igus 6-DOF Robot System | Industrial Automation March 2025 - July 2025

- Commissioned and optimized an igus 6-DOF robotic system operating in an automated manufacturing workflow.
- Conducted system **test runs** and structured **failure diagnostics**.
- Tuned motion **parameters** and reference points to achieve **repeatable** robotic operations.

Publications

Automatic Pothole Repair Technology | *IJSRD Journal* April 2019

- Published research paper proposing an automated road maintenance concept for **pothole detection** and repair.
- Developed mechanical design concept and analysis for improving **road infrastructure maintenance efficiency**.