

Muhammad Maarij

Robotics Engineer | Industrial Automation & Intelligent Manufacturing

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PROFESSIONAL SUMMARY

Robotics and industrial automation engineer with five years of experience translating customer requirements into robust automated production and inspection systems. Hands-on experience with ABB, UR, and KUKA robot programming, ROS2, vision-based quality inspection, PLC-integrated test rigs, and on-site commissioning of industrial machinery. Delivered automation and inspection solutions for major manufacturing clients including Audi, Bosch and Valeo across automotive, food, packaging and metalworking applications. Most recently developed a cobot-driven Roboforming demonstrator, integrating robotic toolpath planning, 6D process control, force-feedback, simulation and experimental validation.

CORE COMPETENCIES

Robot Programming & Commissioning	Expertise in ROS2, URScript (UR) and Rapid (ABB), Familiarity with Karel & Roboguide, robotic path planning, on-site commissioning and ramp-up, cycle-time and quality optimization
Industrial Automation & Controls	PLC-based control, automated production and in-line inspection systems, sensor & multi-arm integration, technical handover and training
Vision Systems & AI Inspection	Industrial cameras, computer vision – Open CV, edge-AI deployment, food and packaging quality control
Mechanical Design & DFM	SolidWorks, Creo Parametric, Autodesk Inventor, Fusion 360, fixture and component design, rapid prototyping, FEM (ANSYS, Abaqus)
Simulation & Programming	Robot simulation / Moveit / Gazebo / RViz, Python, MATLAB, R, data analysis and ML applications for engineering

PROFESSIONAL EXPERIENCE

Robotics Engineer | Fraunhofer Innovation Platform

Enschede, Netherlands

Oct 2024 – Present

- Final phase of testing the developed **cobot-driven Roboforming demonstrator** for incremental sheet forming, targeting flexible, low-volume and modular production — directly relevant to high-mix automated manufacturing.
- Implementing robot toolpath generation with URScript and ROS2 (with customization in moveit | Pilz), 6D process control, force-controlled forming strategies and offline process planning for accurate, repeatable sheet-metal forming.
- Iteratively testing, simulating and optimizing robotic forming trials by tuning process parameters, toolpath strategies, control logic and robot motion to improve part quality and geometric accuracy.
- Translating product geometry into manufacturable robot trajectories using offline simulation and process-planning workflows (already successfully tested geometric designs, testing abstract designs now).
- Integrating mechanical design, robot programming, sensors, process feedback and experimental validation in a multidisciplinary engineering environment.

Technical Executive — Design & Inspection | XRAY-LAB GmbH & Co. KG

Sternenfels, Germany | Michigan, US

Feb 2022 – Jan 2024

- Designed and developed components, fixtures and integrated subsystems for **fully automated in-line inspection facilities for automotive and e-mobility** (Industry 4.0 standard) supplied to Audi, Bosch, Valeo US, and other manufacturing clients across Germany, Europe and the United States.
- Worked with ABB and KUKA robot systems, industrial vision systems and sensor stacks to develop robotic and automated inspection cells for production-quality workflows.

- Worked with the German, US and Slovakian companies to translate customer functional and technical requirements into manufacturable engineering solutions, coordinating with internal teams, suppliers and international clients throughout the project lifecycle.
- Managed technical team for testing, simulation, validation and on-floor optimization of inspection and production-related systems to improve repeatability, reliability and industrial readiness.
- Contributed to **xis.ai** (XRAY-LAB's AI venture) on **vision-based defect detection deployments, including a computer-vision setup for food and packaging inspection** — covering packaging defects, seal integrity, contamination and surface-quality checks for high-speed production lines.
- Used SolidWorks, Creo Parametric, Inventor and Fusion 360 with DFM principles, rapid prototyping and 3D printing to take concepts from CAD to working hardware.

Project Engineer – Design | [Resource Tech International Pvt Ltd]

Islamabad, Pakistan

Aug 2020 – Dec 2021

- Designed mechanical structures and load-frame assemblies for **engine test benches**, working from customer specifications through to manufacturable engineering drawings.
- Performed assembly, alignment and on-site commissioning of test benches at customer facilities, ensuring functional, performance and safety acceptance against specification.
- Worked with PLC-based control and instrumentation (National Instruments cRIO / LabVIEW Real-Time platforms) for sensor integration, signal conditioning and test sequence automation.
- Coordinated with mechanical, electrical and instrumentation teams to deliver complete, customer-ready test systems on schedule.

EDUCATION

EngD Project — Robotics University of Twente / Fraunhofer Innovation Platform Oct 2024 – Present

Professional doctorate project on cobot-driven Roboforming, robotic process control and flexible manufacturing.

M.Sc. Mechanical Engineering — Applied Mechanics & Design University of Engineering and Technology, Taxila, Pakistan 2019 – 2021

CGPA 3.92 / 4.00. *Thesis: Design and Experimental Investigation of a Four-Bar Dynamic Testing Machine.*

B.Sc. Mechanical Engineering University of Engineering and Technology, Taxila, Pakistan 2015 – 2019

PUBLICATIONS & PRESENTATIONS

- Mediterranean Machine Learning Summer School (Sep 2025) — Presented Roboforming poster on machine-learning-supported force-controlled manufacturing and robotic process optimization.
- *Design and structural analysis of non-pneumatic tyres for different polyurethane spoke structures* — peer-reviewed publication, 2022.
- *Design and Experimental Investigation of a Four-Bar Dynamic Testing Machine* — M.Sc. publication, 2022.

LANGUAGES

Urdu (native) • **English** (proficient, C1–C2) • **Dutch** (A2/B1)

HOBBIES

Reading & Writing – Novels & Editorials • Video Editing

REFERENCES

Dr. Jos Havinga — EngD Project Supervisor

University of Twente — supervises the EngD Robo-forming project | jos.havinga@utwente.nl

Eng. Muti Ur Rehman — Project Lead

Xray-Lab GmbH Co. & KG – Led key product development & design projects | muti.rehman@xray-lab.com