

SYED MUHAMMAD USMAN

Mechanical Design Engineer | London, United Kingdom (Open to Relocation)

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EXPERIENCE

Mechanical Designer

Sep 2022 – Present

Freelance (Self-Employed)

London, UK

- Developing robotics software and simulations using C++ and Python in ROS1, ROS2, Gazebo, and Isaac Sim.
- 3D-printed and rapid prototyped designs for various clients using SolidWorks, Siemens NX and Fusion 360.
- Conducting FEA, modal analysis, and other simulations in ANSYS Mechanical and SolidWorks Simulation.
- Designing and programming Discord chat bots for various clients using Python and Node.js.

Mechanical Design Engineer

Mar 2022 – Sep 2022

SignAxes Private Limited

Karachi, Pakistan

- Designed their VisiTec 800 machine, an automated blister pack inspection and rejection system for packaging quality control.
- DFM and DFA of pneumatic automation systems, sub-assemblies, and their components for packaging lines using SolidWorks.
- Production of detailed 2D CAD drawings using SolidWorks for the assembly and manufacturing of components.
- Tuning, calibration & integration of sensors, PLC control systems and other electronics into the mechanical design.
- Creating BOMs and sourcing sensors, actuators, valves, and precision mechanical parts for automation machinery.

Mechanical Design & CAE Engineer

Jan 2021 – Dec 2021

DICE Foundation

Karachi, Pakistan

- DFM, DFA, & CAE of a Twist Beam Suspension for an EV, using SolidWorks, ANSYS FEA and fatigue testing across 10+ load cases.
- Designed mounting brackets, interior trims, BIW, suspension, and powertrain components for an EV in SolidWorks.
- Developed packaging solution for steering, powertrain, and cooling components within the engine compartment of an EV.
- Vehicle frontal crash simulations using LS Dyna with pre-processing of the vehicle model in LS-Prepost and Altair Hypermesh.
- GD&T, tolerance stack-up analysis and CAE of components and assemblies to minimise deviations, enhancing part reliability.
- Led a team of three CAE engineers, managing FEA, modal, CFD, and topology optimisation for vehicle components in ANSYS.

CAD Instructor

Oct 2020 – Dec 2021

National Vocational and Technical Training Commission

Karachi, Pakistan

- Provided training in SolidWorks, Autodesk Inventor and Fusion 360 to high school students.

TECHNICAL SKILLS

Languages, Tools, Libraries: Java, Python, MATLAB, Simulink, C++, JavaScript, Git, Docker, GitHub, pandas, NumPy, PyTorch

Robotics: ROS1/ROS2, Gazebo, RoboDK, URDF, SLAM, Robot Kinematics, Robot Navigation, Sensor Fusion

Mechanical: DFM, DFA, GD&T, BS8888, DFMEA, FEA, Rapid Prototyping, 3D Printing, Injection Moulding, Sheet Metal Design

CAD/CAE Tools: SolidWorks, AutoCAD, ANSYS Mechanical, Autodesk Inventor, Fusion 360, Siemens NX, PTC Creo

PROJECTS

Design, Simulation & Real-Time Control of a Quadruped Robot

MSc. Research Project

- A quadruped robot designed in SolidWorks with real-time control architecture built in ROS & simulated in Gazebo, controlled using the `ros_control` package, with dynamic foothold positioning and leg trajectory algorithms based on Raibert's heuristics.

Design, Analysis & Lap-time Simulation of an Electric Go Kart

Undergraduate Final Year Project

- Designed a four-link pneumatic manipulator in SolidWorks, improving assembly efficiency for vehicle instrument panels.

Pneumatic Manipulator for Automotive Instrument Panel Assembly

Personal Project

- Designed a four-link pneumatic manipulator in SolidWorks, improving assembly efficiency for vehicle instrument panels.

EDUCATION

Queen Mary University of London

Sep 2022 – Sep 2023

Master of Science in Advanced Robotics

London, UK

DHA Suffa University

Aug 2016 – Jul 2020

Bachelor of Engineering in Mechanical Engineering

Karachi, Pakistan