Syed Muhammad Usman

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

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Experience

Mechanical/Robotics 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 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.

Product Design & CAD Instructor ***Oct 2020 – Dec 2021***

National Vocational and Technical Training Commission DSU *Karachi, Pakistan*

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

Technical Skills

Mechanical: DFM, DFA, GD&T, BS8888, DFMEA, Prototyping, Sheet Metal Design, CNC Programming, Injection Moulding
Robotics: ROS1/ROS2, Gazebo, RoboDK, URDF, SLAM, Robot Kinematics, Robot Navigation, Sensor Fusion, System Design
Languages, Tools, Libraries: Java, Python, MATLAB, Simulink, C++, JavaScript, Git, Docker, GitHub, pandas, NumPy, PyTorch
CAD/CAE Tools: SolidWorks, SolidWorks PDM, AutoCAD, ANSYS, 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

Master of Science in Advanced Robotics ***Sep 2022 – Sep 2023***

Queen Mary University of London *London, UK*

Bachelor of Engineering in Mechanical Engineering ***Aug 2016 – Jul 2020***

DHA Suffa University *Karachi, Pakistan*