

HEMAN SAINI

✉ sainiheman.94@gmail.com  [LinkedIn](#)  [Portfolio](#)  [Medium](#) ☎ +1 (951) 548-4124

SUMMARY

Mechanical Engineer with a Master's degree in Robotics Engineering and over three years of experience in designing, building, and testing advanced mechanical and robotic systems. Proficient in high-precision vehicle design, electro-mechanical integration, and the development of robotic hardware and software using ROS, C++, and Python. Adept at utilizing CAD tools for detailed design and analysis, performing FEA simulations, and applying robust manufacturing techniques for prototyping and production. Proven ability to lead multidisciplinary teams, execute research experiments, and integrate sensors, actuators, and microcontrollers to create innovative, high-performance solutions in both mechanical and robotics domains.

EDUCATION

Master's in Robotics, Automation, and Mechatronics

University of California, Riverside

GPA: 3.57/4.0

📅 09/2023 – 03/2025

Bachelor's in Mechanical Engineering

Maharshi Dayanand University, India

GPA: 7.8/10.0

📅 07/2017 – 07/2021

SKILLS

Robotics & Automation: Robot Kinematics & Dynamics, Motion Planning (A*, RRT, RRT*), Control Systems (PID, LQR, MPC), Sensor Fusion (Kalman Filter, EKF, UKF), Reinforcement Learning, SLAM, Path Planning, Robot Perception (Computer Vision, Deep Learning), ROS1/ROS2, Gazebo, MoveIt!

Mechanical Design & Analysis: CAD Modeling (SolidWorks, Siemens NX, CATIA), Geometric Dimensioning & Tolerancing (GD&T), Tolerance Stack-Up Analysis, Finite Element Analysis (ANSYS, Abaqus), CFD, DFMEA, DFM/DFA

High-Volume Manufacturing: CNC Machining, Die-Casting, Sheet Metal, Injection Molding, Overmolding, Ultrasonic Welding, Metrology, Statistical Process Control (SPC)

Electro-Mechanical Integration: Sensor & Actuator Integration, Microcontrollers (Arduino, STM32, ESP32), Experimental Design, Data Collection, Quality Control, Protocol Compliance

Software & Programming: C++, Python, MATLAB, OpenCV, PCL, TensorFlow, PyTorch, NumPy, SciPy, Git, Docker, Linux

Soft Skills: Problem-Solving, Adaptability, Leadership, Spatial Reasoning, Project Management, Cross-Functional Collaboration, Communication (Verbal & Written)

EXPERIENCE

Robotic Engineer Intern

Orangewood Labs (YC-18), India

📅 06/2024 – 08/2024

- Designed and implemented 2D trajectory planning algorithms for the AutoSpray Robot using ROS and C++, automating precise wall painting operations.
- Developed real-time online trajectory generation and motion planning solutions leveraging control theory, kinematic modeling, and dynamic obstacle avoidance.
- Integrated sensors and actuators to optimize robotic hardware performance, ensuring robust data collection and system adaptability in dynamic environments.

Design Engineer (R&D)

EFEV Charging Solutions Pvt Ltd., India

📅 12/2022 – 09/2023

- Led the design and development of electro-mechanical assemblies—including chassis, battery housings, and motor enclosures—for EV systems with production-readiness in mind.
- Conducted GD&T, tolerance analysis, and FEA (thermal, structural, and impact) to validate designs and ensure manufacturability.
- Collaborated with cross-functional teams (industrial designers, electrical engineers, and suppliers) to integrate sensor systems and electronic modules, improving overall system performance and reliability.

Mechanical Engineer (R&D)

Greenvolt Mobility LLP, India

📅 06/2021 – 11/2021

- Engineered a telescopic suspension system and developed a sensor-based data acquisition kit incorporating accelerometers and strain gauges for dynamic performance evaluation.
- Designed and executed experiments to analyze shock propagation and human impact response, ensuring data integrity and quality control.
- Assisted in the integration of mechanical and electronic components to enhance system reliability and meet research objectives.

Mechanical Engineer Trainee

Honda Two-Wheeler Pvt. Ltd., India

📅 06/2019 – 07/2019

- Supported manual assembly processes and analyzed engine workflows, identifying automation opportunities to improve efficiency in manufacturing operations.

PROJECTS

Teleoperation System & Explainable AI Lab (In Progress)

- Fine-tuned models for action recognition and anomaly detection in assembly processes, ensuring accurate identification of deviations.
- Designing experiments, managing data collection, and developing control algorithms to enhance remote robotic manipulation and system performance.

Depth-Based Object Localization and Manipulation with Kinova Arm

- Developed an integrated robotic system using ROS, MoveIt!, and a Kinova Gen3 Lite robotic arm paired with a Robotiq 2F-140 gripper for real-time object detection and pick-and-place operations.
- Designed and executed motion planning experiments and sensor fusion strategies to ensure precise and reliable robotic manipulation.

Perception and Visual Recognition for Robotic Applications

- Developed advanced CNN architectures and zero-shot learning models (using frameworks such as CLIP) to improve object recognition and depth estimation.
- Integrated these models into robotic perception pipelines, enhancing spatial alignment and 3D scene reconstruction for improved robotic interaction.

Kinematic & Dynamics of a 4-DOF Robotic Arm


- Designed and fabricated a 4-degree-of-freedom robotic arm using SolidWorks and rapid prototyping techniques.
- Implemented advanced kinematics algorithms in Python and MATLAB, integrating with Arduino and ROS to achieve precise real-time motion control.

Differential Design and Testing

- Optimized differential of L5-EVs and performed thermal simulations to enhance reliability in collaboration with Hero MotoCorp.

Teaching Experience

University of california, Riverside

 **06/2024 – 08/2024**

- Instructor – ME130: Kinematics and Dynamics of Machines: Delivered lectures and guided students through complex concepts of machine motion and dynamics.
- Teaching Assistant – ME175B: Engineering Design: Assisted with lab sessions and supported student projects, reinforcing principles of design and system integration.

RELEVANT COURSEWORK

• Machine Learning • Advanced Computer Vision • Machine Design • Thermodynamics • Manufacturing Processes • Linear Control Systems • Heat Transfer