

# HEMAN

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## SUMMARY

Robotics Engineer passionate about equipping machines with the ability to think, learn, and adapt through system integration, motion planning, and AI-driven perception systems. Proficient in designing, simulating, and implementing robotics applications that enhance automation and create intelligent systems. Committed to pushing the boundaries of robotics technology, transforming machines into autonomous entities capable of dynamic decision-making and cognitive functionality.

## EDUCATION

### University of California, Riverside

Sept 2023 – Dec 2024

*Master of Science in Robotics, Automation, and Mechatronics*

**Major:** Robotics    **Focus:** Artificial Intelligence and Perception    **GPA:** 3.45/4.0

**Relevant Coursework:** Advanced Computer Vision, Trustworthy Artificial Intelligence, Fundamentals of Deep Learning

### Maharshi Dayanand University, India

Jul 2017 – Jul 2021

*Bachelor of Technology in Mechanical Engineering*

## EXPERIENCE

### Orangewood Labs (YC-18), India

June 2024 – Aug 2024

*Robotic Software Engineer Intern (Remote)*

- Developed and implemented 2D trajectory planning algorithms for the AutoSpray Robot, utilizing **ROS** and **C++** to automate precise wall painting operations.
- Designed and optimized real-time online trajectory generation in C++, leveraging **control theory**, **kinematic modeling**, and **path planning algorithms** for smooth motion execution.
- Engineered advanced motion planning for 3D surfaces, incorporating **inverse kinematics**, **dynamic obstacle avoidance**, and **MoveIt!** to navigate complex geometries.
- Integrated path optimization techniques with **C++** and **ROS**, enhancing the robot's adaptability and performance in dynamic environments.

### EFEV Charging Solutions Pvt Ltd., Sonipat, India

Dec 2022 – Sept 2023

*Design Engineer (Research and Development Department)*

- Led the design and development** of three-wheeler EV projects, **Muver** and **Muver+**, ensuring production readiness and compliance with **ISO 9001/14001 standards**.
- Designed jigs and fixtures** to streamline assembly processes and improve overall manufacturing efficiency.
- Collaborated with the production team** to oversee the **design-to-production transition**, ensuring alignment with high-quality manufacturing practices.
- Managed EBOM and MBOM** using **ERP software**, optimizing procurement workflows and maintaining efficient production processes.
- Performed FEA using ANSYS** for structural integrity and developed detailed **3D models using SolidWorks and CATIA**, focusing on cost-effective material selection for new product development.

### Moog Advance Systems Pvt. Ltd., Gurugram, India

Mar 2022 – Nov 2022

*Mechanical Design Engineer (Research and Development Department)*

- Designed components for armored vehicles, steering assemblies, and military weapons, ensuring compliance with rigorous specifications.
- Created detailed production drawings using **AutoCAD** and **SolidWorks**.

### Greenvolt Mobility LLP, Ahmedabad, India

June 2021 – Nov 2021

*Mechanical Engineer Intern (Research and Development Department)*

- Designed a data acquisition device for capturing driving scenarios on Indian roads, essential for training autonomous vehicle algorithms, using **C++** and **Python** for data processing.
- Developed a testing system to evaluate motor, controller, and battery pack performance, showcasing expertise in system integration, testing, and performance evaluation with **C++**.
- Contributed to the design of a telescopic suspension system for two-wheelers, focusing on **mechanical design**, **ergonomics**, and **vehicle dynamics**.

### Honda Two-Wheeler Pvt. Ltd., Manesar, India

June 2019 – July 2019

*Trainee*

- Inspected wiring harnesses in **Honda Shine (150cc)**, **Honda CBR150**, and **Hornet** models, ensuring compliance with quality standards.
- Assisted in the **manual assembly** of the **African Twin**, gaining hands-on experience in component integration and assembly processes.
- Analyzed the **engine assembly workflow** for **Activa** and **Honda Shine (150cc)**, identifying opportunities for **automation** to streamline repetitive tasks and improve efficiency.

## SKILLS

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**Programming:** Python, C/C++, MATLAB, HTML, CSS

**Robotics Simulation:** Robot Operating System (ROS1, ROS2), Gazebo, MoveIt!, Simultaneous Localization and Mapping (SLAM), Point Cloud Library (PCL), Carla, Mujoco

**Software Tools:** SolidWorks (Certified SolidWorks Associate - CSWA), AutoCAD, CATIA, Creo, ANSYS

**Operating Systems:** Linux, Windows, Raspberry Pi

**Development Tools:** Docker, Git, Amazon Web Services (AWS), Jenkins

**Machining:** Welding, Computer Numerical Control (CNC), Lathe Machine, Sheet Metal Fabrication, 3D Printing

**Design Analysis:** Design for Assembly (DFA), Design for Manufacturing (DFM), Geometric Dimensioning and Tolerancing (GD&T)

## PROJECTS

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### Teleoperation (Robotic and Explainable AI Lab - In Progress)

*Advisor: Professor Mingyu Cai*

- **Lead Robotics Lab:** Directed lab operations and coordinated a multidisciplinary team to advance research and development in teleoperation systems.
- **Enhanced Action Recognition & System Integration:** Developed and fine-tuned **MAML models** utilizing **TSM features** and **RGB data** to enhance action recognition accuracy. Implemented **imitation learning algorithms** on the **Aloha v2 kit**, while integrating **force sensors** into **CAD designs**, resulting in improved robot autonomy and functionality.

### Sensor Development (RAMS LAB - In Progress)

*Advisor: Professor Jun Sheng*

- Conducting research to develop sensors for **soft robots**, focusing on measuring resistance to length changes.

### Depth-Based Object Localization and Manipulation with a Kinova Arm

- Developed an integrated system using **ROS**, **MoveIt!**, and a Kinova Gen3 Lite robotic arm with a **Robotiq 2F-140 gripper** for real-time object detection via **Darknet ROS** and 3D localization with **point cloud processing**. Implemented a two-step motion planning for pick-and-place operations. [Github Link](#) || [Medium](#)

### Kinematic & Dynamics of Kinova\_gen3

- Designed and fabricated a 4-degree-of-freedom robotic arm using **SolidWorks** and 3D printing for rapid prototyping.
- Implemented advanced **kinematics algorithms** in **Python** and **MATLAB** for precise motion control, integrated with **Arduino** and **ROS** for real-time interfacing. [Github Link](#) || [Medium](#)

### Quadruped Robot (In Progress)

- Designed and developed a 4-legged robot for dynamic movement using **SolidWorks**. Implemented **Gazebo** and **ROS** for simulation and control.

### Real-time Driver Behavior Detection

- Developed a real-time driver attentiveness detection system using **Python**, **OpenCV**, and deep neural networks for immediate safety interventions. [Github Link](#)
- Engineered algorithms for real-time data processing and **computer vision analysis** to enhance driver focus and safety.

### Fabrication of FDM 3D Printer

- Optimized **thermoplastic filament production** by blending materials with additives and nanofibers for enhanced mechanical properties, applying precise process parameters for efficiency.

## EXTRACURRICULAR ACTIVITIES

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- **Hackathon Champion:** 1st place at CipherSchools Hackathon, August 2020
- **Science Competition Winner:** 2nd place, Department of Environment of Science
- **Athletics:** 1st in 2017 & 3rd in 2019 Inter-College Badminton Championships