HEMAN

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SUMMARY

Passionate about robot design, motion planning, and system integration for efficient robotic operations.

EDUCATION

University of California, Riverside **Sept 2023 – Dec 2024**
M.S. in Robotics, Automation, and Mechatronics **GPA: 3.45/4.0**
Maharshi Dayanand University, India **Jul 2017 – Jul 2021**
B.Tech in Mechanical Engineering **GPA: 7.8/10.0**

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, 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**.
- 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** 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.
- 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

Relevant Coursework: Advanced Computer Vision, Trustworthy Artificial Intelligence, Linear control system
Programming: Python, C/C++, MATLAB, HTML, CSS, SQL
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

Fabrication: 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), FEA, Rapid Prototype, Bill of material

TEACHING

University of California, Riverside **Oct 2024 – Dec 2024**
Teaching Assistant, ME130 & ME175B

- **Instructor**: *Kinematics and Dynamics of Machines* – Delivered lectures and guided students through complex concepts of machine motion and dynamics.
- **Teaching Assistant**: *Engineering Design* – Assisted with lectures and supported students during lab sessions.

PROJECTS

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.

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

- 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.

EXTRACURRICULAR ACTIVITIES

- **Southern California Robotics Symposium**: Volunteered and promoted collaboration among robotics enthusiasts.
- **Hackathon Champion**: Secured 1st place at CipherSchools Hackathon, 2020
- **Science Competition Winner**: Secured 2nd place at the competition held at Maharshi Dayanand University
- **Athletics**: Secured 1st place in 2017 & 3rd place in 2019 at Inter-College Badminton Championships