Jay Ashwinkumar Ajudiya

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PROFESSIONAL SUMMARY

Mechanical Engineer with a first principles approach to solving complex engineering problems breaking challenges down to their core physics to address root causes, not just symptoms. Skilled in FEA, CFD, and DOE for optimizing high performance, efficient designs across EV, automotive, and manufacturing systems. Experienced in translating analytical insights into practical, manufacturable solutions, improving product performance, reducing costs, and streamlining processes. Adept at collaborating across design, process, and manufacturing teams to deliver innovative, reliable, and scalable engineering solutions.

CORE SKILLS

CAD Tools: CATIA V5, SolidWorks, ANSYS, AutoCAD

Manufacturing Methods: 3D Printing, CNC, Additive Manufacturing, Composites Manufacturing, Fabrication

Design and Engineering: 3D Modeling, GD&T, Computational Fluid Dynamics (CFD), Design for Manufacturing (DFM), Design for Assembly (DFA), Computer aided Engineering (CAE), Finite Element Analysis (FEA), Prototyping, Topology Optimization, Generative Design

Programming: MATLAB, Minitab

CERTIFICATION

Certified SolidWorks Associate (Dassault system)

Electric Cars: Technology (edX)

Agile Innovation and Problem-Solving Skills (edX)

EDUCATION

California State University, Long Beach   **Aug 2022 - May 2025**

*Master of Science in **Mechanical Engineering***

Concentration in Design and Manufacturing

Coursework: *Additive Manufacturing, Composites Manufacturing, Design of Experiments, Controls of Dynamic System*

Uka Tarsadia University, Bardoli, Gujarat, India   **Aug 2018 – May 2022**

*Bachelor of technology in **Automobile Engineering***

Coursework: *Automotive Materials, Vehicle Dynamics, Automotive Transmission, Automobile Chassis Design, Automotive HVAC, Automotive Product Life Cycle Management, Automotive Aerodynamics, Automotive NVH*

PROFESSIONAL EXPERIENCE

Mechanical Design / Manufacturing Engineer   **Jan 2022 – Jun 2022**

Hero Electric | Motor Vehicle Manufacturing

- Engineered modular chassis designs using **CATIA V5 and** performed **Finite Element Analysis** in **Ansys Workbench**, validating structural robustness and optimizing performance.
- Executed **Topology Optimization** in **Ansys Mechanical** to create lightweight Electric Vehicle parts resulting in **20% more lightweight Electric Vehicle**.
- Applied first principles of thermodynamics to optimize battery cooling, resulting in 40% more heat dissipation.
- Implemented **GD&T** principles in the design and validation of Electric Vehicle components, ensuring precise manufacturing and assembly, resulting in less production errors.
- Utilized **CATIA V5 Sheet Metal** tools to design battery enclosures, footrest panels, side covers, and component mounting brackets.

Process / Manufacturing Engineer | Co-op   **Jan 2021 - Dec 2021**

Esteem Auto | Automobile and Industrial Parts Manufacturer

- Developed and designed **400+** parametric 3D models of engine components such as cylinder liners, engine blocks, valve guides, and sleeves in **SolidWorks**, integrating automated **Bill of Materials (BOM)** to streamline manufacturing processes.

- Optimized complex assembly designs of induction-hardened liners and centrifugal castings through **Design for Manufacturing (DFM)** and **Design for Assembly (DFA)** principles, enhancing manufacturability and reducing assembly time by **15%**.
- Performed **Finite Element Analysis** in **Ansys** to evaluate component durability, and stress distribution led to structural integrity.
- Built precise **shop-floor drawings** and Assessed **tolerance stack-up analysis** to optimize component fit and functionality. This contributed to minimizing **post-manufacture errors by 12%,** improving overall assembly efficiency and product quality.

Manufacturing Engineer Intern   Jun 2020- Aug 2020
Esteem Auto | Automobile and Industrial Parts Manufacturer
- Generated **2D and 3D CAD drawings** using **Geometric Dimensioning and Tolerancing (GD&T)** principles in **SolidWorks** for **prototype** engine blocks and cylinder sleeves, ensuring manufacturability through collaboration with fabrication teams.
- Produced precise **G-code** using **SolidWorks CAM** for mass Production of cylinder lines and casting components, ensuring optimized **toolpath** and machining process.
- Conducted **root cause analysis** to predict and resolve machining and assembly issues, boosting operational efficiency by **18%.**
- Systematized the **Product database** by creating a new organizational structure in **ENOVIA**, enabling the team to locate and retrieve design documentation in **10 seconds** or less.

Mechanical Assembly and Testing Intern   May 2019 – Jul 2019
Atul Auto | Three-wheel vehicle manufacturer
- Coordinated with integration team in assembling and aligning mechanical components for smooth vehicle performance and functionality.
- Took initiative in identifying process bottlenecks and suggested improvements, maximizing workflow agility by 10%.
- Conducted testing and validation of vehicle systems, improving reliability and reducing production errors by 15%.

RELEVANT PROJECT

Parametric Analysis of CPU Cooling Systems Using Heat Pipes   Jan 2024 - May 2024
- Designed 3D models of the CPU, heat sinks, and heat pipe configurations in **CATIA V5**, ensuring accurate geometry and boundary interfaces for simulation.
- Executed detailed **CFD simulations** in **ANSYS Fluen**t to study airflow, temperature distribution, and heat transfer across multiple operating conditions.
- Performed parametric analysis by varying the number, orientation, and material of heat pipes, optimizing thermal conductivity, and surface contact.
- Achieved a **20 °C reductio**n in CPU temperature, significantly improving thermal performance and preventing thermal throttling.

Topology Optimization of a Robotic Arm   Aug 2023 - Dec 2023
- Created the detailed 3D CAD model of the robotic arm, base and joints in **CATIA V5**, incorporating manufacturable geometry for optimization.
- Applied **ANSYS** to conduct **topology optimization** and leveraged **Ansys Discovery** for **generative design**, targeting minimum material usage while maintaining structural integrity.
- Achieved a **70%** volume reduction and improved stiffness-to-weight ratio by identifying and removing non-load-bearing regions.
- Conducted static structural analysis under multiple load cases to evaluate stress concentration and deformation.
- Ensured the final design met all strength requirements with a **factor of safety ≥ 2**, validating readiness for lightweight robotic applications.

Hybrid Composite   Sep 2022 – Dec 2022
- Analyzed 30+ research papers on hybrid composites identified up to **110%** tensile strength gain using graphene-jute reinforcement.
- Evaluated bio-composite structures; found **37× stiffness** increases with only **6% weight** gain in honeycomb-core sandwich panels.