Jimit Vyas

Senior Virtual Analyst - FEA | Automation & Scripting Specialist | CAE–AI Integration

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Professional Summary

Engineering professional with 10+ years of experience in Structural FEA, CAE Process Automation, and AI–CAE Integration. Adept at leveraging Python, TCL, and Generative AI (LLMs) to streamline workflows and drive data driven insights. Proven expertise in developing Surrogate Models (ROM) and deploying solutions to accelerate validation in Automotive, Off-Highway and Mining industries. Skilled in cross-functional collaboration and team leadership, transforming traditional simulation teams into efficient, technically sound units through standardization and mentoring.

Core Competencies

- **AI-Driven CAE Strategy:** ML + Reduced Order Models (ROM)
- **Generative AI for Engineering:** LLM + RAG (Retrieval-Augmented Generation)
- **CAE Automation & Integration:** Python, Tcl, FastAPI/REST
- **Structural Integrity & Durability:** Static/Dynamic FEA, Fatigue, DVPs
- **Design Optimization:** Topology, Parametric, DoE + Surrogates
- **Multi-Physics / Dynamics:** MBD, DEM (Discrete Element Method)
- **Cross-Functional Collaboration:** Agile delivery, Stakeholder management
- **Technical Leadership:** Mentoring, Cross-Functional Delivery
- **Technical Documentation & Presentations:** Knowledge sharing & Best practices

Professional Experience

Deputy Manager | Sr. Virtual Analyst

TVS Motor Company | Norton Motorcycles, *Mar 2024 – Present*

- Lead structural FEA for Super Premium NPD projects, driving simulation-based durability/performance validation and correlating results with physical tests through cross-functional DVP execution.
- **AI-Driven Workflow Automation:**
  - Developed a RAG based knowledge system (FastAPI + Ollama) to retrieve historical DVPs and simulation insights, significantly reducing engineering query time.
  - Architected Python middleware integrating LLMs with CAE pre-processors, enabling natural-language control of meshing, loadcase setup, post-processing, and reporting.
- Identify workflow bottlenecks and introduce Reduced Order Models (ROM) where applicable to improve simulation efficiency and throughput.
- **Standardization:** Enforced standardized CAE workflows via custom Python/TCL tools, creating a structured data pipeline, essential for future Machine Learning model training.
- Deliver automation led process improvements achieving >60% reduction in CAE turnaround time
- Mentor junior engineers on simulation, scripting, and validation best practices.

Senior Software Engineer

InfoVision | VCollab, *May 2022 – Mar 2024*

- Developed Python-based automation solutions with VCollab APIs to generate 3D digital CAE reports, cutting manual post-processing effort.
- Built custom tools and interfaces, delivering client-specific reporting workflows and functionality.
- Integrated DoE-driven AI/ML techniques to accelerate post-processing and extract insights from large simulation datasets.

- Standardized batch workflows to improve reporting speed, accuracy, and repeatability.
- Partnered with product managers, sales, and customers to implement tailored automation solutions that boosted user productivity.

Structural Analyst

Metso:Outotec, *Aug 2020 – May 2022*

- Led a team of four engineers delivering structural simulations for crushers, screens, hoppers, and conveyors.
- Performed integrated analytical, MBD, DEM, and FEA studies for load and operational analysis.
- Correlated FEA/MBD results with physical test data to validate CAE methodologies for wheel/track-mounted systems.
- Automated repetitive ANSYS WB tasks with Python scripting and developed scripts to post-process and visualize test data obtained from accelerometers and strain gauges.

CAE Engineer

L&T Technology Services, *Dec 2017 – Jun 2020*

- Executed FEA simulations for wreckers, MEWPs, and tipper/mining trucks.
- Developed load cases and simulation methodologies aligned to product operating conditions.
- Developed and implemented a CGAP-based contact simplification technique, reducing nonlinear solution time by 90% for simulation-driven design iterations.
- Automated meshing and model setup via TCL in HyperMesh, improving efficiency and consistency.

CAE Engineer / Research Engineer

Freelancer, *Aug 2015 – Nov 2017*

- Designed a 3-DOF robotic arm (30 kg payload, 1 m reach) for packaging applications.
- Developed a 3-axis force sensor using strain gauges for robotic joint feedback.
- Analyzed natural fibre composite beams via analytical modeling and physical testing.
- Completed multiple simulation and prototyping projects, establishing foundational CAE and validation skills.

Education

M.Tech – Machine Design

Birla Vishvakarma Mahavidyalaya, Gujarat

B.E. – Mechanical Engineering

Gujarat Technological University, Gujarat

Technical Skills

- **AI/ML & Data Science:** LLM integration, Scikit-learn, TensorFlow, surrogate modeling, DoE-driven ML, feature engineering.
- **Software Development & Deployment:** Python, FastAPI, REST APIs, Git, Docker, SQL, MLOps fundamentals.
- **Simulation & FEA Tools:** Altair HyperWorks, ANSYS Workbench, Abaqus, MSC Nastran, MSC Adams, Creo Simulate.
- **CAE Automation & Scripting:** HyperWorks Tcl/Python API, ANSYS ACT/APDL, VCollab Python API, batch processing & workflow automation.
- **Simulation Domains:** Structural FEA, MBD, DEM (Discrete Element Method), structural optimization, DoE.
- **CAD & PLM:** Creo + Windchill, NX + Teamcenter.

Certifications & Technical Trainings

- **LinkedIn Learning:** Python Essential Training, Advanced Python, Python for Engineers and Scientists, Automation, OOP, Python Code Challenges
- **SoloLearn:** Python Core, Python for Data Science
- **Hands-On Tool Training:** ANSYS, SpaceClaim, Simufact
- **DoE & Simulation Process:** Parametric Modeling & DoE in ANSYS Workbench
- **Others:** VAVE Training, Taguchi Methods Training, Six Sigma Training
- **Additional Academic Training:** Robotics & Control, GD&T & Machining Parameters, FEA/CFD Fundamentals