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Onkar Salunkhe

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Summary

I am a Masters student in Mechanical Engineering with experience in CAD/CAE in automobile domain and Software Product Development. I am an experienced professional with strong problem solving and analytical skills and effective communication skills. Actively seeking Full-time opportunities from August 2021. **Open for relocation. [F1 VISA]**

Education

Michigan Technological University — Houghton, Michigan
Master of Science in Mechanical Engineering: Design | CAE | FEA | Machine Learning | ***GPA: 3.82/4.0*** — *August 2019 - July 2021*

Vishwakarma Institute of Technology (VIT), Pune — Pune, India
Bachelor of Technology in Mechanical Engineering| ***CGPA: 9.09/10*** — *July 2014 - May 2018*
Honors (Equivalent to Minors): Automobile Engineering| ***CGPA: 9.40/10*** — *July 2016 - May 2018*

Skills

- **Software**: ABAQUS, ANSYS, ADAMS, Arduino, AutoCAD, Autodesk FUSION 360, CATIA, COMSOL, Creo/ProE, Cura, HYPERMESH, Inventor, LS-DYNA, MS Office products, Optistruct, Radioss, Siemens NX, SolidWorks, TOSCA, 3DEXPERIENCE.
- **Programming Languages**: C++ (STL), FORTRAN 77, FlexPDE, Linux, MATLAB, Mathematica, Python.
- **Libraries and Enviornments**: Numpy, Keras, Pandas, Scikit-Learn, Multi-threading, Microsoft Visual Studio, Linux, Windows

Experience

Software Development Meshing Intern | ANSYS | Cannonsburg, PA, USA — January 2021 - **Present**

- Developed an automation script in Python which will convert all input '.aedt' files to '.aedtz' files using Ansys EDT.
- Enhanced existing Python Test-suite runner for converting '.aedtz' files to Mesh input files. Improved the code for exception handling, custom user inputs and User Interface for real-time commands and progress tracking.
- Introduced a function to run the process on user defined Maximum Allowed Memory with Multi-threading.
- Developed Mesh Visualisation UI using Object-Oriented Programming (OOPs) and Data Structures in EBU Prime app for Electromagnetic Finite Element Analysis (FEA) with STL libraries in C++ 11 and Python.
- Recursive functions and Defensive programming techniques are used to develop the code for more robustness and reusability.

R&D Development Associate Engineer | Dassault Systèmes | Pune, India — June 2018 - August 2019

- Assisted Senior developers in debugging and developing code and migrating CAD from CATIA V4 to V5 and above levels.
- Developed a Finite Element Solver in FORTRAN77 using Numerical Linear Algebra and Matrix Algebra.
- Promoted the source code changes in C++ and Automated Test cases and Regression Testing for customers like Boeing on CATIA V4 and 3DEXPERIENCE cloud platform for Software quality assurance and Documented the findings.
- Volunteered for 3DEXPERIENCE Innovation Lab in Race Car event and managed the event execution.

Engineering Intern | John Deere | Pune, India — June 2017 - July 2017

- Designed and manufactured a lightweight tool to assemble a stiff spring in brake pedal with ergonomic considerations.
- Analysed the processes and suggested corrective actions using Poka-yoke (Fool-proofing) and Six-Sigma (6σ) to improve the process quality for multiple variants of Tractors which are exporting to Europe.
- Root cause analysis of steering wheel cut marks and suggested the process improvement on the assembly line.

Research Experience

Graduate Student Researcher | Michigan Technological University | Michigan, USA — September 2019 - **Present**

- Design and FEA of Carbon Nanotubes actuators for bending the Guide-wires for Biomedical applications.
- Designed and Optimised a bending actuator using geometrical combination of Electromechanical linear actuators with Mathematical Modeling and FEA. Bio-compatible nanomaterials are used wchich are useful in Cardiovascular treatments.
- Using High Performance Computing (HPC) and Nano-material modeling for simulating multi-element FEA model.
- Solved the Analytical equation and got the optimal values for the equation using MATLAB solver.
- *Advisor:* Dr Gregory Odegard and Dr Parisa Abadi

Research Intern | Indian Institute of Technology (IIT) Bombay | Mumbai, India — January 2018 - June 2018

- Finite Element Analysis (FEA) of Bulk Metallic Glass (BMG) composites.| Poster Presentation.
- Numerically investigated mechanical behavior of BMG through FEA using ABAQUS with parallel computing.
- User material library (UMAT) is used for Mathematical Modeling of Plasticity of BMG Material and developed MATLAB codes to perturb the values of Material parameters through the elements of 3D FE Mesh.
- 2 % strain plasticity enhancement is achieved with 5 % thickness of the copper coating on the monolithic BMG matrix.
- *Advisor:* Dr Parag Tandaiya

PROJECTS

- **Development of algorithm for removing duplicate points in the point cloud** *September 2020 - December 2020*
  - The objective of the algorithm is to remove duplicate points in the given point cloud with a specified tolerance of 10^{-6} units.
  - A Computational Geometry algorithm for points in 2D is developed with $O(n^2)$ time complexity and extended it to 3D.
  - A new algorithm is developed with lower time complexity of $O(nlog(n))$
- **Reliability Analysis of FEA simulations with Implementation of Machine Learning** *September 2019 - December 2019*
  - Performed a reliability analysis of FEA using FORM and Kriging (ML) method on MATLAB.
  - Automated the FEA simulations of 10 bar 2D planar truss on ABAQUS 6.13 using Python Macros for Statistical data inputs.
  - Implemented Machine Learning method with adaptive sampling for Reliability-Based Design Optimization (RBDO).
- **2D Finite Difference Modeling of Linear Elastic material for bending of Plate** *January 2020 - April 2020*
  - Modeled a 2D plate on Abaqus and Numerically solved the plate bending equations using matrix algebra.
  - Compared Solver time for computations with Finite Elements in Abaqus and Finite Difference in Mathematica.
- **Design and FEA of Automotive Differential case (CAE Durability)** *September 2019 - December 2019*
  - Developed and optimized the design in CAD and 2D Drawing with tolerance is created for the production considering Design for Manufacturing Assembly (DFMA).
  - Worked on the FEA analysis on SIMULIA Abaqus with ductile iron material for desired fatigue life.
  - Performed Topology optimization for mass reduction using Altair Optistruct to generate improved design.
- **Finite Element Implementation of damage model: Application to Automobile Gear** *September 2019 - December 2019*
  - Implemented Explicit/Dynamic simulation for dynamic gear rotation with Ductile damage model using Abaqus 6.13.
  - Achieved the stability of Finite Element Simulation using mesh convergence study.
  - Predicted the failure at gear tooth root and compared with existing experimental results.
- **Finite Element Modeling for Hyper-velocity impact of Aluminium sphere on a plate** *May 2018 - June 2018*
  - Simulated a hyper-velocity crash model of an aluminum sphere projecting on a plate at the velocity of 6.8 km/sec.
  - Performed Explicit/Dynamic simulation with Smoothed Particle Hydrodynamics (SPH) to model large deformations.
- **Design, simulation and prototyping of Theo Jansen's mechanism** *January 2016 - June 2016*
  - The project is inspired by the kinematics of walking mechanisms from Biomimetics. It aims to design and manufacture the Theo Jansen's Walking robot.
  - The project aimed at learning the 3D CAD modeling, path tracing, and velocity analysis in Solidworks.
  - The velocity and the height of the step is optimized by changing lengths of the links.

PUBLICATION

Onkar Salunkhe, Neeraj Vijantkar, and Santosh Joshi, Selection of tires based on cornering stiffness for formula student car *International Journal for Research in Applied Science and Engineering Technology Volume 5 Issue 6 September pp.2056-2063, 2017.*

SCHOLASTIC ACHIEVEMENTS

- **5 Gold Medals**: Science and Mathematics Olympiad by Science Olympiad foundation as *school topper*.
- **Best student award**: by *District Council of India* for successive achievements in scholarship examinations.
- **Topper's list by State**: Scoring 100% in 10th standard in *Secondary School Certificate* among 1 million students.
- **Topper**: Among top 5 students in *Ready Engineers program* by Tata Technologies Pvt. Ltd.
- **3rd rank**: Online course on NPTEL Mechanics of Solids by *Indian Institute of Technology, Kanpur*.

LEADERSHIP AND EXTRACURRICULAR EXPERIENCE

- **President of *Ekasutram*** | VIT's Mathematics club | Student organisation | VIT Pune *April 2016 - May 2017*
  - Encouraged students to discuss engineering problems with pure mathematical ideas and arranged Maths events.
  - Delivered guest lectures to mathematics enthusiasts in different institutions.
- **Senior steering design and CAE Engineer**| Veloce Racing | Formula Student Team | VIT Pune *August 2015 - December 2016*
  - Managed the team of design and manufacturing of the steering sub-system for formula student vehicle.
  - Headed the CAE department in the team to perform FEA and CFD simulations of crucial parts of the vehicle.

INTERESTS

- Badminton | Football | Music | Piano.