LALIT GHULE

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EDUCATION

Master of Science in Mechanical Engineering – Research, GPA: 3.96/4   **May 2021**
Carnegie Mellon University
   Thesis : Applied AI in Manufacturing and Designing
   Advisor: Professor Amir Barati

Bachelor of Technology in Mechanical Engineering, GPA: 9.2/10   **May 2017**
Vishwakarma Institute of Technology, Pune, India

RESEARCH INTERESTS

Finite Element Methods, PDE modeling using Neural Networks, Topology and design optimization, Bayesian Machine Learning, Computer Vision, NLP

RESEARCH EXPERIENCE

Graduate Research Assistant   **Aug 2019 – May 2021**
Department of Mechanical Engineering, Carnegie Mellon University
- Developed a custom image processing pipeline for 3D metal printing splatter detection
- Trained an AI model for qualitative and quantitative inspection of 3D metal printing process using images
- Designed and coded up a 'No-code' AI library in python allowing non-technical users to train custom model
- Formulated a surrogate model using deep learning for transient fluid analysis
- Developed a custom CNN model for industrial bearing fault classification and achieved 99% accuracy

Undergraduate Research Fellow   **Jun 2016 – Aug 2016**
CSIR- Central Mechanical Engineering Research Institute
- Got Summer Research Fellowship that is offered to only 50 students across India
- Worked on the project involving designing and manufacturing of lower limb exoskeletons
- Designed and analyzed various designs using CAD software and ANSYS for simulation

Reviewer   **Oct 2022 - Present**
Neurips: Machine Learning and the Physical Sciences
- Served as a reviewer for Machine learning applications in Physical Sciences related paper submissions
- Reviewed over 6 high-impact publications

ICML: Synergy of Scientific and Machine Learning Modeling
- Reviewed papers related to Turbulence modeling, Heat transfer modeling and Offline learning

TEACHING EXPERIENCE

Teaching Assistant, 24789: Deep Learning for Engineers   **Jan 2021 – May 2021**
College of Engineering, Carnegie Mellon University
- Prepared lectures and class activities focusing on State-of-the-art deep learning algorithm and Linear Algebra for graduate students
- Created and graded course assessments to ensure students understood material and stayed on track.

Teaching Assistant, 24787: AI and Machine Learning for Engineers   **Aug 2020 - Dec 2020**
College of Engineering, Carnegie Mellon University
- Explained challenging concepts using planned tutorials, and targeted discussions for 50+ graduate students.
- Conducted TA sessions for students, created and graded course assignments, quizzes and exams

HONORS AND AWARDS

- Dean's list: All four semesters during the graduate degree
- Fullbright scholarship to pursue a graduate degree from the Government of Maharashtra, India

PUBLICATIONS

- A Discrete–Continuous Curriculum Learning (DCCL) Framework for Stable Long-Horizon PDE Surrogates, Neurips: ML4PS 2025
- A composable machine-learning approach for steady-state simulations on high-resolution grids, Neurips Main Conference 2022
- NLP Inspired Training Mechanics For Modeling Transient Dynamics, Neurips: ML4PS 2022
- FaultNet: A Deep Convolutional Neural Network for bearing fault classification, IEEE Access 2021
- ManufacturingNet: A Machine Learning tool for engineers, Neurips: ML4Eng 2020

PATENTS

- Handling Unstructured Representations in Machine-Learning Based Solver for Coupled Differential Equations (Patent filed in 2023)

CONFERENCE PRESENTATIONS

ORAL PRESENTATIONS
NLP Inspired Training Mechanics For Modeling Transient Dynamics, USACM: MFEM 2022, Berkeley, CA

PROFESSIONAL EXPERIENCE

Senior R&D Engineer   **Jul 2021 - Present**
Ansys Inc, Canonsburg, PA
- Developing Bayesian Learning and Machine Learning algorithm for optimizing physical system parameters for TwinAI software product line
- Devising deep learning models for learning dynamical systems and partial differential equations for SimAI product helping in reducing simulation time
- Supporting different business units' custom Machine Learning workflows to integrate Ansys AI+ strategy into different products

Machine Learning Intern   **Jun 2020 - Aug 2020**
Innovative Numerics LLC, Cincinnati, OH
- Trained Deep Learning model for non-linear material modeling to obtain material coefficients using experimental data
- Solved multi-constraints geometry optimization by utilizing Reinforcement Learning and reduced initial design time
- Formulated a custom reward function and implemented a Deep Q Network (DQN) for finding material coefficients

PROGRAMMIG AND TECHNICAL SKILLS

Python, Julia, PyTorch, Keras, TensorFlow, CUDA, OpenCV, AWS, Azure, Docker, Git, Ansys workbench