

Vaibhav Sahu

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EDUCATION

University of Pennsylvania

Master of Science in Scientific Computing - GPA: 3.76/4

Philadelphia, PA

Aug. 2022 – May 2024

Indian Institute of Science

Bachelor of Science in Physics - GPA: 8.2/10 -

Bangalore, India

Aug. 2016 – June 2020

EXPERIENCE

Graduate Research Assistant

University of Pennsylvania

May 2023 – Present

Philadelphia, PA

- Measured the Performance of Neural Network Potentials at predicting the Energy Landscape of Materials
- Trained Symmetry Preserving Neural Network Potentials on the DeePMD framework for Copper systems
- Ran 1000s of Molecular Dynamics simulations on LAMMPS using high capacity H100 and A100 GPUs on the cloud for analyzing the Performance of Neural Network Potentials

Research Engineer

Simyog Technology Pvt. Ltd.

April 2021 – July 2022

Bangalore, India

- Achieved a 22% speedup by optimizing the Matrix-Vector Product (detected bottleneck) by parallelizing it to speed up computational solvers to perform EMI/EMC simulations of IC boards
- Implemented experiments on achieving the best way to custom parallelize 1000s of Matrix-Vector operations in the solver
- Implemented a concurrent GMRES algorithm for the computational solver, resulting in a 40% speed improvement using contiguous memory operations
- Single-handedly established a pipeline for simulating Black-box measurement-based Integrated Circuit models using Neural Networks within TensorFlow

PUBLICATIONS

Co-Author: "Black-Box Behavioral DC-DC Converter IC Emission Model," 2022 IEEE International Symposium on Electromagnetic Compatibility & Signal/Power Integrity (EMCSI), 2022

Details: We modeled the output of the DC-DC Converter using Neural Networks for various operating conditions using collected experimental data on them. These models were later used to do simulations to predict IC emissions. My role was designing the Neural Network models and training them to simulate the behavior of the DC-DC converter.

PROJECTS

Masked Face identification using One-Shot Learning | Python, PyTorch, OpenCV

- Applied transfer learning on Inception-ResnetV1 deployed as a Siamese Network for one-shot face identification to achieve 91% accuracy of the LFW Dataset
- Generated database of masked faces using LFW Dataset and Image Editing using OpenCV
- Retrained the models to achieve 82% accuracy on masked faces

Generating Adversarial Attack Examples using GANs | Python, PyTorch

- Implemented the Adv-GAN model for performing semi-white-box attacks on Deep Nets
- Achieved attack success rates on training and validation sets of 95% and 87% respectively on a trained All-CNN on CIFAR-10

Extracting Lexical Stylistic Notions From Words Using LLMs | PyTorch, Hugging Face, Scikit-learn

- Performed Literature Review on Extracting Directions attributing to features, such as Complexity and Formality of Text
- Improved the Performance of LLM-based Contextual Word Embeddings on extracting lexical features and using them to classify phrases using cluster-based Anisotropy removing - accuracy improved from 64% to 83%
- Fine-tuned LLMs to do document-level classification for these features
- Used ML models to make new similarity measures that performed better than cosine similarity

TECHNICAL SKILLS

Languages: Python, C/C++, SQL, MATLAB

ML Frameworks: PyTorch, Tensorflow, Spark, PyTorch, Scikit-learn, Hugging Face

Other Frameworks: pandas, NumPy, Matplotlib, Seaborn, OpenMP, AWS, Azure

Courses: Deep Learning, Computer Vision, Big Data Analytics, Applied Machine Learning, Natural Language Processing

CERTIFICATIONS

Generative AI with Large Language Models

[Certificate](#)

DeepLearning.AI: Deep Learning Specialisation

[Certificate](#)

Fundamentals of Parallelism on Intel Architecture

[Certificate](#)