Vaibhav Sahu

2679280709 | vaibhavs@seas.upenn.edu | linkedin.com/in/vaibhav | Portfolio

EDUCATION

University of Pennsylvania   Philadelphia, PA
Master of Science in Scientific Computing - GPA: 3.76/4   *Aug. 2022 – May 2024*

Indian Institute of Science   Bangalore, India
Bachelor of Science in Physics - GPA: 8.2/10   *Aug. 2016 – June 2020*

PROJECTS

Playing Hangman with Transformers | *PyTorch, Hugging Face, NumPy*
- Devised a pre-training task in the form of a multiclass classification for the transformer to learn guessing letters in hangman
- Pre-trained Google CANINE-s on a corpus of 200k words to achieve optimal performance of 45% game winning accuracy
- Devised a Reinforcement Learning based fine-tuning task for better performance
- Fine-tuned the model to achieve 57% winning accuracy within 6 wrong guesses and 83% accuracy within 10 wrong guesses

Extracting Lexical Stylistic Notions From Words Using LLMs | *PyTorch, Hugging Face, NumPy, 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

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

EXPERIENCE

Graduate Research Assistant   May 2023 – Present
University of Pennsylvania   *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   April 2021 – July 2022
Simyog Technology Pvt. Ltd.   *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 which also resulted in a publication

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
Conceptual Skills: Machine Learning, Large Language Models, Natural Language Processing, Parallel Computing, Data Science

CERTIFICATIONS

Generative AI with Large Language Models   Certificate
DeepLearning.AI: Deep Learning Specialisation   Certificate
Fundamentals of Parallelism on Intel Architecture   Certificate