LUV VERMA

Khoury College of Computer Sciences ◇ Boston, MA ◇ +1(857) 869-3556
verma.lu@northeastern.edu ◇ LinkedIn ◇ Medium ◇ GitHub

EDUCATION

MS in Artificial Intelligence, Northeastern University, USA — Jan 2023 - present
Coursework: Deep Learning, Natural Language Processing, Advanced Perception — GPA: 4.0/4.0

PhD in Applied Mechanics, Indian Institute of Technology, Madras — July 2014 - Nov 2018
Research Area: Inspection of Damaged Smart Composites

SKILLS

Technical Skills	Deep Learning, NLP, Computer Vision, Machine Learning, Big Data
Programming	Python, Java, C++, SQL, MATLAB
ML/DL Frameworks	PyTorch, Keras, Tensorflow, CUDA, HuggingFace, OpenCV, NLTK, Pandas
Big-Data Frameworks	Apache Spark, Azure Databricks, Lakehouse, Delta Lake, Delta Engine
Learning In-progress	NeRFs, Big-Data, Cloud Computing, Databricks
Certifications	Generative AI with LLMs, Accelerated Computing with CUDA in Python

PROFESSIONAL EXPERIENCE

Senior Data Scientist — Nov 2021 - Dec 2022
General Electric Aerospace — *Bangalore, India*

- **Novel Deep Learning and Regression Modeling for FEA & CFD Simulations**:
  - **Problem**: Needed a method to analyze critical parameters in a limited range of FEA & CFD simulations to improve the efficiency of design space exploration.
  - **Models**: **Deep Learning (Variational Auto Encoder), Machine Learning (Regression Models)**.
  - **Impact**: Developed a method and achieved a drastic reduction in simulation time, decreasing from 3 weeks to just 2 hours, enhancing the design space exploration.
- **Computer Vision-based Tool for Detecting Failure Modes in Aviation Components**:
  - **Problem**: Required a solution to detect and categorize failure modes in critical aviation components, particularly high-pressure turbine blades.
  - **Models**: **Segmentation Models (U-Net & FCN-8)**.
  - **Impact**: Developed a tool that was adopted by internal teams, enabling damage rating on a scale of 1 to 10. This transitioned 6 months of raw image analysis to just 1 month of model fine-tuning tailored to various damage types.

Research Engineer — July 2019 - July 2021
General Electric Research — *Bangalore, India*

- **Detection System for False Alarms in Wind Turbines**:
  - **Problem**: Developed a solution to detect false alarms in the high-speed shaft coupling of wind turbines.
  - **Models**: **Machine Learning Classification Algorithms**.
  - **Impact**: **Filed a patent for the developed solution**. Significantly reduced downtime and man-hours, decreasing response time from 8 hours per fault to just 1 hour.
- **Surface Crack Detection in Wind Turbine Pitch Bearings**:
  - **Problem**: Identified invisible surface cracks in pitch bearings of wind turbines.
  - **Models**: CNN based **Yolo-v3 Object Detection Algorithm**.
  - **Impact**: Clustered different failure modes in pitch bearing, enhancing fleet management. Introduced prognosis of pitch-bearing surfaces, facilitating proactive maintenance.

PUBLICATIONS & PROJECTS

Paper 1, Paper 2: Published two research papers in psychology, applying statistical methods such as structural equation modeling and mediation analysis for hypotheses testing. Utilized **multi-label classification** to build prediction models (to capture the relationship between the mediator and dependent variable), and conducted correlation and bias checks to refine respondent data

Image Reconstruction: Conducted an ablation study on the **Vector Quantized Generative Adversarial Network (VQGAN)**, focusing on vector quantization loss, important for image-to-image generation using single A100 GPU using PyTorch. The work explored critical parameters such as codebook vectors, latent dimensions, and the effect of 2D positional encodings on image reconstruction.

Machine Translation Model:

- **Objective:** Focussed on balancing model complexity with computational efficiency in language models with millions of parameters.
- **Approach:** Conducted ablation studies on a sequence-to-sequence transformer model tailored for the machine translation task.
- **Model:** Implemented **Sequence-to-Sequence encoder-decoder transformer pipeline in PyTorch**.
- **Results:** Achieved a significant reduction in model complexity, **reducing parameters from 257 million to 26 million**.