Muhammad Arbab Arshad

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Education

Iowa State University — Iowa, USA
Ph.D. (Computer Science) — *Jan. 2022 – Dec 2025*

American University of Sharjah — Sharjah, UAE
M.S (Computer Engineering) — *Aug. 2019 – Aug 2021*

Lahore University of Management Sciences — Lahore, PK
B.S (Computer Science) — *Aug. 2015 – May 2019*

Experience

Research Assistant - ML — May 2022 – August 2022
Laboratory for Software Design — *Iowa, USA*

- Led an empirical study on SLURM-based GPU clusters using 5 automated program repair tools, emphasizing on **NLP and neural machine translation techniques**.
- Optimized the execution by achieving **16x speedup** through parallel execution on 40 GPU clusters.
- *Distinguished Paper Award* recipient at the 38th IEEE/ACM International Conference on Automated Software Engineering, signifying expertise in ML research (URL).

Machine Learning Engineer — May 2020 – Dec 2021
OpenUAE — *Sharjah, UAE*

- Designed and fine-tuned 12 **ML models** for predicting monthly electricity use in Dubai, leveraging advanced NLP algorithms to achieve **92.5% accuracy**.
- Directed a team of 6 in model analysis, enhancing training efficiency by **10x** through advanced algorithmic optimization techniques (URL).

Software Engineering Intern — 05/2022 – 08/2022
Kingland — *Iowa, USA*

- Deployed auto-scaling in AWS Fargate, integrating NLTK-like libraries to enhance NLP tasks during stress-testing.
- Developed a comprehensive end-to-end pipeline for stress tests, using JMeter for scripting and Blazemeter via Taurus for cloud execution.
- Customized GitLab CI/CD pipeline, ensuring seamless model training and deployment without disruption to AWS resources.
- Recognized twice in sprint retrospectives for pioneering a baseline for intensive load tests, reflecting dedication and expertise.

Projects

MeditateGPT | *MERN Stack, GPT-3 API, Amazon Polly, AWS S3*

- Crafted MeditateGPT, an NLP-powered application to deliver guided meditations using GPT-3, offering users the ability to provide prompts for tailored sessions.
- Employed SSML alongside Amazon Polly's TTS API, producing natural-sounding audio, enhancing the linguistic user experience.

Adapting Image Clustering for Audio Analysis of Bat Behaviors - Masters Thesis | *Python, Keras, TensorFlow, PyTorch*

- Innovatively transformed unsupervised ML image clustering techniques for audio data, specifically focusing on analyzing bat behaviors via echolocation calls.
- Effectively employed IMSAT, IIC, SCAN, JULE, and DeepCluster algorithms, securing a commendable accuracy of 88.28% in bat classifications.

Utilizing GANs for Emotional Melody Generation | *Python, Keras*

- Initiated a pioneering text-to-audio generation mechanism for converting poetry into melody using Generative Adversarial Networks (GANs).
- Successfully generated melodies that resonated with 68% similarity to genuine melodies, emphasizing the potential of NLP in audio engineering.

Amazon Elastic Inference for Intrusion Detection | *Java, AWS EC2, Keras*

- Leveraged Amazon Elastic Inference (EI) for real-time SSH and FTP brute-force attack detection, eliminating the need for on-premise ML model training.
- Realized an F1 score of 99%, simultaneously boosting speed by 8x with the model on EI, underscoring the efficiency of cloud-based NLP implementations.

Technical Skills

NLP & Deep Learning: Python, TensorFlow, PyTorch, Keras, GPT-3 API, NLTK, Neural Machine Translation, LLMs using LORA, Unsupervised Deep Learning
Machine Learning: Scikit-learn, CUDA, R
Programming: C++, Java, MATLAB
Version Control & Databases: Git, SQL
Amazon Web Services: EC2, Lambda, S3, VPC, ELB, IAM, KMS, Amazon Polly