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*

- Employed Python and **TensorFlow** to execute 5 automated program repair tools, conducting ML research on SLURM-based GPU clusters.
- Achieved a **16x reduction** in execution time by leveraging parallel execution on 40 GPU clusters, demonstrating proficiency in linear algebra and optimization techniques.
- **Publication recognized with a Distinguished Paper Award** at the 38th IEEE/ACM International Conference, highlighting expertise in ML research and academic publishing.

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

- Designed and optimized ML models using **PyTorch** and **Sklearn** on 50 million records, achieving **92.5% accuracy** in predicting monthly electricity use in Dubai.
- Led a 6-person collaborative team, achieving 10x faster training using algorithm optimization and advanced mathematical skills.

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

- Deployed auto-scaling in AWS using **Python**, validated container duplication, and optimized resource usage to maintain user privacy and system efficiency.
- Developed an end-to-end pipeline for routine stress tests, harnessing JMeter and Blazemeter, ensuring seamless user experiences.
- Tailored GitLab CI/CD pipeline for seamless test execution, guaranteeing minimal disruption to resources.
- Received formal recognition for establishing comprehensive load test baselines, reflecting commitment to innovation and excellence.

Projects

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

- Designed and developed MeditateGPT, an application for customized guided meditations using GPT-3, which allows users to input prompts for personalized sessions.
- Leveraged SSML and Amazon Polly's TTS API to synthesize natural-sounding audio for the meditation sessions.

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

- Adapted unsupervised ML image clustering algorithms to audio data for bat behavior analysis using echolocation calls.
- Implemented IMSAT, IIC, SCAN, JULE, and DeepCluster algorithms and achieved an accuracy of 88.28% in classifying bats.

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

- Developed a text-to-audio generation system for poetry-to-melody using Generative Adversarial Networks (GANs).
- Generated melodies with 68% perceived similarity to real melodies.

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

- Utilized Amazon Elastic Inference (EI) to remotely detect SSH and FTP brute-force attacks in traffic data, eliminating the need for on-site deployment/training of ML models.
- Achieved F1 score of 99% and increased speed by 8x with the model deployed on EI compared to local inference.

Technical Skills

Deep Learning: Python, R, Keras, CUDA, TensorFlow, PyTorch, Scikit-learn, OpenCV, GPT-3 API, Unsupervised Deep Learning
General: C++, Java, Git, SQL, MATLAB
Amazon Web Services: Compute (EC2, Lambda), Storage (S3), Networking (VPC, ELB), Cloud (IAM, KMS, Amazon Polly)