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

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

- Expertly developed and fine-tuned 12 ML models using Python, handling 50 million records to predict monthly electricity usage in Dubai, achieving a notable 92.5% accuracy.
- Led a dynamic 6-member team in rigorous model analysis; accomplished a 10x speedup in training time through advanced algorithmic optimization techniques (URL).
- Showcased strong collaboration skills by working seamlessly with cross-functional teams, demonstrating the ability to lead and solve complex problems efficiently.

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

- Played a key role in the execution of 5 automated program repair tools on SLURM-based GPU clusters, demonstrating proficiency in advanced machine learning research.
- Achieved a significant reduction in execution time by 16x through enabling parallel execution of tools across 40 GPU clusters, underscoring my ability to innovate and optimize.
- Publication received a *Distinguished Paper Award* at the 38th IEEE/ACM International Conference on Automated Software Engineering, highlighting my strong research prowess in the machine learning domain (URL).

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

- Implemented auto-scaling in AWS Fargate using object-oriented languages; rigorously stress-tested API to ensure container duplication and optimize resource usage.
- Architected an end-to-end testing pipeline, employing JMeter for scripting and integrating with Blazemeter via Taurus for efficient cloud execution.
- Enhanced the GitLab CI/CD pipeline to ensure smooth test executions, further displaying my proficiency in Python and a commitment to resource optimization.
- Recognized twice in sprint retrospectives for establishing a robust baseline for comprehensive load tests, demonstrating my attention to detail and commitment to quality.

Projects

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

- Devised innovative adaptations of unsupervised ML image clustering algorithms for audio analysis, specifically bat behavior categorization using echolocation calls, emphasizing deep learning proficiency.
- Efficiently executed IMSAT, IIC, SCAN, JULE, and DeepCluster algorithms, achieving an impressive accuracy of 88.28% in classifying intricate bat behaviors.

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

- Pioneered a state-of-the-art text-to-audio generation system transforming poetry-to-melody using advanced Generative Adversarial Networks (GANs).
- Produced high-fidelity melodies with 68% perceived similarity to genuine melodies, showcasing expertise in AI-driven content creation.

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

- Leveraged Amazon Elastic Inference (EI) to innovatively detect SSH and FTP brute-force attacks from traffic data, eliminating conventional on-site deployment/training of ML models.
- Delivered outstanding results with an F1 score of 99% and enhanced speed by 8x using EI, proving the model's superiority over traditional local inference techniques.

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

- Spearheaded the design and development of MeditateGPT, a novel application harnessing GPT-3 for tailored guided meditations, enabling user-driven input for individualized experiences.
- Integrated SSML with Amazon Polly's TTS API, generating natural-sounding audio, highlighting proficiency in AI and Data Analytics.

Technical Skills

Languages: Python, Java, C++, R, SQL, MATLAB
AI/Data Analytics: TensorFlow, PyTorch, Keras, Scikit-learn, OpenCV, Unsupervised Deep Learning, GPT-3 API
Big Data: Experience with large scale data processing (knowledgeable in tools like Hadoop and MapReduce)
General Tools: Git, CUDA
Amazon Web Services: Compute (EC2, Lambda), Storage (S3), Networking (VPC, ELB), Cloud (IAM, KMS, Amazon Polly)