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*

- Architected and executed 5 automated program repair tools using **deep learning** and **computer vision** methodologies on SLURM-based GPU clusters.
- Achieved *16x faster execution time* via parallel processing on 40 GPU clusters, demonstrating proficiency in distributed systems.
- **Publication recognized with a *Distinguished Paper Award*** at the 38th IEEE/ACM International Conference on Automated Software Engineering, highlighting advanced research capabilities (URL).

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

- Designed and refined 12 ML algorithms in **Python** for predicting monthly electricity usage, attaining *92.5% prediction accuracy* with 50 million datasets.
- Headed a team of 6 in in-depth model analysis and optimization; realized *10x faster training times* via advanced algorithm techniques, showcasing deep understanding of dynamics and controls (URL).

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

- Designed an auto-scaling feature in AWS Fargate using **C++** and stress-tested API to validate container replication, ensuring optimized resource consumption.
- Established a pipeline for routine stress tests using JMeter and Blazemeter (via Taurus), embodying a commitment to writing clean, well-architected code.
- Custom-tailored GitLab CI/CD pipeline for seamless test executions, ensuring consistent resource integrity in a collaborative, fast-paced environment.
- Earned formal *acknowledgment in two sprint retrospectives* for laying the groundwork for comprehensive load assessments.

Projects

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

- Pioneered the adaptation of unsupervised **ML image clustering algorithms** to audio data for understanding bat behaviors via echolocation patterns.
- Employed deep learning techniques like IMSAT, IIC, SCAN, JULE, and DeepCluster, resulting in *88.28% classification accuracy* for differentiating bat species.

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

- Innovated a text-to-audio generation framework transforming poetry into melody using **Generative Adversarial Networks (GANs)**; a venture into **deep learning** and **computer vision**.
- Generated compositions exhibiting *68% perceived similarity* to authentic melodies, indicating the system's efficiency in creating lifelike sequences.

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

- Harnessed Amazon Elastic Inference to remotely identify SSH and FTP brute-force assaults in traffic datasets, emphasizing real-time **embedded software** solutions.
- Marked a remarkable *99% F1 score*, and achieved an *8x speed increment* in model evaluation on EI as opposed to local evaluations.

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

- Conceived and launched MeditateGPT, a tailored guided meditation platform leveraging GPT-3, offering users a tailored meditation experience.
- Integrated SSML with Amazon Polly's TTS API, producing naturalistic audio sessions, showcasing an intersection of AI and user experience.

Technical Skills

Programming Languages: High proficiency in C++, Python, and Java
Deep Learning and Computer Vision: TensorFlow, PyTorch, Keras, OpenCV, Unsupervised Deep Learning, CUDA, Scikit-learn, GPT-3 API
General Software Development: Git, SQL, MATLAB, Software Architecture and Design Patterns
Distributed Systems and AWS: EC2, Lambda, S3, VPC, ELB, IAM, KMS, Amazon Polly
Other: R, Dynamics and Controls, Motion Planning, 3D Graphics