

# Muhammad Arbab Arshad

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## EDUCATION

### Iowa State University

*Ph.D. (Computer Science)*

Iowa, USA

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

Jan 2023 – Present

*AI Institute for Resilient Agriculture (AIIRA)*

Iowa, USA

- Achieved 3D reconstruction of organic subjects from images using Neural Radiance Fields; model generation within 5 minutes.
- Designed an evaluation framework to assess NeRF-derived outputs against LiDAR ground truth, highlighting 3D vision accuracy.
- Identified models with up to 90% F1 score alignment with ground truth data in computer vision analyses.

### Summer Software Engineering Intern

May 2023 – Aug 2023

*Kingland Systems*

Iowa, USA

- Deployed auto-scaling in AWS Fargate; stress-tested API to validate container duplication and optimized resource usage.
- Constructed end-to-end pipeline for routine stress tests, utilizing JMeter for scripting and Blazemeter via Taurus for cloud execution.
- Customized GitLab CI/CD pipeline to execute tests seamlessly, guaranteeing no disruption to AWS resources or other development work.
- Received formal recognition in two sprint retrospectives for establishing the baseline for comprehensive load tests.

### Research Assistant - ML

Jan 2022 – Dec 2022

*Laboratory for Software Design*

Iowa, USA

- Contributed to the execution of 5 automated program repair tools for an empirical study on SLURM-based GPU clusters
- Reduced execution time by 16x by enabling parallel execution of tools on 40 GPU clusters
- Publication received a Distinguished Paper Award at the 38th IEEE/ACM International Conference on Automated Software Engineering ([URL](#)).

### Machine Learning Engineer

May 2020 – Dec 2021

*OpenUAE*

Sharjah, UAE

- Developed and optimized 12 ML models with 50 million records to predict monthly electricity use in Dubai, achieving 92.5% accuracy.
- Led a 6-person team in model analysis; achieved 10x faster training time using advanced algorithmic optimization techniques ([URL](#)).

## PROJECTS

### MeditateGPT | MERN Stack, Amazon Polly, AWS S3

- Designed and developed MeditateGPT, an application for customized guided meditations using GPT-4 API, 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)