MUHAMMAD ARBAB ARSHAD

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Education

Ph.D. (Computer Science)	**Iowa State University**	*Iowa, USA*	**01/2022 - 12/2025**

- Specialization in Machine Learning (GPA: 3.9/4.0)

M.S (Computer Engineering)	**American University of Sharjah**	*Sharjah, UAE*	**08/2019 - 08/2021**

- Specialization in Machine Learning (Relevant Courses: Generative Deep Learning, Big Data and Analytics, Advanced Multicore Computing)

B.S (Computer Science)	**Lahore University of Management Sciences**	*Lahore, PK*	**08/2015 - 05/2019**

Relevant Experience

Research Assistant - ML	**Laboratory for Software Design**	*Iowa, USA*	**05/2022 - 08/2022**

- Contributed to the execution of 5 automated program repair tools for an empirical study on university GPU clusters.
- Reduced execution time by 16x by enabling parallel execution of tools on 40 GPU clusters.
- Managed GPU clusters, executed tools, collected results, and assisted in evaluating tools. Publication under review in ESEC/FSE 2023.

Machine Learning Engineer	**OpenUAE**	*Sharjah, UAE*	**05/2020 - 12/2021**

- Developed 12 ML models (including Artificial Neural Network, Deep Belief Network, Random Forest, and Light Gradient Boosting) using 50 million data records of 18 features to predict monthly electricity consumption in Dubai.
- Assessed models performance through 10-fold cross-validation, resulting in R2 scores ranging from 64.2% to 92.5%.
- Optimized training time from 420.4 ms to 45.2 ms by using the decision tree model.
- Facilitated a team of 6 data scientists in analyzing model outcomes. Authored and published research paper (publication).

Additional Experience

Graduate Teaching Assistant	**Iowa State University**	*Iowa, USA*	**01/2022 - Present**

- Teaching Assistant for the course on Computer Architecture, leading a team of 4 TAs and managing the grading of 200 students.

Projects

- **MeditateGPT** (*Technologies***:** 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** (*Technologies***:** 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** (*Technologies***:** 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** (*Technologies***:** 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.

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)

Honors & awards

- Fully funded Scholarship for Undergraduate Studies at LUMS (Acceptance Rate: 2.0%).
- Founded the IEEE Computer Society Student Chapter at LUMS University and also served as president of the IEEE LUMS Student Branch.