MUHAMMAD SAAD

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PROFESSIONAL SUMMARY

AI Engineer with 4+ years of experience building and deploying deep learning systems across vision, natural language processing (NLP), and interactive applications. Skilled in developing full-stack systems that integrate large language models into web-based 3D environments, enabling lifelike avatar interactions and domain-specific digital twins. Experienced in RAG pipeline implementation, real-time AI integration, and optimizing models for deployment across cloud and edge systems. Delivers impactful, research-driven solutions through scalable engineering and intelligent system design.

EDUCATION

Bachelor of Science, Software Engineering

Islamia College Peshawar (ICP)

- Undergraduate research student supervised by Dr. Muhammad Sajjad and Dr. Jamil Ahmad.
- Thesis: "Visual explanation of deep learning-based breast cancer classification via gradient localization."
- Major Courses: Object-Oriented Programming (OOP), Data Structures and Algorithms, Software Architecture, Artificial Intelligence

PROFESSIONAL EXPERIENCE

AI Engineer & Researcher

Metaverse Center, Mohamed Bin Zayed University of Artificial Intelligence

Research topics: Digital twin, Metaverse, Violence Detection, LLMs for Interactive Avatars.

- Designed and launched ZapAura, a customized virtual learning platform built on Hubs, featuring full-body avatars, real-time lip-syncing, and sentiment-aware interaction for immersive web-based learning environments.
- Built **dTalk**, an AI-powered avatar system with expressive 3D animations and real-time lip-sync using Mixamo and Three.js, enabling LLM-driven, speech-based interaction (GitHub).
- Built expressive 3D avatar animations using Mixamo and enabled real-time lip-sync functionality through Three.js (GitHub).
- Created a React-based analytics dashboard for the Malaria No More (MnM) project, enabling live data visualization and streamlined decision-making.
- Developed a multimodal real-time violence detection system using LSTM, GRU, and Vision Transformer architectures on Jetson Nano at the Technology Innovation Institute (TII), improving inference performance for edge deployment.

AI Developer

Digital Image Processing (DIP) Lab Islamia College Peshawar

Research topics: Medical Imaging, Activity recognition, Facial emotion recognition (FER).

- Contributed to NTNU's facial emotion recognition module for ALAMEDA AI Toolkit
- Built an automatic vehicle number plate detection system using deep learning and image processing techniques for real-time recognition and localization in traffic footage.
- Attention-Based CNN-LSTM, CNN-GRU, and Video Vision Transformer (ViViT) Models for Complex Activity Recognition in Cricket.
- Teaching assistant for Python programming course, helping students with programming concepts and practical lab assignments.

KEY PROJECTS

AI Systems & Production Applications

- ZapAura Platform: Immersive learning platform with sentiment-aware avatars and LLM-based interaction for educational environments.
- dTalk System: AI-powered avatar with speech interaction and real-time animations using Mixamo and Three.js.
- Violence Detection: Multimodal LSTM/GRU/ViT system deployed on Jetson Nano for edge surveillance.
- ALAMEDA AI Toolkit: Facial emotion recognition for neurological healthcare applications.
- License Plate Detection: Deep learning system for real-time vehicle recognition in traffic surveillance.

Peshawar, Pakistan Dec 2020 – 2022

Dec 2020 – 2022

2021 - 2025

Abu Dhabi, UAE

Peshawar, Pakistan

Aug 2017 – Sep 2021

Jan 2023 – Present

PUBLICATIONS

- M. Saad, M. Saeed, F. Laamarti, A. El Saddik, Multimodal Interaction with Digital Twins: An Embodied Assistant for Immersive Virtual Environments, *ACM Multimedia (ACMMM) 2025*, BNI Track. (Submitted)
- M. Saeed, M. Khan, M. Saad, N. Rahim, W. Gueaieb, A. El Saddik, CP-Diffusion: Conditional Prompt-Based Diffusion Models for Video Generation, ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM), 2025. (Submitted)
- A. Vayani, D. Dissanayake, H. Watawana, N. Ahsan, [...], **M. Saad**, [...], F. Khan, All Languages Matter: Evaluating LMMs on Culturally Diverse 100 Languages, *CVPR 2025*. (Accepted)
- M. Khan, M. Saad, A. Khan, W. Gueaieb, A. El Saddik, G. De Masi, F. Karray, Action Knowledge Graph for Violence Detection Using Audiovisual Features, *IEEE International Conference on Consumer Electronics (ICCE)*, Las Vegas, USA, 2024.
- M. Saad, M. Khan, M. Saeed, A. El Saddik, W. Gueaieb, Combating Counterfeit Products in Smart Cities with Digital Twin Technology, *IEEE International Smart Cities Conference (ISC2)*, Bucharest, Romania, 2023.
- M. Saeed, A. Khan, M. Khan, M. Saad, A. El Saddik, W. Gueaieb, Gaming-Based Education System for Children on Road Safety in Metaverse Towards Smart Cities, *IEEE International Smart Cities Conference (ISC2)*, Bucharest, Romania, 2023.
- M. Saad, M. Ullah, H. Afridi, F. A. Cheikh, M. Sajjad, BreastUS: Vision Transformer for Breast Cancer Classification Using Breast Ultrasound Images, International Conference on Signal-Image Technology & Internet-Based Systems (SITIS), Dijon, France, 2022.

TECHNICAL SKILLS

- Programming Languages: Python, C++, MATLAB, JavaScript, HTML, CSS
- Frameworks & Libraries: PyTorch, TensorFlow, Scikit-learn, Keras, Hugging Face, LlamaIndex, OpenCV, NumPy, Pandas, Matplotlib
- Deployment & MLOps: Docker, Git, REST APIs, DigitalOcean, Weights & Biases
- Computer Vision & Edge AI: Vision Transformers (ViT), YOLOv5, LSTM/GRU, Siamese Networks, Jetson Nano, Model Optimization, Quantization
- Web & 3D Development: React, NodeJS, Three.js, A-Frame, WebSockets, Blender, Mixamo, Unity
- Tools & IDEs: PyCharm, VS Code, LaTeX

HONORS AND AWARDS

•	Award of appreciation for securing 1 st position in Youth Talent Expo	2020
•	Awarded with a Data Science certificate by the Government of Pakistan (NAVTTC)	2022

LANGUAGES

- English: Fluent
- Urdu: Native speaker
- **Pashto:** Native speaker

References

Prof. Abdulmotaleb El Saddik

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Prof. Muhammad Sajjad

Associate Professor, Department of Computer Science, Islamia College Peshawar, Pakistan Email: Muhammad.sajjad@icp.edu.pk