

Muhammad Talha

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Education

University of Alberta

Master of Science in Engineering Management (Thesis-Based) | GPA: 3.8/4.0

Courses: Applied ML & AI, ML for Procedural Content Generation, Wearables & IoT, IP Commercialization, Ergonomics & Work Design.

Jan. 2024 – Apr. 2026

Edmonton, Canada

Lahore University of Management Sciences (LUMS)

Bachelor of Science in Computer Science

Courses: OOP, Data Structures, Algorithms, Operating Systems, Software Engineering, ML, AI, HCI, Computer Graphics, Databases, Networks.

Sep. 2019 – Jun. 2023

Lahore, Pakistan

Experience

Research Assistant, ADaMS Lab, University of Alberta

Software, AI/ML, AR/VR, UX/HCI, NLP, Computer Vision, and Signal Processing

Dec. 2023 – Present

Edmonton, Canada

- Designed and developed **AR-CAD**, a standalone augmented-reality CAD system for Meta Quest 3 using Unity, C#, and Meta XR SDK; enabled spatial modeling, object manipulation, and STL export (*University of Alberta Report of Invention approved.*)
- Led a **20-participant user study** comparing AR-CAD with a traditional CAD tool, collecting task performance, SUS, NASA-TLX, think-aloud, and interview data to evaluate usability, workload, and adoption barriers.
- Built **Python NLP/ML pipelines** using Whisper ASR, spaCy, NLTK, sentence-transformers, and scikit-learn to extend Bloom's Taxonomy and classify time-aligned cognitive-process transcripts.
- Developed **computer-vision and manufacturing-AI workflows** using YOLOv8 and WAAM spectral/process data to detect assembly components, estimate production progress, classify materials with up to **97% confidence**, and identify WAAM phases/interfaces.
- Designed **EEG signal-processing workflows** using Emotiv hardware, event markers, baseline normalization, spectral bandpower, and ROI analysis to process sensor data and study cognitive load during CAD tasks.
- Collaborated with **cross-functional teams** across engineering design, neuroscience, HCI, manufacturing, and commercialization to translate research prototypes into validated, product-oriented systems.

Instructor, Knowledge Streams

Industry Training, Python, Data Science, Programming Fundamentals, and MERN Stack

Aug. 2023 – Oct. 2023

Lahore, Pakistan

- Delivered industry-oriented technical training in Python, data science, programming fundamentals, and MERN stack development for industry-referred trainees preparing for professional software roles.

Associate UX Analyst, CureMD Inc.

US Healthcare UX, EHR Workflows, Product Analysis, and Remote Collaboration

Apr. 2022 – Jun. 2023

Remote, Pakistan

- Improved UX for **US healthcare systems**, including EHR, Nightingale, and healthcare portals, by analyzing clinical workflows, identifying usability issues, and recommending product-focused interface improvements.
- Collaborated remotely with product, design, engineering, and QA teams across the US, India, and Pakistan to refine workflows, improve task clarity, and support patient/provider-facing digital experiences.

Research Assistant, CHISEL Lab, LUMS

UX Research, Health Technology, VR, Accessibility, and Assistive Systems

Nov. 2021 – May 2023

Lahore, Pakistan

- Designed and evaluated **health-tech, VR, and assistive prototypes** across AssistTH, RehabVR, Meditare, Rawaan, and VR awareness training using Figma, Unity, 3D environments, raycasting, materials/shaders, interviews, surveys, and usability testing.
- Built user flows, wireframes, prototypes, and research documentation for AssistTH, RehabVR, Meditare, Rawaan, and VR awareness training; implemented Unity-based VR environments using 3D interaction, raycasting, materials, and shaders.

Projects

Product, Full-Stack, and Field-UX Applications

React, Node.js, Express.js, SQL, Figma, Selenium

- Built database-backed and UX-driven applications including an Instagram-style social platform, **choka tutoring platform** tested with Selenium, **AssistTH telehealth prototype**, and **WWF/NCRA Forest Health Calculator** mobile redesign for field-user workflows and tree-imagery-based assessment.

Generative AI, Applied ML, and RAG Pipelines

Python, PyTorch, Scikit-learn, BERT, RAG, Pandas

- Developed AI/ML workflows across diffusion-based sprite generation, **Markov-chain procedural content generation**, clinical prediction, classification, regression, **air-quality forecasting**, computer vision, BERT sentiment analysis, RAG, and Bloom's Taxonomy extension.

Publications

- M. Talha, A. Mohiuddin, S. Javed, and A. J. Qureshi, "Lowering Barriers to CAD Adoption: A Comparative Study of AR-CAD and a Traditional CAD Tool," ASME IDETC/CIE, 2025.
- M. Talha, J. Shi, and A. J. Qureshi, "Extending the Cognitive Domain of Bloom's Taxonomy using Machine Learning," Research Square preprint, 2026; submitted to *Discover Education*.

Technical Skills

Programming & Web: Python, C#, C/C++, JavaScript, TypeScript, SQL, Bash, HTML/CSS, React, Node.js, Express.js, REST APIs, MongoDB, Firebase, MySQL, PostgreSQL, Git, GitHub, Selenium

AI/ML/Data: Scikit-learn, PyTorch, YOLOv8, OpenCV, Pandas, NumPy, SciPy, Statsmodels, spaCy, NLTK, Whisper ASR, BERT, RAG, Jupyter

XR/UX/Product: Unity, Meta Quest, Meta XR SDK, SteamVR, Computer Graphics, Raycasting, Shaders/Materials, 3D Interaction, STL Export, Figma, Adobe XD, Prototyping, User Research, Usability Testing, Interviews, Surveys, SUS, NASA-TLX

Signal/Embedded/Tools: EEG Signal Processing, Spectral Bandpower, Sensor Data, Event Markers, IoT, BLE, MQTT, FreeRTOS, LVGL, Blender, Visual Studio, VS Code, Jira/Trello