

MUHAMMAD USAMA

AI Engineer & Researcher | Deep Learning · NLP · Full-Stack Development

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EDUCATION

Bachelor of Science in Computer Science (BSCS)

Mar 2021 – Jan 2025

COMSATS University Islamabad – Abbottabad Campus, Pakistan

CGPA: 3.56 / 4.0 **Thesis:** Multi-Class Brain Tumor Classification and Grade Estimation using Dual-Head Neural Network

Relevant Coursework: Artificial Intelligence, Machine Learning, Data Structures & Algorithms, Database Management, Operating Systems, Distributed Systems, Object-Oriented Design, Discrete Mathematics

RESEARCH & PUBLICATIONS

Multi-Class Brain Tumor Classification and Grade Estimation using Dual-Head Neural Network

2026

First Author — Elsevier Results in Engineering (Under Review, Manuscript No. RINENG-D-26-00182)

- Proposed a novel Dual-Head Neural Network (DHNN) for simultaneous multi-class brain tumor classification and grade prediction from MRI scans.
- Achieved 93.2% classification accuracy using EfficientNetB0 as the backbone with dual output heads for type and grade prediction.
- Built preprocessing pipelines for large-scale MRI datasets (cleaning, labeling, augmentation) using OpenCV and Pandas.
- Keywords: Deep Learning, Brain Tumor Classification, Dual-Head Neural Network, Grade Prediction, Multi-Class Classification.

RESEARCH EXPERIENCE

Research Assistant — COMSATS University Islamabad (Abbottabad Campus)

Mar 2024 – Feb 2025

- Led the development of the Dual-Head Neural Network for brain tumor classification, serving as the core ML research project for the thesis.
- Designed and validated preprocessing pipelines for large-scale MRI datasets; performed cleaning, augmentation, and annotation.
- Co-authored findings submitted to Elsevier and presented technical methodologies in departmental seminars.
- Collaborated with interdisciplinary team members on AI-driven medical imaging research.

PROFESSIONAL EXPERIENCE

AI & Full Stack Engineer — Lean Automation

Feb 2024 – Present

- Architected Retrieval-Augmented Generation (RAG) systems using FAISS and LLMs for querying complex industrial logs.
- Fine-tuned open-source LLMs (Llama 3, Grok) for specialized industrial domains, improving domain-specific response accuracy.
- Developed predictive maintenance models (VAE-LSTM, ANN/RNN) achieving >90% accuracy for oil & gas equipment fault prediction.
- Built a microservices-based IoT platform (Node.js, NestJS, Docker) decomposing a monolith into 12+ services processing millions of events daily.
- Designed Kafka event-streaming pipelines ingesting 10,000+ sensor events/second with sub-50ms latency — zero data loss.
- Created real-time analytics dashboards (React, ECharts, ReactFlow) for KPI visualization and anomaly monitoring.

Full Stack Engineer — Lean Automation

Jan 2023 – Jan 2024

- Built and deployed 5+ production full-stack applications (React, Next.js, Node.js, NestJS) with 99.5% availability SLAs.
- Implemented CI/CD pipelines (GitHub Actions + Docker) enabling zero-downtime deployments multiple times daily.
- Automated data reporting workflows with SQL stored procedures and REST APIs, reducing manual effort by 80%.

TECHNICAL SKILLS

Programming: Python, TypeScript, JavaScript (ES6+), SQL, R, C++, Bash

AI & Machine Learning: TensorFlow, PyTorch, Keras, Scikit-learn, LLM Fine-Tuning, RAG Pipelines, LangChain, NLP, Computer Vision, XGBoost, LSTM, Autoencoders, Transformers

Web & Backend: React 18, Next.js 14, Node.js, NestJS, FastAPI, Flask, Django, GraphQL, gRPC, WebSockets, REST APIs

Databases: PostgreSQL, MongoDB, Redis, MySQL, Firebase, Supabase, Neo4j, MS SQL, Pinecone, Qdrant

DevOps & Cloud: Docker, Kubernetes, GitHub Actions, Jenkins, AWS (EC2, S3, RDS, Lambda), Azure, Nginx, Apache Kafka, RabbitMQ

CERTIFICATIONS & TRAINING

- Machine Learning Specialization — Stanford University / DeepLearning.AI (Coursera)
- Generative AI for Everyone — DeepLearning.AI
- Google Data Analytics Professional Certification — Google
- Fundamentals of Management — University of California
- Web Development Bootcamp — Angela Yu (Udemy)

HONOURS & AWARDS

- Merit Scholarship — COMSATS University (Top Academic Performance)
- Prime Minister's Laptop Award — Government of Pakistan
- Pakistan Education Endowment Fund (PEEF) Award — High Achiever Recognition
- First Position — Intermediate Board Examinations

LEADERSHIP & COMMUNITY ENGAGEMENT

- Data Analytics Lead / Organizer — Google Developer Student Club (GDSC): Led technical workshops, hackathons, and AI/ML training sessions.
- ML Lead — IEEE COMSATS Chapter: Mentored peers in machine learning research and guided technical initiatives.
- Media Head — IET UK & Seerah Society: Coordinated digital media campaigns and student engagement.
- Anti-Narcotics Campus Ambassador — Provincial Anti-Narcotics Office: Led awareness campaigns and community workshops.
- Proctor — CS Department, COMSATS Abbottabad: Supervised student discipline and departmental events.

LANGUAGES

English: C1 (Proficient — Reading, Writing, Speaking, Listening) **Urdu:** Native **Punjabi:** Native

PERSONAL INFORMATION

Date of Birth: 01 April 2003 **Nationality:** Pakistani **Passport No.:** JV2858041

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