

Muhammad Azlaan Zubair

Software Engineer | Applied & Generative AI Researcher

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Academic Profile

Graduate Software Engineering researcher with more than five years of professional experience designing scalable software systems while conducting independent research in Artificial Intelligence, Software Engineering, and Large Language Models.

My current research focuses on the intersection of

- Large Language Models (LLMs)
- Reasoning AI
- Software Engineering
- AI-assisted Software Testing
- Retrieval-Augmented Generation (RAG)
- Human-AI Collaboration
- AI-powered Developer Tools
- Intelligent Information Systems

My industrial experience has provided practical exposure to large-scale distributed applications, cloud-native software, enterprise systems, knowledge retrieval, intelligent automation, API ecosystems, and human-centered software engineering. These experiences directly inform my research interests in developing reliable, interpretable, and efficient AI systems for real-world software engineering problems.

I am currently pursuing a Master's degree in Software Engineering while actively preparing for doctoral research in Artificial Intelligence and Software Engineering. My long-term objective is to contribute to academia through high-impact research in trustworthy AI, software quality, intelligent developer tools, and applied machine learning, while collaborating with interdisciplinary research groups that bridge academic innovation with industrial impact.

Education

National University of Computer and Emerging Sciences (FAST)

Master of Science in Software Engineering

2024 – 2026 (Expected December 2026)

Thesis: *MS Deep CensorNet Lite: Advancing Context-Aware YOLO Detection for Automated Content Moderation*

Supervisor: [Zulfiqar Memon](#)

CGPA: 3.37

ILMA University

Bachelor of Science in Software Engineering

2016 – 2020

Final Year Project: *Automated Attention System using Computer Vision*

CGPA: 3.16

Certifications

- Front-End Web UI Frameworks and Tools – The Hong Kong University of Science and Technology
- AI Fluency Framework & Foundations – Anthropic
- Claude 101 – Anthropic
- Data Structures in Python – University of Michigan
- Python Programming – University of Michigan
- Image Processing and OCR – University of Michigan
- Introduction to Artificial Intelligence – DeepLearning.AI

Research Experience

Graduate Researcher

National University of Computer and Emerging Sciences (FAST)

August 2024 – Present

My graduate research focuses on applying Artificial Intelligence and Large Language Models to Software Engineering problems, particularly software quality assurance, intelligent automation, and developer productivity. My work combines empirical experimentation with practical software engineering to evaluate AI systems in realistic industrial settings.

Research activities include:

- Designing evaluation methodologies for benchmarking Large Language Models on software engineering tasks.
- Investigating reasoning models for automated software testing.
- Studying prompt engineering strategies for improving AI-generated software artifacts.
- Developing Retrieval-Augmented Generation (RAG) systems for intelligent document understanding.
- Building reproducible experimental pipelines for evaluating AI systems.
- Conducting statistical analysis of experimental results.
- Designing AI-assisted developer productivity tools.
- Investigating trustworthy AI systems for enterprise software engineering.

Industrial Research Experience

Although employed primarily as a Software Engineer, many of my professional responsibilities have involved applied research, experimental system design, intelligent automation, and evaluation of emerging AI technologies. These projects bridge industrial software engineering with research-oriented investigation.

Software Engineer

PM Workbench AI

Travis County, Central Texas, United State America (USA)

December 2025 – Present

Contributions:

- Investigating scalable architectures for enterprise AI systems using modern web technologies.

- Designing real-time AI workflows supporting extraction, embedding, semantic analysis, and synthesis pipelines.
- Developing interfaces that facilitate collaboration between Product Managers and AI-assisted document generation systems.
- Studying user interaction patterns for AI-assisted requirement engineering.
- Integrating multiple heterogeneous data sources into unified AI processing pipelines.
- Designing architectures for asynchronous intelligent systems using WebSockets and distributed processing.

Frontend Developer

Cobone

Dubai, United Arab Emirates (UAE)

September 2024 – December 2025

Contributions:

- Investigated performance optimization strategies for large-scale e-commerce platforms.
- Studied user interaction behaviour to improve mobile usability and conversion.
- Evaluated frontend optimization techniques including lazy loading, bundle optimization and caching.
- Integrated secure payment systems while investigating scalable API architecture.
- Collaborated with UX researchers and designers to improve user engagement through evidence-driven interface improvements.

Frontend Developer

YallaCompare

Dubai, United Arab Emirates (UAE)

June 2024 – August 2024

Contributions:

- Investigated micro-frontend architectural patterns for enterprise software.
- Evaluated frontend performance optimization techniques.
- Conducted usability improvements through iterative interface redesign.
- Produced technical documentation supporting software maintainability and knowledge transfer.
- Investigated modular software architectures supporting scalable development teams.

Frontend Developer

Transviti

Riyadh, Saudia Arabia

October 2023 – June 2024

Contributions:

- Designed enterprise identity synchronization using Microsoft Entra ID.
- Investigated secure authentication protocols including OAuth 2.0.
- Designed enterprise integration workflows connecting heterogeneous software systems.
- Developed recurring logistics optimization workflows.
- Investigated enterprise software automation for workforce management.

IT Assistant

Pakistan Space and Upper Atmosphere Research Commission (SUPARCO)

Karachi, Pakistan

February 2020 – October 2023

Contributions:

- Developed enterprise workflow automation systems.
- Investigated document lifecycle automation.
- Improved software usability through iterative interface development.
- Participated in modernization of organizational IT infrastructure.
- Developed internal web-based software systems supporting organizational efficiency.

Publications

Journal Articles

1. **Evaluating AI reasoning and prompt engineering in automated test case generation: A comparative study of GPT-4o, O1 models, and human QA**

Authors: Muhammad Azlaan Zubair, Wided Bouchelligua, Sufyan Danish, Shabir Ahmad, Amel Ksibi

Journal: Computer Science Review

Status: [Published in June 2026](#)

2. **MS Deep CensorNet Lite: Advancing Context-Aware YOLO Detection for Automated Content Moderation**

Authors: Muhammad Azlaan Zubair, Sufyan Danish, Zulfiqar Ali Memon, Waiz bin Qasim

Journal: To be decided

Status: Ready to Publish

3. **Efficient UAV-Based Fire and Smoke Detection via Attention-Enhanced Multi-Scale Feature Fusion**

Authors: Sufyan Danish, Muhammad Azlaan Zubair, Muhammad Fayaz, L. Minh Dang, Hyeon-joon Moon

Journal: To be decided

Status: Ready to Publish

Research Projects

AI-powered Automated Test Case Generation

1. **AI-powered Automated Test Case Generation**

Summary: Designed and evaluated a comprehensive benchmark for comparing reasoning and non-reasoning Large Language Models in automated software test case generation. The study investigates multiple prompt engineering strategies, evaluates thousands of generated test cases, and performs statistical comparisons against human software testers.

Technologies: Python, LLMs, OpenAI, Mixtral, Statistical Analysis, Git

Key Contributions:

- Experimental design
- Dataset preparation
- Statistical evaluation
- Benchmark creation
- Prompt engineering
- Research reproducibility

2. RAG - Based QnA Web Application – Dr. Source

Summary: Developed a full-stack intelligent document understanding platform using Retrieval-Augmented Generation (RAG). The system combines vector embeddings, semantic retrieval, document indexing, and Large Language Models to support question answering over user-uploaded documents.

Technologies: Next.js, Python, LangChain, PostgreSQL, Supabase, Flask, Vector Databases

Key Contributions:

- Retrieval-Augmented Generation
- AI-assisted Knowledge Retrieval
- Semantic Search
- Intelligent Document Processing
- Vector Databases

3. LinkedIn LLM based auto-composer – Articulate AI: Intelligent Writing Assistant

Summary: Designed and developed an AI-powered Chrome Extension that assists professionals in generating high-quality written content across various web platforms. The system explores the application of Large Language Models for context-aware writing assistance while emphasizing privacy, low-latency inference, and seamless user experience.

Technologies: React, TypeScript, Chrome Extension API, Supabase, Clerk, REST APIs, LLMs

Key Contributions:

- Human-centered AI interface design
- Secure AI application architecture
- Context-aware prompt engineering
- User interaction optimization
- Browser-based AI systems

4. TaskVare Enterprise Identity Synchronization

Summary: Designed and implemented an enterprise identity synchronization framework integrating Microsoft Entra ID with TaskVare using Microsoft Graph API. The project investigates scalable identity synchronization, authentication, and enterprise software interoperability.

5. LOADe Intelligent Logistics Platform

Summary: Designed workflow automation supporting recurring logistics operations, resource allocation, scheduling, and operational optimization. The project investigates intelligent enterprise workflow automation for logistics management.

Technical Skills

Research Methods

- Experimental Design
- Research Reproducibility
- Literature Review
- Statistical Analysis
- Quantitative Analysis
- Scientific Writing
- Comparative Evaluation
- Data Collection
- Visualization

Programming Languages

- Python
- JavaScript / Node.js
- TypeScript

Artificial Intelligence

- LLM
- RAG
- LangChain
- Prompt Engineering
- AI Agents
- TensorFlow
- Vector Databases
- Semantic Search
- Gen AI

Software Engineering

- Software Architecture
- Design Patterns
- REST APIs
- WebSockets
- CI/CD
- Testing
- SQA
- Microservices
- OAuth 2.0
- Enterprise Integration

Frameworks

- React
- Next.js
- Node.js
- Express
- Flask
- Supabase

Developer Tools

- Git
- GitHub
- Docker
- Linux
- Vercel
- Cloud (GCP, Azure, AWS)
- PostgreSQL
- MongoDB

Languages

- English (Professional Working Proficiency)
- Urdu (Native)

References

- **Dr. Zulfiqar Ali Memon**
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National University of Computer and Emerging Sciences
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- **Sufyan Danish**
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