Muhammad Usman Khan

Professionally known as **Usman Ghias**

Email: iusmanghias@gmail.com | ORCID: 0009-0009-4038-5762 | Portfolio: https://usmanghias.co.uk
GitHub: github.com/UsmanGhias | LinkedIn: linkedin.com/in/iusmanghias | Location: Samundri / Lahore, Pakistan

RESEARCH INTERESTS

Distributed Systems, Relational Data Synchronization, Database Engine Internals, Concurrency Control, Conflict-Free Data Replication, Offline-First Mobile Architectures, and Runtime Query Plan Optimization.

EDUCATION

Quantic School of Business and Technology — Washington D.C., USA
Master of Science in Software Engineering (MSSE) — Graduated October 15, 2026

- **Academic Standing**: 95.29% cumulative average (32 credit hours).
- **Comprehensive Examination**: 92% score on proctored technical evaluation.
- Curriculum: Advanced Software Architecture, Distributed Systems Design, Concurrent Programming, Cloud Infrastructure, and Data Engineering.

Punjab University College of Information Technology (PUCIT) — Lahore, Pakistan
Bachelor of Science in Software Engineering (BSSE) — Graduated 2024

- **Honors**: Graduated with Distinction (Top 5% of graduating cohort, 4.0 GPA scale).
- **Teaching Appointments**: Appointed three times as Undergraduate Teaching Assistant (Data Science, Computer Networks, and Object-Oriented Programming in C++).

PREPRINTS AND RESEARCH MANUSCRIPTS

Adaptive Just-In-Time Query Compilation and Memory-Bounded Indexing for Evolving Enterprise Relational Schemas
Author: **Muhammad Usman Khan**
Zenodo (Open Access, Preprint, not yet peer-reviewed), 2026. DOI: 10.5281/zenodo.23940925.

- Formulated a control-theoretic online utility function balancing query latency reduction against memory footprint, write amplification, and index reconfiguration.
- Engineered a non-blocking 5-state lifecycle automaton (Candidate, Building, Active, Decaying, Evicted) preserving Snapshot Isolation during concurrent mutations.
- Demonstrated 95.1% reduction in p99 query latency, 73.0% secondary index memory contraction, and 21.2% lower tail write latency on 50,000 ledger records.

Durable Edge-Outbox Synchronization: Managing Relational Divergence in Intermittent Mobile Enterprise Workloads
Author: **Muhammad Usman Khan**
Zenodo (Open Access, Preprint, not yet peer-reviewed), 2026. DOI: 10.5281/zenodo.22843765.

- Investigated data divergence between intermittent mobile client databases (SQLite in WAL mode) and central PostgreSQL systems.
- Designed a six-state durable outbox lifecycle with idempotent transaction dispatching, preventing update loss across connection drops.
- Implemented explicit conflict staging to decouple local write latency from network roundtrips and centralized serializability locks.

SGDNet: Deep Multispectral and Topographic Feature Fusion for Supraglacial Debris Delineation in the Karakoram Under Moraine-Bedrock Spectral Equivalence
Authors: **Muhammad Usman Khan**, M. N. Majeed, M. Q. Hanif, A. Sultan, K. Bashir, M. U. Zahid
Zenodo (Open Access, Preprint, not yet peer-reviewed), 2026. DOI: 10.5281/zenodo.22844232.

- Fused 9-channel Sentinel-2 multispectral MSI bands with ALOS AW3D30 digital elevation models and topographic slope priors.
- Evaluated over 4.86 million multispectral pixel samples across Karakoram glaciated catchments, achieving 96.3% classification accuracy.

SYSTEMS AND SOFTWARE ENGINEERING EXPERIENCE

CODCrafters Lahore, Pakistan
Lead Systems Architect and Technical Lead 2020 – Present

- Architected high-concurrency relational data pipelines for enterprise clients across Switzerland, Austria, Sweden, and Saudi Arabia.
- Profiled PostgreSQL execution plans using `EXPLAIN ANALYZE`, connection poolers (PgBouncer), and compound B-tree index structures, achieving a 60% reduction in production query latency under peak transaction load.
- Designed and stress-tested client-side caching, queue-backed outbox processors, and WebSocket replication pipelines for mobile field applications under unstable network conditions.
- Implemented cryptographic e-invoicing pipelines ensuring deterministic XML signing and audit compliance across multi-tenant environments.

ACADEMIC HONORS AND DISTINCTIONS

- **Distinction in BSSE**: Awarded by PUCIT for academic excellence in Software Engineering.
- **Three-Time Teaching Assistant**: Selected by faculty to conduct lab sessions and grade assignments in Data Science, Computer Networks, and OOP in C++.
- **Amal Career Fellowship**: Competitive leadership and professional development fellowship supported by Stanford University and Amal Academy.

TECHNICAL PROFICIENCIES

- **Databases and Storage**: PostgreSQL (internals, query optimization, connection pooling), SQLite (WAL mode, transactions), Redis.
- **Systems and Tools**: Linux/POSIX environments, Docker, Git, CI/CD pipelines, Nginx.
- **Programming Languages**: Python, C++, TypeScript, SQL, JavaScript.
- **Architectures**: Distributed transaction pipelines, offline-first client storage, idempotent replication, RESTful and WebSocket protocols.