UMER FAROOQ

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PROFILE

A systems-focused computer scientist with deep expertise in high-performance computing, parallel and distributed systems, and full-stack development. I build efficient, scalable systems—from low-level GPU-accelerated algorithms and compiler design to interactive full-stack applications and distributed systems. My work spans quantum simulation, high-performance neural networks, custom language implementation, distributed hash tables, and real-time networked systems.

EDUCATION

Bachelor of Computer Science **August 2022 - Present**

National University of Computer and Emerging Sciences (NUCES), Islamabad

- Awarded Dean's List in Spring 2023
- Expected Graduation: 2026

TECHNICAL PROJECTS

High-Performance & Computational Projects

- **Parallel Tensor Network Quantum Simulator (C++, CUDA, OpenMP, MPI)**
  - Enhanced a quantum circuit simulator using hybrid MPI/OpenMP and GPU acceleration via CUDA.
  - Integrated METIS for improved graph partitioning, reducing communication overhead and improving load balancing.
  - Achieved scalable performance for large-scale quantum circuits (>20 qubits).
- **MNIST Classification with GPU Acceleration**
  - Optimized a neural network across five versions (V1–V5), from serial CPU to highly parallel GPU execution.
  - Achieved 6× faster inference using Tensor Cores, FP16 precision, and CUDA optimizations (shared memory, kernel fusion, streams).
  - Profiled and analyzed performance using Nsight Systems to eliminate bottlenecks.
- **Compiler for Custom Language (IU)**
  - Designed and built a full compiler for a custom educational language featuring unique syntax (hajimeru/gulegule), data types, and I/O operations.
  - Implemented lexer, parser, semantic analyzer, and code generator in C++.
- **GPU-Accelerated Canny Edge Detection (C++, CUDA)**
  - Implemented the Canny edge detector in CUDA, focusing on optimizing memory access patterns. Resulted in a 3.5x speedup over a sequential CPU implementation.
- **Parallel Graph & Text Analysis (C++, pthreads, perf)**
  - Developed multithreaded solutions for graph analysis (node/edge counting) and large-text word frequency analysis.
  - Achieved near-linear speedup using thread affinity and chunk-based processing.
  - Used perf for hotspot analysis and optimization.

Distributed Systems & Networking

- **Ring DHT with IPFS Integration (C++, Data Structures, SHA-1, B-Trees)**
  - Built a distributed hash table with circular linked list architecture and IPFS integration for distributed file storage
  - Implemented routing tables via double linked lists and B-Tree file storage with SHA-1 hashing in 160-bit address space
  - Created console interface for machine management, file insertion/retrieval, and system monitoring
- **Doodle Dash – Multiplayer Drawing Game (C++, SFML, TCP Sockets, pthreads)**
  - Developed a client-server drawing and guessing game with real-time synchronization over TCP sockets.
  - Implemented multi-threaded client handling, custom reliable send/receive functions, and graceful shutdown.

Full-Stack & Application Development

- **DJ Web Application (React, Vite, Node.js, Express, MongoDB)**
  - Built a real-time music streaming interface with a responsive React front-end and scalable Express back-end.
- **Pac-Man Game with Multi-threaded Ghost AI (C++, SFML, pthreads)**
  - Built a full Pac-Man clone with custom graphics, collision detection, and multi-threaded ghost movement algorithms.
  - Implemented player controls, power-ups, and game state management.
- **Management Systems**
  - JavaFX Management Systems (Java, JavaFX, PostgreSQL)
  - NET Applications (.NET, PostgreSQL, React)

WORK EXPERIENCE

Freelance Developer **August 2023 - August 2024**

- Delivered 30+ full-stack web applications for diverse clients using MERN stack and .NET, serving 500+ end users
- Architected and developed high-performance 2D games in C++/SFML/SDL2, implementing custom physics engines and optimized rendering pipelines
- Built enterprise desktop applications in C#/Java with SQL backends, following MVC architecture patterns and serving 100+ concurrent users
- Collaborated directly with clients to gather requirements, design solutions, and deliver projects 20% ahead of schedule
- Maintained 98% client satisfaction rate through iterative development and responsive communication
- Developed 100+ projects with a 80% rate of repeat customers

TECHNICAL SKILLS

- **Programming Languages:** C, C++, CUDA, Python, Java, C#, JavaScript/TypeScript, HTML/CSS
- **Parallel & Distributed Computing:** CUDA, OpenMP, MPI, Hybrid Programming (MPI + OpenMP), Multi-GPU Programming
- **AI/ML & Quantum Computing:** PyTorch, TensorFlow, GPU-Accelerated Training, Qiskit, Quantum Circuit Simulation
- **Compiler & Language Design:** Lex/Yacc, Parsing, Code Generation, Custom Language Implementation
- **Web Development:** React, Next.js, Vite, Node.js, Express, REST APIs
- **Desktop & App Development:** JavaFX, Windows Forms, WPF, .NET
- **Databases:** PostgreSQL, MongoDB, MySQL
- **Tools:** Git, Nsight Systems, Nsight Compute, Postman, Linux

INTERESTS

- GPU Architecture & Low-Level Optimization
- Compiler Design & Language Theory
- Quantum Simulation
- Parallel & Distributed Systems
- Full-Stack Development