Maaz Muhammad khan

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Summary

Blockchain developer and researcher specializing in designing and implementing both private (Hyperledger Fabric and Quorum) and public (Ethereum) blockchain solutions. Experienced in Golang, Solidity, React.js, and Python, with a strong foundation in conducting research. Previously, as a Research Assistant at LUMS, focusing on blockchain applications in renewable energy. I am dedicated to continuous learning, technological innovation, and research.

Experience

- **Lahore University of Management Sciences (LUMS)** *Lahore, Pakistan*

  Research Assistant *September 2024 - December 2025*

  - Conducted researched on blockchain applications in renewable-energy systems with a focus on peer-to-peer (P2P) energy trading, and solar-panel recycling life cycle tracking.
  - Developed a blockchain-based solar panel recycling solution using a circular economy model, achieving transparent end-of-life tracking and promoting shared responsibility for sustainable recycling.
  - Implemented a P2P energy trading framework using Raspberry Pi (RPi) as Quorum blockchain node, enabling prosumers to sell excess energy to consumers using double auction matching, resulting in fair pricing and improved energy utilization.
  - Designed a React.js front-end for P2P to initiate blockchain transactions and monitor smart meter (blockchain node) information.

  Teaching Assistant (Introduction to Blockchain: Technology and Applications) *September 2025 - December 2025*

  - Assisted the course instructor during examinations, quizzes, and assignments for undergraduate students.
  - Conducted weekly sessions and provided one-on-one guidance on blockchain fundamentals, including consensus mechanisms, block structure (header and body), and blockchain transactions.
  - Guided students on efficient smart contract design and testing using Solidity, and Remix IDE.

- **HBL Center for Blockchain and Applied Research, GIK Institute** *Topi, Pakistan*

  Research Assistant *August 2023 - July 2024*

  - Built a cross-border remittance DApp in Solidity and React.js, enabling seamless transactions with real-time tracking, account creation, transaction management, and on-chain record-keeping.
  - Developed a benchmarking tool that evaluated Hyperledger Fabric against private Ethereum, demonstrating Fabric's $5\times$ higher throughput and $26\times$ lower latency.
  - Developed a Hyperledger Fabric-based supply chain solution for Pakistan's corn and textile sectors using Golang chaincode to improve transparency, traceability, and security across all stakeholders.

- **BI Consultancy** *Rawalpindi, Pakistan*

  Blockchain Developer Internee *Jun 2023 - July 2023*

  - Developed, tested, and deployed ERC-20 and ERC-721 tokens on Ethereum blockchain, and front-end on React.js for token distribution and management.

- **Competitive Collective Intelligence Exponent with Experience (CCIXER Inc)** *Remote*

  Research Associate *December 2022 - May 2023*

  - Developed Solidity smart contracts for renewable energy using Remix/Truffle with Test-Driven Development methodologies.
  - Presented business development and investment plans for project funding.

Education

- **COMSATS University Islamabad, Abbottabad Campus** *Abbottabad, Pakistan*

  BS Software Engineering *September 2018 - August 2022*

  - **CGPA:** 3.58/4.00
  - **Thesis Title:** Health Record Management System using Blockchain Technology

PROJECTS

- **Blockchain-enabled Smart Meter in P2P Energy Trading Market: Funded by Higher Education Commission, Pakistan** *December 2024 - December 2025*
  Tools: Quorum, RPi, Solidity, React.js, WEM3080 Smart Meter with current transformer, Lithium Packed Batteries, TB-1504 Terminal Block [GitHub]
  - Developed a decentralized energy trading platform using Quorum blockchain on RPi nodes to facilitate energy transactions between prosumers and consumers.
  - Designed a round-based trading system in smart contract with 3 phases in each round, i.e., Order Submission, Execution (double auction), and Trading.
  - Implemented Greedy Matching double auction algorithm off-chain to improve the efficiency of the system.
  - Integrated WEM3080 smart meters with current transformers to track energy generation and consumption.
  - Created a React.js dashboard for participants and admin to initiate energy transactions and monitor smart meters respectively.
  - Designed an end-user smart meter device comprising RPi, energy meter, terminal block, and battery pack to power RPi.

- **Blockchain-enabled Circular Economy in Solar Panel Recycling: Funded by LUMS Faculty Initiative Fund** *September 2024 - December 2024*
  Tools: Golang, Hyperledger Fabric, Solidity, Remix IDE, Hard Hat [GitHub] [GitHub]
  - Implemented smart contract in Golang, and Solidity for consortium blockchain using *Hyperledger Fabric* and *Quorum*, respectively, to track the solar panel life cycle and recycling responsibilities across stakeholders.
  - Tested and deployed smart contract in Hardhat and Remix IDE, implemented functionalities to record energy production, end-of-life (EOL) status and cost-sharing agreements between stakeholders, ensuring data immutability, auditability, and transparency.

- **Blockchain-enabled Supply Chain Management: Funded by Habib Bank Limited (HBL)** *January 2024 - July 2024*
  Tools: Go (Hyperledger Fabric Chaincode), Hyperledger Fabric Network, Docker, Fabric CA [GitHub] [GitHub]
  - Designed and implemented blockchain-based *Corn and Textile* supply chain management system using Hyperledger Fabric to ensure transparency, traceability, and immutability of product data across multiple stakeholders.
  - Developed chaincode to manage complete product lifecycles for both *textile* and *corn* industries, encompassing batch creation, quality inspection, product tracking, and retail distribution.
  - Deployed and tested the Fabric network using *Docker* containers, multiple peers, and channels to simulate end-to-end product management across supply chain stages.

- **Blockchain Performance Benchmarking Tool: Funded by HBL** *November 2023 - January 2024*
  Tools: Node.js, React.js, Solidity, Go (Chaincode), Web3.js, Docker, Ganache, Hyperledger Fabric, Private Ethereum [GitHub] [GitHub]
  - Developed a blockchain performance evaluation tool to assess the throughput and latency of various blockchain platforms.
  - Assessed the performance of the private Ethereum and Hyperledger Fabric network using this tool, where Hyperledger Fabric outperforms private Ethereum.
  - Built a React.js dashboard to visualize latency and throughput metrics, and integrated Node.js backend with Web3.js for interaction between front-end and blockchain.

- **Cross-Border Remittance DApp: Funded by HBL** *August 2023 - December 2023*
  Tools: Solidity, React.js, Node.js, Express.js, Web3.js, Python (Brownie Framework), Sepolia Testnet [GitHub]
  - Developed a decentralized cross-border remittance platform for HBL to facilitate transactions through smart contracts.
  - Implemented smart contracts in Solidity to manage customer registration, transaction initiation, account management, and customer blocklisting.
  - Tested and deployed smart contracts on the *Sepolia testnet* using the *Brownie* framework and Python integration scripts for automated deployment and verification.
  - Built React.js-based front-end interfaces for both customers and bank managers, enabling functionalities such as transaction creation, user and transaction deletion, user registration, and transaction history tracking.
  - Integrated Node.js backend with Web3.js for interaction between the DApp and blockchain network.

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, S=IN SUBMISSION

[J.1] Khan, M. M., Khan, F. S., Nadeem, M., Khan, T. H., Haider, S., & Daas, D. (2025). **Scalability and Efficiency Analysis of Hyperledger Fabric and Private Ethereum in Smart Contract Execution**. *Computers*, Vol. 14, Issue 4, pp. 132. DOI: 10.3390/computers14040132

[C.1] Khan, M. M., Imran, Z., & Hassan, N. U. (2025). **Performance Analysis of Double Auction Implementations for Peer-to-Peer Energy Trading on Resource Constrained Blockchain Platforms**. In *IEEE PES Innovative Smart Grid Technologies (ISGT) Middle East 2025*, November 25, Dubai, UAE.

[S.1] Khan, M. M., Saleem, M. S., Imran, Z., Humayoun, S., & Hassan, N. U. (2025). **Blockchain-enabled Smart Meter in Peer-to-Peer Energy Trading Markets**.

[S.2] Khan, M. M., & Khan, F. S. (2025). **Optimizing the Textile Supply Chain with Hyperledger Fabric: A Secure and Transparent Approach**.

SKILLS

- **Programming Languages:** Golang, C/C++, JavaScript, Java, Solidity, Python
- **Web Technologies:** React.js, HTML5, CSS, Node.js, FastAPI
- **Software Engineering:** Object Oriented Programming, Data Structures and Algorithms, Design Patterns, Object Oriented Software Engineering
- **Cloud Technologies:** Amazon Web Services, Google Cloud Platform
- **DevOps & Version Control:** Docker, Git, GitHub
- **Blockchain Platforms:** Hyperledger Fabric, Quorum, Ethereum
- **Research Skills:** Technical research, literature review, data analysis, manuscript writing, journal selection, presentation skills, report writing, documentation
- **Other Tools & Technologies:** LaTeX, MS Word, Remix IDE, VS Code, Ubuntu

HONORS AND AWARDS

- **International Impact Award: Scholarship** *December 2025*
  George Washington University [🌐]
  ◦ Awarded a merit-based scholarship for the Masters in Computer Science program for Spring 2026.

- **Employee of the Month (January & April 2023)** *Awarded: February & May 2023*
  CCIXER Inc. [🌐] [🌐]
  ◦ Honored for outstanding performance, research quality, dedication, consistency, teamwork, hard work, and timely completion of tasks.

- **Letter of Appreciation for COVID-19 Contribution** *August 2022*
  Village Council Ghalegay [🌐]
  ◦ Acknowledged for leadership and community service during the COVID-19 pandemic, organizing volunteer initiatives for resource distribution and public awareness.

- **Most Disciplined Cadet** *May 2018*
  Cadet College Swat [🌐]
  ◦ Recognized for exemplary discipline and leadership among cadets, demonstrating strong character and adherence to institutional values.
  ◦ Selected from the entire cadet entry for maintaining the highest standards of conduct throughout the academic year.

LEADERSHIP EXPERIENCE

- **Vice President - ACM Student Chapter** *September 2021 - June 2022*
  COMSATS University Islamabad, Abbottabad Campus [🌐]
  ◦ Led the ACM student chapter in organizing coding competitions, workshops, and seminars on various technologies.
  ◦ Supervised executive members, managed event logistics, and established industry-academia collaboration to improve student participation in technical activities.
  ◦ Mentored juniors in software development and promoted a collaborative environment for peer learning and research.

- **Community Lead - COVID-19 Assistance Initiative** *May 2020 - June 2021*
  Village Council Ghalegay, Swat District [🌐]
  ◦ Led a volunteer team to distribute essential supplies, including food and medical aid, raise awareness, and donations.
  ◦ Coordinated logistics and communication in multiple localities, ensuring fair distribution and safety compliance.

Volunteer Experience

- **Mentee** *June 2024 - December 2024*
  Linux (Hyperledger) Foundation Remote[🌐]
  - Designed the **BiniBFT consensus mechanism** to enhance the performance of Hyperledger Fabric, replacing the PBFT and Raft consensus algorithms.
  - Proposed leader selection through *weighted random polling* and *verified random functions (VRF)*, optimizing transaction verification by dynamically selecting 33% of replica nodes.
  - Developed expertise in *Golang* and *distributed consensus algorithms*.
- **Community Lead** *May 2020 - June 2021*
  COVID-19 Assistance Initiative [🌐]
  - Led a volunteer team to distribute essential supplies, including food and medicine, while raising community awareness and capital.
  - Demonstrated leadership, crisis management, and community coordination skills under emergency conditions.

Certifications

- **BlockTech Media (Morya Innovations, India):** Agreement Management using Hyperledger Fabric v2.5 (Full Stack Application) *November 2025*
- **GIK Institute:** Experience Letter *July 2024*
- **Kerala Blockchain Academy (India):** Hyperledger Fabric Fundamentals (Go) Program Kerala Blockchain Academy *July 2024*
- **Zero To Mastery:** Complete React Developer (w/ Redux, Hooks, GraphQL) *February 2024*
- **Tutorials Point:** Hyperledger Fabric 2.x Multihost Deployment (4 Org, 4 VM) *October 2023*
- **CCIXER Inc:** Experience Letter *June 2023*
- **Free Code Camp:** Solidity, Blockchain, and Smart Contract Course Beginner to Expert Python Tutorial *June 2023*

Additional Information

Languages: English (Fluent), Urdu (Fluent), Pashto (Native)

IELTS Academic: (7.0/9.0); L: 8, R: 6.5, W: 6.5, S: 6.5

Research Interests: Blockchain technology and its applications, decentralized finance (DeFi), Fintech, Artificial intelligence

Hobbies and Interests: Cricket, Badminton, Hiking, Traveling

References

1. **Dr. Kashif Bilal**
   Associate Professor, Head of Department (Computer Science)
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