Tanzim Hossain Romel

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Uttara, Dhaka, Bangladesh

Education

- **Bangladesh University of Engineering and Technology (BUET)** *Mar 2018 - May 2023*
  B.Sc. in Computer Science and Engineering Dhaka, Bangladesh
  - CGPA: 3.53/4.00 [3.61 in final term]
  - Thesis: Patient-Centric Blockchain Framework for Electronic Health Record Management

Research Interests

AI for Software Engineering (AI4SE), Empirical Software Engineering, Software and LLM Security, Human-Centered Computing, Blockchain Systems

Work Experience

- **IQVIA** *June 2023 - Present*
  Software Development Engineer Dhaka, Bangladesh
  - Backend Engineer developing microservices-based healthcare applications handling millions of patient records using .NET Core, C#, and AWS
  - Deployed Multi-Agent systems using LangGraph for dashboard generation/modification, integrated with data exploration agent achieving 85% reduction in setup time
  - Developed novel gap-based axis break algorithm for data visualization, addressing outlier-threshold limitations and improving chart clarity
  - Achieved 60% reduction in query execution times through database optimization; implemented 40% API response improvement via Redis caching
  - Pioneered browser automation testing methodology in .NET, simplifying regression testing and improving test coverage from 72% to 95%
  - Received IQVIA Impact Program – Silver award (May 2025) for outstanding performance

Research Experience

- **ReAgent++: Detecting Aligned Backdoors in LLM Agents** *August 2025 - Present*
  Research Collaboration
  - Developing runtime detection system for aligned backdoors in LLM agents using STRIP-style perturbation testing and K-Arm trigger inversion
  - Extending ReAgent framework with targeted malicious scenario testing and comprehensive evaluation on LLM agent benchmarks
  - Collaboration with Dr. Chowdhury Md. Rakin Haider (BUET)
- **An Empirical Study on Remote Code Execution in Machine Learning Model Hosting Ecosystems** *June 2025 - Oct 2025*
  Publication (Under Review at MSR 2026)
  - **Co-authors:** Mohammad Latif Siddiq, Joanna C. Santos
  - Comprehensive analysis of remote code execution (RCE) vulnerabilities across 5 ML platforms with multi-phase empirical study
  - Static analysis and developer discussion analysis; proposed security recommendations and developed automated vulnerability detection toolkit
- **Multi-Agent Framework for Generating Relational DB Schema & ERD** *July 2025 - Present*
  Research Project
  - Extending SchemaAgent baseline with Dr. Sukarna Barua (BUET) through DSL-based communication protocol
  - Hierarchical agent architecture for entity extraction, relationship mapping, and constraint validation to reduce schema generation errors
- **Design by Contract for LLM APIs** *Nov 2024 - Present*
  Research Collaboration
  - Developing taxonomy for API contracts through empirical study of 412 real-world issues
  - Created OpenAI SDK and LangChain extensions for automatic contract enforcement and runtime remediation
  - Collaboration with Dr. Akond Rahman (Auburn University)
- **Sentiment Analysis of Anonymous Crisis Reports in Bangladesh** *Sep 2024 - Nov 2024*
  Research Project | *Website*

- Developed uReporter – Bangladesh's first anonymous reporting system during 2024 national crisis
- Analyzed 124 crowd-sourced reports using six transformer models with multilingual NLP pipeline for Bengali/Romanized Bengali
- Demonstrated anonymous crowd-sourcing's potential for understanding Global South socio-political dynamics

- **Patient-Centric Blockchain Framework for EHR Management** *June 2022 - May 2023*
  Undergraduate Thesis
  - Supervised by Professor ASM Latiful Hoque (BUET)
  - Designed blockchain framework with encrypted off-chain IPFS storage and on-chain Ethereum access control
  - Implemented ERC-721 based patient records with AES-GCM encryption, ECIES key wrapping, and EIP-712 signed permissions
  - Evaluated on 10,000 synthetic patients

PROJECTS

- **Production-Ready Database Engine in Go** *Oct 2024 - Present*
  Tools: Go, B+ Tree, WAL, ARIES Protocol
  - Built complete database engine from scratch with B+ tree indexing and page management system with 8KB pages
  - Implemented LRU buffer pool achieving ~2M ops/sec for reads
  - Implemented ACID transactions with WAL, crash recovery using ARIES protocol, and concurrent access support
- **Blockchain-Based Ticketing Platform** *Jan 2021 - April 2021*
  Tools: Ethereum, Polygon, Solidity, ERC-1155, Web3.js
  - Finalist in Blockchain Olympiad Bangladesh (BCOLBD) 2021 with team "Recursively Enumerable"
  - Designed NFT-based ticketing system using ERC-1155 standard
  - Implemented smart contracts for anti-scalping, dynamic QR codes, and decentralized identity management with zero-knowledge proofs
- **Image Captioning with Attention Mechanisms** *Jan 2023 - Feb 2023*
  Tools: PyTorch, ResNet-101, LSTM, MS-COCO
  - Implemented Show, Attend and Tell architecture with ResNet-101 encoder and LSTM decoder
  - Achieved BLEU-4: 0.335, CIDEr: 0.92 on MS-COCO dataset
  - Enhanced with beam search and multi-head attention achieving 11-point BLEU-4 improvement
  - Conducted comprehensive ablation studies and attention visualizations
- **Eventfly: End-to-end Event Management System** *May 2022 - July 2022*
  Tools: TypeScript, Express.js, Next.js, Docker, Kubernetes, NATS, MongoDB
  - Designed microservices-based event management system
  - Led back-end architecture implementing newsfeed, payment, authentication, and event management services
- **C Compiler Implementation** *Jan 2022 - April 2022*
  Tools: Flex, Bison, C++
  - Built complete compiler for subset of C language using Flex (lexical analysis) and Bison (parsing)
  - Implemented symbol table management with scope handling and comprehensive error reporting
  - Added semantic analysis for type checking and function validation
- **Network Simulation & TCP Protocol Analysis** *Jan 2022 - May 2022*
  Tools: NS3, C++, TCP Reno, TCP Vegas
  - Implemented and analyzed TCP congestion control variants (Reno vs Vegas) using NS3 network simulator
  - Designed TCP Vegas+ modification addressing fairness issues through dual-mode operation
  - Conducted comprehensive performance analysis measuring throughput, fairness index, and packet drop ratios

SKILLS

- **Programming Languages:** C#, Python, JavaScript, TypeScript, Go, SQL, Java, Solidity
- **ML/AI Frameworks:** PyTorch, LangChain, LangGraph, Transformers, ResNet, LSTM, BERT
- **Backend Frameworks:** .NET Core, ASP.NET, Express.js, FastAPI, Next.js
- **Databases:** PostgreSQL, MongoDB, Redis, SQL Server, DynamoDB
- **Cloud & DevOps:** AWS, Azure, Docker, Kubernetes, GitHub Actions, Terraform, OpenTelemetry, Jaeger, NATS
- **Blockchain & Web3:** Ethereum, Solidity, IPFS, ERC-721, ERC-1155, Web3.js
- **Tools & Technologies:** NS3, Flex, Bison, Git, Linux, WAL, ARIES Protocol

Honors and Awards

- **IQVIA Impact Program – Silver Award** *May 2025*
  IQVIA
  ◦ Awarded for outstanding performance and essential feature development
- **Finalist, Blockchain Olympiad Bangladesh** *2021*
  BCOLBD
  ◦ Top 40 teams nationally with "Blockchain Based Ticketing Platform"
- **2nd Place - Bangla Handwritten Digits Recognition** *2022*
  BUET ML Lab
  ◦ Achieved 95.9% accuracy using custom CNN
- **Dean's List Award** *Level-2*
  BUET
  ◦ Awarded for outstanding academic results
- **National Science Olympiads** *2017*
  Bangladesh
  ◦ National prize winner in Bangladesh Physics Olympiad (2017)
  ◦ National prize winner in Chemistry Olympiad (2017)
- **Talentpool HSC Scholarship** *2017*
  Rajshahi Board
  ◦ 15th in Rajshahi Board with 95.6% marks

Test Scores

- **TOEFL iBT**: 103/120 (Listening: 29, Reading: 29, Writing: 22, Speaking: 23)

Additional Information

Languages: Bengali (Native), English (Professional proficiency)
Interests: AI Security Research, Blockchain Technology, Database Systems, Reading Research Papers