MD. Jawadul Hasan

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Research Interests

Large Language Models, DevOps Automation, and AI-augmented Software Engineering, with an emphasis on intelligent code generation, transformation, and ensuring robust, secure software systems.

Education

American International University - Bangladesh September 2023

BSc. in Computer Science and Engineering (CSE) *Cumulative GPA:* ***3.99/4.00***

- Relevant coursework: Algorithms & Data structures, OOP, Database, Networks, Web technologies, Data mining, Advanced programming with Java & Dot Net, Software Quality & Testing, Artificial Intelligence

Professional Experience

Software Engineer July 2023 – Present

Brain Station 23 PLC *Dhaka, Bangladesh*

- Designed high-throughput concurrent processing systems with transaction isolation mechanisms, processing 10,000+ daily applications while maintaining data consistency constraints
- Developed distributed payment infrastructure utilizing bank API integrations, reducing transaction latency through parallel processing methodologies
- Engineered a real-time data streaming architecture using SignalR and optimized geospatial query performance with MongoDB and Redis in-memory caching for fast analytical processing.
- Constructed event-driven architecture using message queuing systems (RabbitMQ), implementing asynchronous communication patterns
- Executed migration of legacy relational data spanning 15 years, applying normalization techniques to enhance analytical query capabilities
- Established automated CI/CD pipelines (Jenkins) for Windows Server environments, creating reproducible build processes and systematic deployment methods
- Implemented systematic code refactoring with unit tests and test-driven development to improve testability, eliminate code smells, and reduce system defect rates.
- Contributed to an insurance project focused on predictive analytics, implementing claim forecasting models and leveraging LLM-powered retrieval-augmented generation (RAG) to automate claim processing and improve risk assessment.
- Mentored and trained junior engineers in software engineering best practices and problem solving, fostering a culture of technical excellence and preparing them for complex engineering challenges.

Research Assistant Dec 2024 – Present

ELITE Lab *NY, USA*

- Pursuing applied research in machine learning and AI, focusing on generative models, predictive modeling, and computer vision.
- Developing AI-driven systems and tools, including context-aware conversational agents for real-world applications.
- Building GradAgent, an AI-powered assistant that helps students navigate university admissions by providing context-aware guidance for applications, essays, interviews, and real-time university and professor matching.

Research Publications

- Md Asgor Hossain Reaj, Rajan Das Gupta, Md Yeasin Rahat, Nafiz Fahad, **Md Jawadul Hasan**, and Tze Hui Liew.
  GANDiff-FR: Hybrid GAN–Diffusion Synthesis for Causal Bias Attribution in Face Recognition.
  Accepted at the *International Conference on Computer Vision and Data Mining (ICCVDM 2025).*
  arXiv: 2508.11334 [cs.CV]

- **Md Jawadul Hasan**, Aritra Das, Joy Matubber, Shadril Hassan Shifat, and Md. Kishor Morol.
  Enhanced Classification of Anxiety, Depression, and Stress Levels: A Comparative Analysis of DASS21 Questionnaire Data Augmentation and Classification Algorithms.
  3rd International Conference on Computing Advancements (ICCA 2024).
  DOI: 10.1145/3723178.3723236

- Atunu Saha, Fahima Haque, Abu Sufian Rupok, S. M. Ferdous Islam, Mohammad Sakib Mahmood, Abdullah Esha, Rajan Das Gupta, and **Md Jawadul Hasan**.
  Machine Learning-Based Predictive Models for Dengue Outcomes Using Clinical and Hematological Data.
  Submitted to the *International Conference on Computer and Information Technology (ICCIT 2025).*

Technical Skills

Skills: Problem Solving, Algorithms & Data Structures, OOP, Agile, Scrum
Programming: C# , C++, SQL, Java, Python, JavaScript
Frameworks & Libraries: Dot Net, Dot Net Core, EF Core, xUnit, Angular, Vue, NextJs, Fast API
Database: MSSQL, MongoDB, PostgreSQL, Redis, Pinecone
Architecture & Design: Clean, Monolith, Microservice, Vertical Slice, MVC, REST, CQRS, SOLID
DevOps & Tools: Git, GitHub, CI/CD, Jenkins, Docker, IIS, Figma, Azure Repos, Amazon S3

Research & Development Projects

GradAgent – AI Assistant for University Admissions *Jan 2025 - Present*

- Developing an AI-powered assistant to guide students through university applications, providing context-aware support for essays, interviews, SOPs, and real-time university and professor matching.
- Integrating a fine-tuned GPT model to deliver personalized, accurate, and domain-specific responses tailored to admission processes and eligibility requirements.
- Implementing a sliding window mechanism to allocate a specific number of tokens over a defined time period, with restrictions applied once the quota is reached.
- Designing scalable AI-driven features for real-world educational applications and automated application support.

Intent Based Search – Advanced Information Retrieval System *Mar 2025 - April 2025*

- Developed a sophisticated search system that interprets user intent using language models to enhance query understanding
- Fine-tuned the Hugging Face MiniLM model using a custom synthetic dataset specifically created for optimizing query paraphrasing
- Engineered a metadata extraction pipeline that processes user queries, generates embeddings, and performs vector similarity matching
- Implemented a hybrid architecture combining language models with Pinecone vector database for semantic search and MongoDB for storing corpus data

Academic Projects

- **EkSheba - Integrated E-Government Services Platform** Fall 2022
  Web Application Development Project [Project Link]
  - Developed a comprehensive e-government portal with banking, passport, tax, and job application services
  - Implemented secure user authentication with token-based validation and role-based access control
  - **Tools & Technology:** ASP.NET Core, REST API, MSSQL, Entity Framework
- **Brain Stroke Prediction System using Machine Learning** Summer 2022
  Machine Learning Course Project [Project Link]
  - Developed classification models using Naive Bayes, Decision Tree and KNN algorithms
  - Achieved 95% prediction accuracy using WEKA tool for early stroke risk assessment
  - **Tools & Technology:** WEKA, Cross-validation, Data Preprocessing
- **HealthPlus - Centralized Healthcare Information System** Spring 2022
  Healthcare Informatics Project [Project Link]
  - Developed a platform for centralizing citizens health records while providing integrated healthcare services
  - Implemented features for medical history storage, appointment booking, emergency services, and blood donation network
  - **Tools & Technology:** PHP, MySQL, HTML, CSS, JavaScript, Selenium (for automated testing)
- **Padma Multipurpose Bridge Simulation** Fall 2021
  Computer Graphics Project [Project Link]
  - Developed an interactive graphical simulation depicting the historical significance of Bangladesh's Padma Bridge
  - Implemented multiple animated scenarios showing pre-bridge transportation challenges, construction phase, and post-construction benefits
  - **Tools & Technology:** C++, OpenGL, GLUT

Achievements

- Top 1% in class; received Summa Cum Laude for an exceptional CGPA
- Selected for the Dean's List honors for outstanding academic performance
- Ranked 6th in the Intra AIUB Programming Contest Fall 2021-22
- Solved over 600+ algorithmic challenges on LeetCode, Codeforces, HackerRank etc
- Finalist on a app development competition hosted by IEEE India in 2020
- Ranked 13th in CTO Forum Hackathon idea round among 124 Teams