JAID MONWAR CHOWDHURY

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EDUCATION

Bangladesh University of Engineering and Technology (BUET) February 2020 – March 2025
BS, Computer Science and Engineering

Sunnydale School, Cambridge International A Levels & O Levels May 2017 – June 2019
A Levels: Four A | O Levels: Eight A*/A*

RESEARCH EXPERIENCE

Prof. Reyhaneh Jabbarvand's Group, Intelligent CAT Lab, UIUC Urbana, Illinois
Research Intern *June 2025 – Present*

- Designed a novel agentic framework for automated generation of behavior-driven unit tests for C programs using AI Agents, ensuring comprehensive coverage of functional scenarios.
  - Proposed an agent decomposition strategy, designing a dual-phase framework that decouples high-level reasoning about program behavior (System 2) from concrete test code generation (System 1), addressing limitations of monolithic AI Agents.
  - Implemented a neuro-symbolic algorithm to generate program control flow representations in the reasoning phase, isolating model understanding from surface-level generation errors and achieving 2× improvement in code coverage over standard monolithic agents.
  - Evaluated advanced testing tools including KLEE for symbolic execution and AFL++ for fuzzing, identifying their limitations in test generation.

Prof. Mahmuda Naznin's Group, BUET Dhaka, Bangladesh
Research Assistant *March 2024 – Present*

- Developed *ATLAS*, a novel static analysis tool addressing limitations of existing single-function program analysis tools by supporting whole-project scope for C and C++ programs.
  - Designed algorithms for constructing statement-level Control Flow Graphs (CFGs) and Data Flow Graphs (DFGs) with support for inter-procedural analysis across function boundaries.
  - Extended analysis capabilities from single-function to whole-project scope including multi-file support using Tree-sitter, enabling AST/CFG/DFG generation for large-scale C/C++ codebases.
- Developed a Generative Adversarial Network (GAN) architecture to distinguish between legitimate and malicious user profiles injected through push and nuke attack strategies in recommender systems.
  - Evaluated detection performance on benchmark datasets (MovieLens, Amazon Sales), demonstrating improved precision and recall over traditional unsupervised learning defense mechanisms.

Prof. Anindya Iqbal's Group, BUET Dhaka, Bangladesh
Research Assistant (World Bank-Bangladesh Government Collaboration) *March 2025 – Present*

- Developed *Trace2Script*, an AI Agent-powered framework that translates natural language test cases into executable and robust Playwright test scripts for automated Web UI testing.
  - Proposed and engineered the Web Agent architecture for simulating realistic human actions during autonomous Web UI traversal with comprehensive trace logging of element interactions.
  - Constructed and validated a comprehensive benchmark dataset of 445 natural language test cases spanning 19 production web applications, ranging from basic UI interactions to complex workflow scenarios.
  - Demonstrated that software-aware constraints with explicit behavior modeling significantly outperformed unconstrained LLM-based test script generation in evaluation across production applications.
- Developed a full-stack inference software for on-premise deployment of fine-tuned LLMs, serving 300 users.
  - Fine-tuned 7B-parameter models (Llama3, Mistral) using LoRA-based optimization, achieving SOTA model performance for software test case generation from business requirement documents.

Industry Experience

Yobo AI Ontario, Canada

Software Engineer *June 2024 – Present*

- Developed a voice-based conversational AI Agent for automating restaurant operations (delivery, pickup, reservation, FAQs), deployed across 27 restaurants.
- Engineered solutions for multilingual voice interactions (English, Bengali, Hindi), addressing transcription errors and language pragmatics challenges in production environments.
- Led the design of a dynamic context injection pipeline that retrieves and integrates specific knowledge into LLMs, enabling efficient querying of large-scale knowledge bases (restaurant menus, business logic).
- Engineered the end-to-end delivery feature, including address capturing, validation using Google Maps API, and automated delivery acceptance/rejection based on distance calculation and dynamic delivery fee integration.

Manuscript Submitted/ Under Preparation

[1] **ATLAS: Automated Tree-based Language Analysis System for C and C++ source programs**
Submitted (Under Review)
IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER), 2026
J. M. Chowdhury, A. F. S. Chowdhury, H. B. Monwar, & M. Naznin

[2] **Dual-Phase Agent Decomposition for Automated Unit Test Generation in C Programs**
Under Preparation
ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA), 2026
J. M. Chowdhury*, F. Oscar*, & J. Reyhaneh

[3] **Trace2Script: Framework for Web UI Test Script Generation from Natural Language Test Cases**
Under Preparation
IEEE/ACM International Conference on Automated Software Engineering (ASE), 2026
J. M. Chowdhury*, S. M. R. Pial*, J. Y. Khan, M. R. Z. Ratul, & A. Iqbal

** denotes equal contribution*

Achievements and Awards

Bangladesh Blockchain Olympiad 2024

Honourable Mention in Both AI Category & Blockchain Category *September 2024*

- Led team to Honourable Mention among 250+ teams by developing an AI-powered health ecosystem featuring machine learning-based medical diagnosis and empathic AI therapist.
- Designed MEDIBLOC, a blockchain-based medical prescription management system with Attribute-Based Access Control (ABAC) for secure sharing of prescriptions between hospitals, pharmacies, and patients.

Hello Yobo AI Hackathon 2024

Second Runners up *May 2024*

- Led team to 2nd runners-up position among 50+ teams by developing Athene, an offline Android LLM chatbot using Mediapipe API with 600 tokens/sec inference speed on mobile CPUs.

Therap Javafest 2023

Top 10 Finalist *August 2023*

- Led team to Grand Finale among 150+ teams by developing a full-stack customer management application using Spring Boot and Angular with AI-powered analytics for revenue tracking and forecasting.

SUST Technovent 2023

First Runners up *January 2023*

- Led team to 2nd runners-up position among 170+ teams by developing a blockchain-based authentication system with RFID technology for vault security. Custom JavaScript blockchain implementation passed 69 test cases.

HackNSU Season 3
Second Runners up *November 2021*

- Led team to 2nd runners-up position among 30+ teams by developing Remedi, a telemedicine platform with AI-powered symptom diagnosis chatbot using Intelligent Machines API.

Academic Olympiads
Physics, Chemistry, Mathematics *2017 – 2020*

- Physics: Translated the Official Physics Olympiad Book (Categories A & B) from Bangla to English; National Round participant (2017-2019).
- Mathematics: First-place winner at Jahangirnagar University Maths Olympiad.
- Chemistry: Achieved 11th place in National Round competition.

The Daily Star Award
Cambridge International A Levels & O Levels *2017 – 2019*

- A Levels: Four A*
- O Levels: Eight A*/A

LANGUAGES

English: IELTS 8.0 (Reading: 8.5, Listening: 8.5, Speaking: 8.0, Writing: 7.5)
Bengali: Native Proficiency

SKILLS

Programming Languages: Python, Java, C/C++, TypeScript, JavaScript, SQL, Shell Scripting
Web Development: React, Flask, FastAPI, Django, Spring Boot, HTML, CSS
AI/ML & Data: TensorFlow, PyTorch, LangChain, LangGraph, CrewAI, PostgreSQL, SQLite, Supabase
DevOps & Cloud: Docker, Linux, DigitalOcean
Tools & Technologies: Git, GitHub, NodeJS, Selenium, AFL++, KLEE, Logstash, Hyperledger Fabric

REFERENCE

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