

Sankhayan Bhattacharjee

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Education

Bachelor of Technology in Computer Science (Bioinformatics)

Vellore Institute of Technology (VIT), Vellore, India

Sept. 2021 – 2025

CGPA: 8.7/10.0

Relevant Coursework:

- **Core Computer Science:** Data Structures and Algorithms, Design and Analysis of Algorithms, Operating Systems, Database Management Systems, Computer Architecture and Organization, Compiler Design, Computer Networks, Cryptography and Network Security
- **Software Engineering:** Software Engineering and Development, Theory of Computation
- **AI:** Artificial Intelligence, Pattern Recognition
- **Mathematics:** Discrete Mathematics and Graph Theory, Probability and Statistics, Linear Algebra, Calculus, Differential Equations
- **Bioinformatics Specialization:** Molecular Biology, Biochemistry, Cell Biology and Genetics, Data Analytics in Bioinformatics, Analytical Bioinformatics, Biological Databases

Academic Projects

Helix – LLVM-Based Compiler

C++, LLVM / 2024

github.com/Lioncat2002/HelixLang

- Designed and implemented a complete compiler for a statically-typed functional programming language using C++ and LLVM framework, targeting x86-64 architecture
- Developed comprehensive compilation pipeline including lexical analysis, recursive descent parsing, and abstract syntax tree (AST) construction
- Implemented semantic analysis with static type checking and scope resolution to ensure program correctness at compile-time
- Integrated LLVM intermediate representation (IR) code generation with optimization passes for efficient binary output
- Supported advanced language features including first-class functions, control flow constructs, and arithmetic operations

Starlight – 3D Game Engine

C++, OpenGL / 2024

github.com/Lioncat2002/starlight

- Developed a cross-platform 3D rendering engine in C++ using modern OpenGL, with support for Windows, macOS, and Linux environments
- Implemented modular Entity-Component-System (ECS) architecture enabling flexible scene composition and extensible gameplay logic
- Integrated Assimp library for 3D model importing, supporting industry-standard formats (OBJ, FBX) for asset pipeline integration
- Designed comprehensive error handling and real-time logging system to facilitate debugging and improve engine stability
- Applied advanced graphics programming concepts including shader programming, texture mapping, and transformation hierarchies

Riviera '23 – Event Management System

TypeScript, Express.js / 2023

- Led backend architecture and development for Riviera '23, a national-level college festival serving 30,000+ concurrent participants
- Designed scalable RESTful API architecture using Express.js with MongoDB for persistent storage and Redis for high-performance caching
- Optimized database queries and implemented caching strategies, reducing data retrieval latency under high-traffic conditions
- Implemented secure authentication, user registration, and event scheduling systems with concurrent request handling
- Demonstrated ability to design and deploy production-grade systems at scale

Nock Attendance – Event Management Platform

Python, Django / 2023

github.com/GDGVIT/attendance-app-backend

- Engineered Django-based backend system for Google Developer Student Club's event attendance platform, supporting 1000+ active users
- Designed and implemented RESTful APIs for real-time check-in, verification, and attendance analytics with minimal latency
- Optimized database queries through strategic indexing and query optimization, improving response times under concurrent load
- Applied software engineering best practices including version control, code review, and systematic testing

Research & Development Experience

MLH Fellowship – Solana Foundation (Mango Markets)

Sept. 2022 – Dec. 2022

Open Source Contributor

- Contributed to solcpp, enhancing interoperability between Solana programs and Web3.js, improving developer experience for blockchain application development
- Optimized literpc implementation for Solana validator execution, reducing computational requirements and enabling deployment on consumer-grade hardware (200% reduction in operational costs)
- Collaborated with open-source maintainers through GitHub issues and pull requests to triage bugs, propose architectural improvements, and accelerate release cycles
- Gained experience in distributed systems, blockchain architecture, and large-scale open-source collaboration

Professional Experience

Backend Developer – Trademarkia

Nov. 2023 – Apr. 2024, Sept. 2024 – Present

- Led redesign and optimization of global trademark search platform, improving search accuracy and performance across multiple international markets
- Automated critical workflows resulting in improvement in successful query rates and enhanced system reliability
- Developed new payment processing flows and checkout optimization, contributing to measurable increase in conversion rates
- Spearheaded backend development for Domainmarkia, a domain registration platform, demonstrating full-stack system design capabilities

- Developed core features for no-code automation platform, improving task execution speed and reducing user setup complexity
- Integrated machine learning models for intelligent decision-making within no-code workflows, increasing automation success rates
- Optimized end-to-end workflow creation through enhanced backend logic and frontend integration, reducing user friction

Technical Competencies

Programming Languages: C++, Python, C, Rust, Go, TypeScript, Java, C#

Systems & Tools: LLVM, OpenGL, Docker, Git, Linux/Unix

Web Technologies: Django, FastAPI, Express.js, RESTful APIs

Databases: PostgreSQL, MongoDB, Redis

Frameworks & Libraries: Bevy, Monogame, Silk.NET, Gorm, Fiber

Development Tools: GitHub, Postman, AWS, Vercel, Oracle Cloud

Areas of Interest: Compiler Design, Systems Programming, Computer Graphics, Distributed Systems, Software Engineering

Additional Information

Languages: English (Fluent C1), Bengali (Native), Hindi (Fluent), Spanish (Limited proficiency)

Extracurricular Involvement: Active member of Google Developer Student Club (GDSC) VIT; Contributor to open-source projects on GitHub; Participant in Major League Hacking (MLH) Fellowship Program

Certifications

MLH Fellowship Completion Certificate – Major League Hacking, 2022