adit4443ya@gmail.com
+91-9510676850

Aditya Trivedi

github.com/adit4443ya
linkedin.com/in/adit4443ya
portfolio-adit-six.vercel.app

Summary

Engineered high-performance solutions in Parallel Computing, External Memory, and Dynamic Graph algorithms. Developed and optimized advanced Compiler features to accelerate parallel computations and enhance system scalability across HPC environments.

Experience

GOOGLE SUMMER OF CODE 2025 - LFORTRAN | Compiler Developer |

May 2025 - Present | Tech Stack: C++, Fortran, OpenMP, CUDA

- Designed and refactored **OMPRegion**-based Abstract Semantic Representation (**ASR**) architecture enabling scalable **OpenMP 6.0 features** support and **GPU-targeted Fortran** code
- Implemented **13+ OMP constructs** and **8+ clauses** covering thread, team and task parallelism
- Extended C-backend for **OpenMP Target Offloading on NVIDIA GPUs**, integrating host-device dual-mode code dump and **OpenMP-CUDA** code generation. More Info? Link
- Built a lightweight **(<250 lines) GPU emulator** as a Runtime library, **CUDA** centric

LFORTRAN COMPILER | Compiler Development Engineer |

Sept. 2024 - Present | Tech Stack: C++, Fortran, OpenMP, Python

- Compiled **MPI**-based **POT3D** codebase achieving **0.95x** compilation speedup and **0.75x** runtime performance compared to GFortran. More Info? -> Blog
- Built pure **Fortran-based MPI wrappers** using **ISO_C_BINDING**, eliminating C-wrapper overhead with **30+ MPI** subroutine implementations. More Info? -> Fortran_mpi
- Resolved **50+** compiler issues across domains such as **OpenMP**, **OOPs**, Structs, and Strings

Publications

HIGH-PERFORMANCE COMPUTING RESEARCH | Fast MIS on Dynamic Graphs

Advisor: Dip Sankar Banerjee | Tech Stack: C++, OpenMP, Python

- **Aditya Trivedi**, P. Nijhara, D.S. Banerjee, *"Fast MIS on Incremental Graphs"*, SRS in **HiPC IEEE 2024**
- P. Nijhara, **Aditya Trivedi**, D.S. Banerjee, *"Fast Maximal Independent Sets on Dynamic Graphs"*, **EuroMicro PDP 2025**
  Developed Parallel Algorithms with OpenMP achieving **15.64x** speedup for insertions and **10.57x** for deletions on graphs with **50M-1.2B** edges. Optimized multi-core load distribution with **NUMA**-aware memory access patterns, maintaining minimal race conditions (**0.18%**).
  Current research focus: Clustering techniques, Multi-GPU and External memory computations

Projects

PARALLEL LLM INFERENCE ON RISC-V |

May 2025 - August 2025 | Tech Stack: C++, OpenMP, MPI, RISC-V, Edge Computing

- Evaluated parallel inference strategies for transformer models (**15M-1B** parameters) on resource-constrained RISC-V architecture
- Achieved **3.42x** speedup using intra-layer MPI parallelization, outperforming OpenMP by **19.6%** for 110M parameter models

DISTRIBUTED ML FRAMEWORK FOR FRAUD DETECTION |

Feb. 2025 - April 2025 | Tech Stack: Python, Azure ML, Federated Learning, LSTM, TensorFlow

- Architected privacy-preserving federated learning system on Azure for credit card fraud detection
- Incorporated LSTM models with differential privacy ($\epsilon \approx 1.5$) achieving **92%** accuracy while reducing training time by **73%**

WORKHUBPRO - ENTERPRISE TASK MANAGEMENT PLATFORM |

Feb. 2024 - August 2024 | Tech Stack: Kotlin, Jetpack Compose, Go, PostgreSQL

- Developed full-stack project management solution using Go backend and Kotlin/Jetpack Compose frontend with **140+** commits, employing SoA architecture
- Implemented real-time updates via WebSockets, role-based access control, and advanced PostgreSQL optimizations, such as indexing, query optimization

Education

INDIAN INSTITUTE OF TECHNOLOGY, JODHPUR |

Bachelor of Technology
Computer Science & Engineering
Nov. 2022 – May 2026
Jodhpur, Rajasthan
Current CGPA: 8.14/10

NEW ENGLISH HIGHER SECONDARY SCHOOL |

High School Education
June 2010 – May 2022
Himmatnagar, Gujarat
GUJCET State Rank: 481
JEE Advanced Rank: 2989

Technical Skills

Programming Languages: C/C++, Python, Fortran, Rust, JavaScript, Kotlin, Go, Java, OOPs, Bash

Parallel/HPC: OpenMP, CUDA, MPI, LLVM, ARMv9 Architecture

Frameworks & Tools: TensorFlow, PyTorch, Azure ML, Docker, Node.js, React, Android/Jetpack Compose, Git, GitHub, PostgreSQL, MySQL, Docker, LaTeX, Azure Cloud, Linux, GDB

Coursework

Data Structures & Algorithms, Operating Systems, Computer Architecture, Database Management Systems, Software Engineering, Computer Networks, Cloud Computing & Virtualization, Embedded Systems, Machine Learning for Big Data, Machine Learning, Cryptography, Cybersecurity, Probability Statistics & Stochastic Processes, Mathematics for Computing

Extracurriculars

IEEE HiPC'24 15k ₹ Grant receiver
Student Guide at SWC, IITJ
Vice Captain of Kabaddi Club, IITJ