Abhijit Amrendra Kumar
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Education

- Bachelor of Technology in **Computer Science and Engineering** | IIT Bombay *(2021-2025)*

Scholastic Achievements

- Secured **All India Rank 45** among a total of **150,000 candidates** appearing for *JEE Advanced 2021* exam *(2021)*
- Obtained **99.989** percentile and secured **All India Rank 175** in *JEE Mains 2021* among **900k candidates** *(2021)*
- Ranked in National **Top 1%** in Indian Olympiad Qualifiers (IOQ) for Astronomy, Chemistry, and Physics *(2020)*
- Awarded the **National Fellowship** in the Kishore Vaigyanik Protsahan Yojana (**KVPY** SA stream) exam *(2019)*

Work Experience

SDE-1 in Data Platform | *Dream 11* *(Jul'25 - Ongoing)*

- Completed onboarding training in **Java - Vert.x** for backend and **React Native** for cross-platform app development.
- Studied distributed infra and streaming platforms through industry case studies and foundational systems papers, including *Uber Data Mesh, Google Dremel, Netflix Streams, Amazon DynamoDB, MapReduce, Google File System.*
- Developed insight into **Apache Kafka**, large-scale data pipelines, and explored trade-offs in modern data platforms.

AI Intern | *Facets Cloud* *(Feb'25 - May'25)*

- Developed an **Agentic AI** ticket assistant leveraging retrieval over historical resolutions and **discussions** to help engineers streamline debugging by identifying **similar past issues**, **underlying causes**, and **resolution steps**.
- Built **crawlers** to extract company-specific info from **LinkedIn** and official sites for **data enrichment** & **analysis**.
- Built **agentic workflows** for **automated PR reviews** using LLMs to assess code quality & adherence to guidelines.

Advanced Application Engineering Intern | *Accenture Plc.* *(May'24 - Jul'24)*

- Collaborated with a team of 8 for **regression testing** of Accenture Hoteling and Capacity Planning services.
- Acquired skills in **Amazon Web Services** in EC2, S3, DynamoDB, Aurora, performance testing and automation.

Full Stack Developer Intern | *MapIT.ai Pvt Ltd* *(June'23-Jul'23)*

- Developed a bluetooth-based **beacon positioning & path tracking** webpage in React and Django Websockets.
- Refined their CMS system & acquired skills in **GeoDjango and PostGIS, Django Websockets and Docker**

Software Developer | *Chocolate Stay Pvt Ltd* *(2023)*

- Constructed a backend server for **hotel bookings, user authentication and real-time updates** in **NodeJS**.
- Modeled a hotel management/administrative interface in **ReactJS** and a hotel reservation app in **Flutter/Dart**.

Key Projects

Flash: In-Memory Database | *Self Project* *(July'24)*

- Integrated **data persistence** with point-in-time snapshots and AOF for continuous logging of write operations.
- Built support for data types like strings, lists, **hashmaps, sorted sets (AVL trees)**, & **heaps** for TTL of keys.
- Incorporated support for **data streams** (sockets in C++) and **time series operations** for timestamped data.
- Accelerated performance using **asynchronous execution** & **thread pooling** (atomic operations for consistency).

Zeal Interpreter | *Self Project* *(June'24)*

- Developed an interpreter for the Monkey programming language using **flex** for lexical analysis and **bison** for parsing.
- Implemented an **object data model**, alongwith **first-class functions**, **higher-order functions** & **closures**.
- Constructed a **bytecode generation** module for efficient program execution on a **stack-based virtual machine**.

SCLP C-like Compiler | *Course Project: Implementation of Programming Languages* *(Apr'24)*

Instructor: Prof. Uday Khedkar

- Developed a C-like language compiler, with **language constructs** like **function calls, scopes & control flow**
- Implemented the different phases of compilation in C++ using **IRs** to translate high level code into machine code
- Executed register allocation to formulate **RTL** and implemented call stack functionality to generate **assembly code**

Raytracing Engine | *Self project* *(May'23)*

- Developed a ray-tracing engine in C++, with features like **motion blur**, **texture mapping**, and **perlin noise**.
- Created realistic Cornell Box scenes by adding **anti-aliasing**, **emissive lighting** and dielectric & metallic materials.
- Optimized rendering with **Bounding Volume Hierarchies** (grouping objects) and **Octrees** (spatial partitioning).

Enhancing xv6 | *Course project: Operating Systems* *(Oct'23)*

Instructor: Prof. Purusottam Kulkarni

- Implemented **priority-based**, **round-robin** and **multiple-queues** scheduling schemes for CPU process scheduling.
- Added **shared memory** functionality using syscalls and ensured synchronization using **spinlock** and **sleeplock**
- Incorporated techniques like **lazy page allocation** using modified **page fault** handling and memory allocation
- Integrated **multi-threading** functionality and implemented **semaphore** to enforce ordered execution using syscalls

Practical Near Neighbor Search via Group Testing | *Course project* *(May'24)*

Instructor: Ajit Rajwade

- Reduced lookup times by atleast **2.2x** & memory requirements by atleast **5%** for k-nearest neighbour search using **group testing** and distance-sensitive bloom filters, comparing against SOTA algorithms like **FLASH** and **FAISS**.
- Implemented the described technique in C++ and ran benchmarks on **PromethION, Webspam, URL** datasets.

Other Projects

Synth Bridge | *InterIIT Tech Competition* *(Dec'23)*

- Developed an AI-based project management system with **RAG** with MERN, Langchain, Redis, ChromaDB & AWS
- Secured **silver rank** in the **Trumio** problem statement and **bronze institute rank** in the InterIIT Tech competition

Cache Optimizations for Graph Analytics | *Course Project: Computer Architecture* *(Apr'23)*

Instructor: Prof. Biswabandan Panda

- Analyzed cache and **memory access patterns** for graph algorithms using Champsim micro-architecture simulator.
- Implemented **cache hierarchies** like Inclusive, Exclusive and **replacement policies** like LFRU, FIFO, LRU, LFU.
- Implemented **IPC for graph workloads** by analyzing different architectures on over 30 million CPU instructions.

Split-Lohmann Multifocal Displays | *Course project: Image Synthesis* *(May'24)*

Instructor: Prof. Parag Chaudhuri

- Implemented a paper on 3D display technology to simulate **object depth** & **eye accommodation on 2D displays**.
- Analyzed the **rendering pipeline** & reproduced results in MATLAB on different images, optical render in Blender.

Position of Responsibility

Seasons Of Code Mentor | *Web and Coding Club, IIT Bombay* *(May'23 - Jul'23)*

Selected to mentor 11 students in their Seasons Of Code project

- Conducted weekly sessions to explain fundamentals of **Full Stack Development** with **custom-prepared code**
- Guided mentees to use MERN stack to develop and deploy a voice-based social media platform like **ClubHouse**

Learner Space Mentor | *Web and Coding Club, IIT Bombay* *(May'23 - Jul'23)*

Selected to mentor about 300 students in their Learner Space project

- Guided mentees to learn the basics of **LaTeX** and **AMS-Math** to write reports, presentations and research papers.

Relevant Courses

Computer Science	Discrete Structures, Data Structures, Algorithm Design, Computer Architecture, Logic, Computer Networks, Operating System, AI & ML, Automata Theory, Compilers, Databases, Advanced Image Processing, Image Synthesis, Virtualization and Cloud Computing, Applied Algorithms, Game Theory, Advanced Compilers, Embedded Systems, Cryptography
Mathematics	Calculus, Linear Algebra, Differential Equations, Probability, Numerical Analysis
Data Science	Data Analysis and Interpretation, Optimization, Deep Learning, NLP

Technical Skills

Programming	C/C++, Python, Java, Bash, Rust, Go, x86-ASM, Dart
Full Stack	Javascript, React, Svelte, NodeJS, Django, MongoDB, Postgresql, ChromaDB
Others	Agentic Workflows & Automation, PyTorch, Tensorflow, Numpy, Docker, Git, flex, bison

Certifications

Tensorflow for Deep Learning Bootcamp | *Zero to Mastery* *(Jul'23)*

- Developed a deep learning model for **sequential sentence classification of medical abstracts**, by replicating the PubMed 200k RCT approach in the SkimLit project to improve readability of unstructured medical literature.
- Achieved **top-1 accuracy of 77.4%** in **food classification** on the Food101 dataset using mixed precision training.
- Developed **time series forecasting models** for Bitcoin price prediction, by utilizing historical data and applying techniques like **LSTM, 1D CNN and ensembling** to enhance forecasting accuracy & evaluate model performance.

The Complete 2023 Web Development Bootcamp | *Udemy* *(Jan'23)*

- Learned frontend technologies such as **Javascript, jQuery, EJS, Bootstrap, ReactJS**, and backend technologies such as **NodeJS, SQL, Mongoose and Motoko for Web3**, alongwith popular tools and the best practices.

The Complete Flutter Development Bootcamp with Dart | *Udemy* *(Mar'23)*

- Developed a **selfie attendance** app, a **memory flashcards** app, an **online music player** app, a **weather forecasting** app, a **basic cryptocurrency tracker** app using CoinAPI, a **realtime chat** app using **Firebase**, a **personal expense tracker**, alongwith the **provider** flutter package for state management, using Flutter/Dart.

Django REST API Development | *Udemy* *(Jul'23)*

- Proficient in **Django REST** framework for API development, covering authentication, pagination, and permissions
- Implemented **serializers, schemas, viewsets, filters, validators** & automated API testing for robust web services

Complete Angular Developer in 2023 | *Zero to Mastery* *(Jul'23)*

- Developed apps in TypeScript, **RxJS** & **WebAssembly**, emphasizing performance and scalability design patterns.
- Acquired skills in **memory leak management**, **Firebase** and Tailwind integration & production-level deployment.

Machine Learning Specialization | *Coursera* *(Jan'23)*

- Developed supervised models, neural networks, and decision trees using **numpy, scikit-learn and TensorFlow**.
- Created **recommender systems** & **deep RL model** to enhance predictive accuracy and recommendation quality.

Extracurricular Activities

- Secured first in the Institute-Level **Smash Karts Championship**, as a member of a five-person team *(Aug'22)*