Naman Nirwan

Indian Institue of Technology Delhi

Dual Degree in Computer Science and Engineering

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EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2026	(B.Tech + M.Tech) Dual Degree 5Y	Indian Institute of Technology Delhi	8.02 /10
2021	Intermediate (12th standard)	Dewan Public School, Hapur	95.60%
2019	High School (10th Standard)	Dewan Public School, Hapur	98.40%

AWARDS AND ACHIEVEMENTS

- **JEE Advanced:** Secured an **AIR 113 (GE)** in JEE Advanced 2021 among 200K Candidates clearing JEE Mains.
- **JEE Mains:** Secured an **AIR 110 (GE)** in JEE Mains 2021 among 1 Million Candidates with a percentile of **99.994**.
- **KVPY 2021:** Qualified KVPY, A science research fellowship from IISc. in year 2021 and Secured an **AIR 257 (GE)**.
- **NTSE 2019:** Qualified all stages (State + National) of NTSE, One of the Largest scholarship examination in year 2019.
- **CBSE 2019:** Scored **97%** marks in major and 98.4% overall, ranking in top 10 students in the city in Central Board.
- **CodeForces:** A specialist at Code Forces, the world's largest competitive programming platform, with a **1500+** rating.
- **Code Chef:** A 3 star coder at Code Chef, India's leading competitive programming platform with a **1700+** rating.

INTERNSHIPS

Large Language Model Internship — Highway9 Networks, U.S.A **Sep 2024 - Present**

- Worked in a startup setting for building a **virtual AI Engineer assistant** with Langchain, Langgraph, and Rags.
- Build an automatic regression framework for testing of non-deterministic assistant responses using **LLM as an evaluator.**
- Integrated **Arize Phoenix** with it for Responses and insights tracing, used for better understanding and debugging of assistant.
- The testing framework was used for comparison of assistant cost, latency, accuracy, and precision on multiple LLM models.
- Reduced the cost barrier from approx. **0.6 dollars** per chat to approx. **0.1 dollars** per chat using data sets to fine-tune the model.

Research Internship—CISPA, Germany **May 2024 - July 2024**

- Worked with **Satellite Communication Security at CISPA**, the world's leading research center for cybersecurity.
- Aim was to optimize for the best attack scenario given a budget constraint and a legitimate satellite constellation.
- Applied linear optimization methods, **Simplex and Karmarkar's methods**, for getting optimal satellite constellations.
- Used MATLAB's **Satellite and Antenna Toolbox** to visualize and simulate **Walker Delta** satellite constellations.
- Maximised the attack probability for **30, 60 and 90** degrees of coverage with spy satellites as low as **40-50 %**.

PROJECTS

Developed functionalities of xv6 OS — Prof. Abhilash Jindal **Jan 2024 - April 2024**

- **Hardware and Software Integration:** Implemented interrupt handling for mouse driver as a high priority operation.
- **Scheduling Sys Calls:** Priority-based system call scheduling in a pre-decided definite proportion for each process.
- **Page Replacement:** Using victim process policy, swap out the Main Memory page into swapped memory in the Disk
- **Copy on Write:** Used page copying only upon write operation. Enhances memory efficiency and performance.

Rollerball(Revised Chess) AI BOT — Prof. Mausam **Aug, 2023 - Dec, 2023**

- Developed and integrated **MiniMax** algorithm to evaluate and select optimal moves considering opponent strategies.
- Utilized advanced **heuristic evaluation** functions to assess the game board states and predict future outcomes.
- Employed a **cross-match** table for end game board to store optimal moves and their outcomes for faster decisions.
- Gained a success rate of **80%+** in an intra-batch rollerball tournament ending in the **4th position** on the leaderboard.

Database Memory Management and Query Processor — Prof. Kaustubh Beedkar **March 2024 - April 2024**

- Implemented a **B+ Tree** structure to optimize in-memory database storage, enhancing data retrieval and modification.
- Utilized **Apache Calcite** for **parsing SQL queries** and converting them into **relational algebra** for query processing.
- Implemented Physical Query Optimizers such as **Join, Project, Filter, Sort, Aggregates like (Sum, Avg, Max, Min).**
- Utilized physical operators to process complex SQL queries and compute results efficiently using databases.

Interpreter for Rational PL — Prof. S Arun Kumar **March 2023 - April 2023**

- Build a language for Rationals handling any size of numbers and computing binary and unary operations on them.
- Developed a language lexer and parser with strict type-checking in **Standard ML**, using tools like ML-lex and ML-yaac.
- Created an **Interpreter** in **Standard ML** to interpret all the boolean, integral, and Rational expressions and procedures.
- The Language offered implementation of **Commands, if-else, Loops, Procedures, Comments, Variables, scoping.**

Work in Theoritical C.S:

- **DSA:** Data Structures like **Heap, Binary Search Trees, Segment Trees, Red Black Trees, 2-4 Trees, Graphs** and Algorithms like **Sieve of Eratosthenes, BFS, DFS, Sorting Algos, Rabin-Karp, KMP, and Floyd's Algorithm**.
- **Computer Logic:** Studied proof systems **Natural Deduction and Hilbert System.** Learned in SAT solvers using the Resolution algorithm and CNF. Studied First Order Logic (FOL), including Resolution and First Order Theories.
- **Analysis and Design of Algorithms:** Learned different methods and techniques to come up with efficient algorithms in different use cases and also learned proving their optimality through structural induction or exchange arguments..

SKILLS AND EXPERTISE

Languages: C, C++, Python, Java, HTML, JavaScript, CSS, Bash, Standard ML, Prolog, MIPS, and x86 Assembly.

Technologies & libraries: Flask, MySQLdb, Figma, Git, Latex, Ml-lex, ML-yacc, Numpy , Pandas and Matplot.lib, Matlab, Satellite Toolbox, Antenna Toolbox, PostgreSQL, Apache Calcite, Copilot, Codespaces, Langgraph, Lnagchain, Langsmith, Jenkins, Arize Phoenix, Redis, Chromadb, LlamaIndex, OpenAI Evals, Finetuning, and Opentelemetry .

Computational Skills: Gradient Descent, Bayesian Networks, Markov Decision Process, Mini-Max Adversarial Search, Socket Programming, Networking Commands, Newton's, Simplex and Karmarkar's Methods, Dynamic Programming.

POSITIONS OF RESPONSIBILITY

Teaching Assistant — COL202: Discrete Maths for CS **Aug 2024 - Dec 2024**

- Helped Prof. Venkata Kopulla in succesful completion of a most fundamental course in Computer Science (COL202).
- Used to take doubt sessions on a regular basis and tutorial solving sessions every week for concept clarity of students.

COURSES DONE

Calculus, Intro. To Electrical Engg., Electromagnetic Waves & Qua.mec., Intro. To Computer Science, Linear Algebra & Diffe. Equa., Principles Of Elect. Materials, Probability & Stochastic Pro., Data Structures And Algorithms, Digital Logic & System Design, Design Practices, Computer Architecture, Signals And Systems, Programming Languages, Managerial Acc.& Finac. Mgmt., Computer Networks, Principles Of Artificial Int., Microeconomics, Discrete Mathematical Structur, Macro Economics, Intro. To Database Mgmt. Syst., Numerical Algorithms, Operating Systems, Intro To Automata & Th. Of Co., CryptoGraphy, Networks and System Security, Machine Learning, Analysis and Design of Algorithms, Cloud Computing, Computer Logic.