Dhruv Ahlawat

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EDUCATION

Senior - Btech. in Computer Science and Engineering   Delhi, India | current
INDIAN INSTITUTE OF TECHNOLOGY DELHI
 CGPA - 9.01

NOTABLE ACHIEVEMENTS

SCIENCE-
INTERNATIONAL OLYMPIAD ON ASTRONOMY AND ASTROPHYSICS - Won **Silver Medal** and represented India as a student-team member at IOAA 2021 hosted by Colombia.
JEE ADVANCE - Achieved an All India **Rank 82** out of nearly **200,000 candidates** in October, 2021.
JEE MAINS - Achieved an All India **Rank 120** out of nearly **1,200,000 candidates** in April, 2021.
IOQA - Achieved an All India **Rank 6** and got qualified to be in the Indian team at IOAA-2021
KVPY SA and SX - All India **Rank 147** at KVPY SA 2019, and **Rank 149** at KVPY SX 2020.
COMPETITIONS- Represented IIT Delhi at Mimamsa Science competition '24 and '23 held in IISER Pune and achieved runner up position in both. Achieved 2nd runner up position at Decoherence physics competition held in IISc. Bangalore.

PROGRAMMING-
COMPETITIVE PROGRAMMING- Majorly an **Expert** (rated 1800+) on Codeforces and **5-star**(rated 2000+) on Codechef
GAME-JAM Tryst - **Won First place** in the game-jam of 3 days hosted in IIT Delhi during Tryst 2021. Link to Web and Windows game files
QUBE DATA CHALLENGE 2025 Placed third in the data challenge hosted by Qube research technologies (QRT) at IIT Delhi.
TOWER RESEARCH LIMESTONE DATA CHALLENGE at IIT Delhi, Placed second and won a cash prize of 500,000 INR in this data analysis challenge involving a gambling game of blackjack bets.

INTERNSHIP

ANDROID MALWARE DETECTION ⬀   PYTHON, BASH, ML | MAY - JULY '23
My **summer research project** at IIT Roorkee, Involves feature extraction and reduction, and experimenting with ML methods to increase accuracy and reliability of malware detection software, along with decreasing inference time. Worked under Prof. Sateesh Kumar Peddoju at IIT Roorkee

QUANTITATIVE RESEARCHER AT TREXQUANT ⬀   PYTHON, ALPHAS, MACHINE LEARNING | MAY - JULY '24
Was a quantitative research intern at the India office of Trexquant.

- Experience with creating Alphas and using ML models for stock value and earnings surprise predictions.

- Worked on making a recommendation system to select alphas that perform well together for combining them to form trading strategies.

BTECH PROJECT

MULTIMODAL LANGUAGE MODEL FOR MATERIAL SCIENCE ⬀   LLMs, DOMAIN ADAPTATION, AI
We are working on building a multimodal large language model specialized for materials research. Last year we created a text-based LLM called **LLaMat** that acts as a materials science copilot. My work includes **debugging, data gathering and setup, model pretraining, finetuning and evaluation.** and I am working with Prof. Mausam and Prof. NM Anoop Krishnan.

COURSE PROJECTS

LANGUAGE IDENTIFICATION ⬀   PYTHON, MACINE LEARNING, SKLEARN, DATA ANALYSIS, NLP
Made a language detection classifier using only standard NLP techniques without deep learning . **Achieved first rank** in this assignment amongst 58 students and a full bonus mark, by creating an improved naive Bayes model that handles the inaccuracies present in training data.

TABLE QUERY NLP ↗ Python, NLP, LSTM, Pytorch

created a custom attention system and training and batching pipeline to answer queries and get cells with the answer based on tabular data.

- Using only Pytorch, Received distinction with a full bonus mark which only 4 out of 40 students received. **Capable of parsing tables even with > 30000 rows** which generally fails for language models due to context length.

- Using prompt finetuning on Gemma - achieved 8th rank out of 40 students and few bonus points.

PEER TO PEER FILE DISTRIBUTION SYSTEM ↗ Python, Multithreading, sockets, TCP/UDP

: implemented an efficient P2P file distribution system between peers using python's low-level networking tools. Built appropriate interfaces to handle UDP and TCP data. Peer to peer file sharing during download results in significantly less load on the server while also increasing speed.

HOSPITAL DATABASE CREATION, SQL QUERIES, AND INDEX CREATION ↗ SQL, Java, Database

- Created a **B+ Tree index, an extendible hashing index, and a bitmap index** along with a query parser that performs queries on data from a CSV file, in Java.

- **created a large database** that conforms to various rules, using SQL

- wrote **SQL queries** to handle complicated retrieval tasks.

MARKDOWN-TO-HTML CONVERTER IN SML ↗ SMLNJ

Designed a parser script that takes an input Markdown file and converts it into an equivalent HTML file. Lists(with nests), blockquotes(with nests), and headers, paras, line breaks, bold, italics, links, codeblocks are implemented as markdown, but with additional error checking. Additional things added are underline, and tables, with a syntax specified.

RENDERING AND MESH MODIFICATION IN COMPUTER GRAPHICS ↗ c++, Graphics, rendering,
RASTERIZATION

- Wrote a software renderer capable of rendering diffuse and specular shaded objects, using rasterization.

- Created a half-edge datastructure to store meshes for effecient querying, and created functions to modify meshes like extruding faces, subdividing the surface, performing catmull-clark smoothing, revolution etc.

RELEVANT COURSES TAKEN

Completed, along with grades out of 10

- Datastructures and Algorithms - 9 (A-)
- Probability and Stochastics - 10 (A)
- Computer Architecture -9(A-)
- Digital Logic and System Design - 10 (A)

- Discrete math for computer science - 9 (A-)
- Differential Equations and Linear Algebra - 10 (A)
- Introduction to Programming - 10 (A)
- Principles of AI - 10 (A)

- Machine Learning ML - 8 (B)
- Programming Languages -9(A-)
- Parallel programming - 9(A-)
- Operating Systems - 9(A-)

SKILLS

Programming Languages: Experienced in **C++, Python, C, MATLAB, Java, BASH (shell) ,SML, VHDL**
Softwares and Technologies: Jupyter notebook, Pytorch, Matplotlib, Scikit-learn, Unity, Java, Maven
Languages: **English**, Hindi and basic French (Learnt french for 4 years in school)

POSITIONS HELD

Aeromodelling Club - A Coordinator of the Aeromodelling Club of IITD. mainly responsible for programming autonomous drones, piloting, and leading the club.
Physics and Astronomy Club -As An active member of this club, we host themed events, physics based competitions, stargazing sessions, and I've also written blogs on interesting topics.