Sankalp Mittal

Junior Undergraduate
Department of Computer Science and Engineering

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Academic Qualifications

Year	Degree/Certificate	Institute	CPI/%
2022 - Present	B.Tech	Indian Institute of Technology Kanpur	**9.3**/10
2022	CBSE(XII)	Bhavan Vidyalaya, Panchkula	96.6%
2020	CISCE(X)	Yadavindra Public School, Patiala	92.4%

Scholastic Achievements

- Secured **All India Rank 109** in **JEE Advanced 2022**, conducted by **IIT Bombay** amongst the 250,000 shortlisted candidates
- Secured **All India Rank 76** amongst the approximately 1 million applicants in **JEE Mains 2022**, conducted by the **NTA**
- Selected for a **Semester Exchange Program** to **EPFL, Switzerland** having a **World QS University Ranking of 36**
- Recipient of the **Class of 1990 Scholarship, IITK** by SSPC for the year **2022** for having **exceptional JEE Advanced Rank**
- Awarded the **Academic Excellence Award** for exceptional academic performance for the years **2022-2023** and **2023-2024**
- Qualified **Kishore Vaigyanik Protsahan Yojna (KVPY) 2022**, conducted by **IISc Banglore**, with **All India Rank 96**
- Amongst the **35** students, throughout the country, to qualify the **Indian National Mathematics Olympiad (INMO) 2022**
- Amongst the **53** students, throughout the country, to qualify the **Indian National Chemistry Olympiad (INChO) 2022**
- Amongst the **32** students, throughout the country, to qualify the **Indian National Astronomy Olympiad (INAO) 2022**
- Among the **300** students, in the country, to qualify the **Indian Olympiad Qualifier in Physics (IOQP), Part-I 2022**

Work Experience

Speech Technologies in Indian Languages | **MADHAV Lab** | *Mentor:* ***Prof. Vipul Arora*** *(Dec' 23)*

Objective	• Created a Speech-to-Text system for use by **Prasar Bharti (Doordarshan)** in regional language channels
Execution	• Experimented with **VAD** models, **PANNs**, **SileroVAD**, **FSMN-VAD** and **WebRTC** using Hindi news audio • Implemented **streaming ASR** using **ESPnet** from the microphone of the local device without **loading** audio • Implemented a **streaming ASR model** for Hindi using **offline ESPnet model**, to **reduce training effort**
Result	• Created a **process** that successfully allowed any **ESPnet style offline model** to be used for **streaming**

Competitive Programming

- Experienced competitive programmer with a peak rating of **1733 (Expert)** on **Codeforces** and **1669** on **Codechef**
- Secured **Global Rank 863** in **Codeforces Round 955**(Division 2) and **Global Rank 266** in **Codechef Starters 141C**

Key Projects

Elysium | ***CS253*** *course project* | *Mentor:* ***Prof. Indranil Saha*** *(Jan'24 - Apr'24)*

- Collaborated with a team of **10** to develop a **Full Stack Web Application** using **MERN Stack** for **Sports and Wellness**
- Implemented a **priority based booking system** that utilizes user history to calculate **dynamic scores** optimizing efficiency
- Implemented a matchmaking system **Matching Players** using a **ladder based rating system** during the **booking step**
- Maintained **comprehensive documentation** of the entire project and extensively both **alpha** and **beta** tested the application

Algebraic Circuit Complexity | ***Under-Graduate Project*** | *Mentor:* ***Prof. Nitin Saxena*** *(Jan'24 - Apr'24)*

- Learnt about models of **computational complexity** like **Arithmetic Circuits** and **Algebraic Branching Programs**
- Read research papers that used **Valiant's Criterion** and **Border Complexity** to prove lower bounds for **special circuits**
- Presented a **30 min talk** on a few research papers that showed **super-polynomial lower bounds** for these special circuits

Hack Companion Arbiter PUF | ***CS771*** *course project* | *Mentor:* ***Prof. Purushottam Kar*** *(Jan'24 - Apr'24)*

- Designed a **mapping** for data based on transforming the **CAR-PUF** from a **non-linear** to a **linear model** using **matrices**
- Experimented with **Linear Models**, like **Logistic Regression, Linear Regression, Ridge Regression** for hacking the PUF
- Tuned the **hyper parameters** like **tolerance** and **loss function** to find the best ones for each model, using **Grid Search**

Verilog FPGA | ***CS220*** *lab project* | *Mentor:* ***Prof. Mainak Chauduri*** *(Jan'24 - Apr'24)*

- Designed a **32-bits MIPS processor** using **Verilog HDL** ,and Implemented it on a **Xilinx Spartan 3e FPGA** board
- Designed a **7-state FSM** handling **fetch**, **decode** and **execute** cycles, ensuring accurate instruction processing and control flow
- Worked with **MIPS Assembly** using **SPIM** to implement and simulate algorithms for **Binary Search** and **Array Addition**

Technical Skills

- **Programming Languages:** C, C++, Python, JavaScript, Verilog, MIPS Assembly
- **Softwares & Libraries:** Jupyter, Bash, Git-Github, LaTeX, Pandas, NumPy, Matplotlib

Relevant Courses

Data Structures and Algorithms (A)	Fundamentals of Computing - I, II (A,A*)	Discrete Maths (A)
Software Developement and Operations	Introduction to Electronics (A)	Introduction to Machine Learning (A)
Probability for Computer Science	Mathematical Logic	Computer Organization