

Antreev Singh Brar

4th Year Undergraduate — Department of Computer Science and Engineering

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Academic Qualifications

| Year | Degree/Certificate | Institute | CPI/% |
|----------------|--|--|--------|
| 2019 - Present | B.Tech in Computer Science and Engineering | Indian Institute of Technology, Kanpur | 9.7/10 |
| 2019 | Class XII (CBSE) | LRS DAV Sr. Sec. Model School | 92% |
| 2017 | Class X (ICSE) | Assumption Convent School, Abohar | 94.8% |

Achievements & Awards

- Awarded **Aditya Birla Scholarship**, Amongst top **15 CSE** candidates across all IITs
- Awarded **Academic Excellence Award**, IIT Kanpur for perfect **10 CPI** in 1st year
- Awarded **Academic Excellence Award**, IIT Kanpur for exceptional performance in the academic year 2020-21
- Awarded **Prof.JN Kapur Prize**, IIT Kanpur for the best Second year undergrad in the Math courses
- Achieved **All India Rank 119** in IIT JEE-Advanced 2019 out of 245,000 candidates
- Achieved **All India Rank 179** in IIT JEE-Mains 2019 out of 1.3 million candidates
- Achieved **All India Rank 72** in KVPY 2019, Conducted by IISC and Gov. of India
- Among **top 1%** in **NSEC & NSEA** 2019, and qualified for **InChO & INAO** conducted by HBSCE in 2019
- Awarded **NTSE Scholarship** by the Gov. of India for being amongst top **1000** students across the nation
- **Papertowns: An AR product** approved under the Pre-seed Ideation Program, IIT Kanpur

Work Experience

Tower Research Capital

May'22 - Jul'22

Limestone Team, Quant Researcher Intern

- Built statistical models to generate **long-range alphas** for an aggressive trading strategy using market signals
- Employed various sampling and feature selection techniques to efficiently use extensive historical data and collect stock agnostic features for enhanced model generalization
- Experimented with various modelling techniques- **NGBoost**, **XGBoost**, **Decision tree**-based models and developed architectures to capture prediction uncertainty and confidence intervals
- Designed effective **de-noising pipelines** to realize improved predictions and PnL scores

Prior-free Strategic Multiagent Scheduling

Jul'20 - Nov'20

Research Project under Prof.Swaprava Nath

📄 Research Paper

- Implemented an effective priority-based scheduling algorithm to maintain social distancing among visitors in a crowded store
- Proposed mechanism transformed the user-preference matrix into Linear Programming problem and assigned delay (payment) via **Vickery-Clarkes-Groves** (VCG) rule
- Utilized the novel approach in the backend development of Mobile application **Doori**

Sogage

May'21 - Jul'21

Software Engineering Intern

- Implemented a data-fetcher using **Django REST framework** to publish user's account data in **Google Cloud Pub-Sub**
- Designed and implemented a robust data pipeline using **Apache Beam** to transform streaming data and store it in **Google Big Table**. Also designed a common schema to harmonise data from all social media networks

Projects

Building GemOS - Operating Systems

Aug'21 - Nov'21

Course Project, Prof. Debadatta Mishra

- Created **file archiving utility** and enabled **IPC** using system calls like pipe(), fork() and exec()
- Implemented system calls for pipe and persistent pipe structures sharing order preserved data concurrently
- Developed a series of threading APIs with private memory areas by extending clone() system call
- Built a debugger for functions using **INT3** featuring stack backtrace of functions

Golang to MIPS Compiler - Compiler Design

Jan'22 - Apr'22

Course Project, Prof. Amey Karkare & Prof. Subhajit Roy

🔗 Project

- Implemented a Golang compiler from scratch with assembly language generated for **MIPS64 bit** architecture
- Designed a **lexer**, **parser** and **semantic analyzer** that supports Go features including Multidimensional Arrays, Short Variable Declaration, Multilevel Pointers, Structs, Floats, Strings and Switch statements.
- Implemented Advanced features such as automatic type inference, short-circuit evaluation, compile-time constant expressions evaluation, pointers, multi-level break, recursion, string manipulation functions and basic features like conditionals, loops, functions and warning generation for erroneous programs.
- Awarded with the **best** score for the project among all groups in the course.

Adversarial Training is All You Need

Jan'22 - Apr'22

Course Project, Prof. Priyanka Bagade

🔗Project

- Examined the defense of Adversarial Training against **Poisoning attacks** by implementing the defense against **BadNet**-type backdoor attack and Clean Label backdoor attack in Keras
- For clean label attack, the method increased the test accuracy on images with backdoor from 1.39 % to 90.68% on MNIST
- For Badnet attacks, the method increased the test accuracy on images with backdoor from 1.17% to 91.71% on MNIST and from 8.64% to 54.86% on CIFAR-10

GenCoin/IITkcoin

May'21 - Jul'21

Programming Club IIT Kanpur

🔗Gen-Coin

- Developed a Centralised pseudo-coin system in GoLang for IITK Campus with **net/http** library for client/server implementation
- Involved Database Management, User Authentication with Hashing & Salting and User Validation with JSON Web Tokens(JWTs) using **bcrypt** and **jwt-go** packages
- Explored and implemented various techniques such as concurrency and deadlock prevention to keep transactions safe in **SQLite** engine and maintain ACID properties in the **SQL** database

IITKBucks

Apr'20 - Jul'20

Programming Club IIT Kanpur

🔗IITKBucks

- Developed my own client for a custom **Blockchain based Cryptocurrency** using **NodeJS** and **ExpressJS**
- Implemented Multi-Threading for Block-Miner, to run in parallel with server and **ngrok** to propagate blocks and data among peers

Model Zoo

Apr'20 - Jul'20

Programming Club IIT Kanpur

🔗Model-Zoo

- Studied **Deep Learning** research papers and implemented them from scratch using **Keras**
- Explored domains of Computer Vision , GANs and MultiModal Neural Networks
- Worked with **YOLOv3**, **SS-GAN**, **ResNet-34** models and **CIFAR-10**, **MNIST**, and **Flickr8k** datasets with max acc. of 91.8%

Speech Ledger

Oct'20 - Nov'20

FlipkartGrid 2.0

🔗Speech-Ledger

- Developed a custom pipeline for Background noise suppression, Speaker Segmentation & Diarization, and voice-to-text translation
- Fine tuned **Dual-Signal Transformation LSTM** Network for Real-Time Noise Suppression, Text-independent Speaker recognition module based on **VGG**-Speaker-recognition as Encoder and Speaker diarization based on **UIS-RNN** as Decoder to work synchronously with Flipkart's voice-to-text API

Competitive Programming

- **Codeforces : [Handle: wolfiee]** Maximum rating of **1929 (Candidate Master)**
- **Google Kickstart 2021** : Global Rank **231** in Round D and **488** in Round C among more than 10,000 participants
- **ICPC 2021** : Achieved Rank **91** in Preliminary and **308** in Amritapuri regional round out of 7000+ teams

Technical Skills

Proficient: C ▪ C++ ▪ Golang ▪ Python ▪ Javascript

Web Development: NodeJS ▪ Django ▪ Express ▪ HTML

Utilities: Git ▪ Docker ▪ Kubernetes ▪ SQLite ▪ Apache Beam ▪ TensorFlow ▪ Matplotlib ▪ \LaTeX ▪ Keras ▪ Bash ▪ Vim

Exposure: ReactNative ▪ Verilog

Relevant Coursework

Data Structures and Algorithms

Advanced Algorithms

Linear Algebra and Ordinary Diff. equations

Mathematics for Computer Science

Derivative Contracts*

Compiler Design

Computer Network

Multivariate Calculus

Logic in Computer Science

Intro to ML*

Operating Systems

Computational Genomics

Deep Learning for Computer Vision

Image Processing*

* - Ongoing Courses

Positions of Responsibility

- **Secretary, Programming Club IIT Kanpur**
Organised various Pclub events throughout the year
- **Teaching Assistant, Data Structures and Algorithms**
Tutored Data structure course to 2nd year Undergrads at IITK.
- **Secretary, Academics and Career Council IIT Kanpur**
Coordinated a blog series, and organised various events of AnC
- **Student Guide, Counselling Service IIT Kanpur**
Guiding and Leading 6 freshmen into college life at IIT Kanpur