Sarthak **Singhal**

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Educational Qualifications

Year	Degree	Institution	CGPA/%
July'17 – May'21(Expected)	B.Tech, CSE	Indian Institute of Technology, Kanpur	9.73/10.0
2017	AISSCE – XII	Sanskar School, Jaipur	94.2%
2015	CBSE – X	Tagore Public School, Jaipur	10.0/10.0

Scholastic Achievements

2018	**Academic Excellence Award**, given to Top 10% of the batch	*IIT Kanpur*
2017	**All India Rank 169**, Joint Entrance Examination Advanced among 200,000 candidates	*India*
2017	**All India Rank 78**, Joint Entrance Examination Mains among 1.5 million candidates	*India*
2017	**National Top 1%**, National Standard Examination in Chemistry (NSEC)	*IAPT*
2016	**All India Rank 173**, KVPY Scholarship by Indian Institute of Science	*Bangalore, India*

Programming Achievements

2019	**Team Rank 88**, ACM-ICPC'19 Amritapuri regionals in 350 teams selected from 4500 teams	*Codechef*
2019	**All India Team Rank 31**, Google Hash Code 2019	*Google*
2019	**Google foo-bar challenge**, Completed all the 5 levels	*Google*
2018	**Team Rank 179**, ACM-ICPC'18 Amritapuri regionals in 250 teams selected from 3000 teams	*Codechef*

Work Experience

D.E. Shaw India Private Limited — *Hyderabad, India*
SDE Intern, DESFlow — *April 2020 - June 2020*

- Built an attachment prediction system for the internal ticketing management system, DESFlow.
- Experimented with various keyword based and ML based algorithms and built a Machine Learning model using the combination of Naïve Bayes and Graham's algorithm and achieved 90% precision, 59% recall and 90% accuracy.
- Improved the Graham's algorithm and employed normalized keyword approach on top of the Machine Learning model to improve the recall to 67% and precision to 91%.
- Extended the solution to handle similar use cases like setting the due date and closing the request and also added the support for active learning for model to evolve over time.

Google Summer of Code — *India*
Software Developer, Boost C++ — *May 2019 - August 2019*

- Integrated Boost.Units with the existing base coordinate system and restructured all the classes to make them compatible with units to provide a robust astronomical coordinate system.
- Created the parser for binary table extension and ASCII table extension for FITS File system.
- Used Template Meta Programming in C++ to provide almost no run-time overhead and allow users to write scientifically infallible code by detecting all the errors at the compile time.

Summer of Code, IIT Kanpur — *IIT Kanpur, India*
Full Stack Developer, Under Prof. Sandeep Shukla — *May 2018 - July 2018*

- Developed a dynamic and scalable web application using LAMP stack from scratch as an initiative to improve the medical system by keeping track of records of patients and their medical history.
- Implemented various functionalities like doctor could add a patient, update its records, refer it to another doctor, etc. and patient could search for doctors and the labs in his area.
- Developed a question-answer platform for the medical system which had the functionality to filter the questions based on illness, search questions based on keywords, notifications for patients if their questions get answered, etc.
- Technologies and languages used: PHP, MYSQL, AJAX, HTML, Javascript, Microsoft Azure(for deployment).

Skills

Programming	C/C++, Python, Java, Haskell, Bash Scripting, Verilog
Web	PHP, HTML5, CSS, Javascript, SQL, Node.js, React Native
Utilities	Linux Shell Utilities, Git, Vim, LaTeX

Relevant Courses

Introduction to Programming	Linear Algebra	Introduction to Logic	Probability
Discrete Mathematics	Data Structures and Algorithms	Software Labs	Algorithms-II
Computer Organization	Introduction to ML	Operating Systems	Theory of Computation
Compiler Design	Computer Networks	Database Systems	Computer Architecture

Projects

Building gemOS
Course Project, Prof. Debadatta Mishra
IIT Kanpur
July 2019 - November 2019

- Implemented file system syscalls including open, write, pipe, etc.
- Implemented multi-level paging management for syscalls like mmap, munmap and mprotect.
- Implemented smart process creation for system calls like cfork and vfork by properly managing the processes.
- Designed a read-write lock and parallelized hash tables using multi-threading.

DCaptcha
Course Project, Prof. Purushottam Kar
IIT Kanpur
November 2019

- Built a CAPTCHA decoder using OpenCV for Image Preprocessing and Segmentation.
- Used PyTorch for building a CNN for character recognition after segmentation.

Address Book
Course Project, Prof. Nisheeth Srivastava
IIT Kanpur
August 2019

- Built an address book for cricketers for storing their details and batting average using Bash scripting.
- Added the functionalities for add, update, search and remove the data.
- Also built a tool to scrape Indian ODI players' records from Cricinfo to populate the address book.

Basics of Reinforcement Learning
Association for Computing Activities, Department of CSE, IIT Kanpur
IIT Kanpur
Jan 2018 - March 2018

- Learned about Markov Decision Processes, Q-Learning and SARSA.
- Implemented Q-learning algorithm to find the shortest possible path to reach diagonally opposite corner in a rectangular grid with obstructions and zero knowledge of environment.

Miscellaneous

- Rated Expert on Codeforces and 5-star on CodeChef.
- Developed a hybrid value predictor for a given simulator using techniques like smart training, blacklist filtering, PC-AM, etc.
- Constructed a parser using flex and bison to obtain ASTs of the input Java programs.
- Built an android app using MERN stack to manage the upcoming coding contests and hackathons.
- Developed a decoder in Haskell to decipher monoalphabetic substitution cipher.
- Designed a live cricket score updater using Bash Scripting and RSS feeds.
- Secretary in Association of Computing Activities, IIT Kanpur from April 2018 - April 2019. Helped in conducting coding contests, hackathons and other events in the campus.
- Mentored students in a summer project Algorithms InDepth organized by Programming Club IIT Kanpur.
- Built a shell similar to BASH with some basic functionalities like executing commands, storing history, etc.