Alapan Chaudhuri

Undergraduate Researcher, CSTAR, IIITH

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Education

International Institute of Information Technology, Hyderabad
B.Tech. (with Honors) in Computer Science and Engineering — *July 2019 - Present*

- **Research Interests:** Quantum Information, Computational Complexity, Programming Languages and Machine Learning Theory
- **CGPA: 8.93/10**

Experience

Quantum Private Information Retrieval
Signal Processing and Communication Research Center, IIITH — *May 2021 - Present*

Working on QPIR capacity and protocols under different scenarios like replicated servers or maximum distance separable coded servers with Prof Prasad Krishnan.

Data Visualization Intern
Trivedi Center for Political Data, Ashoka University — *Dec 2020 - Jan 2021*

- Worked on the data set of Indian Governors to produce visualizations focused on understanding trends, outliers, and patterns in the data.
- Performed large scale web scraping and data cleaning in order to ensure correct standardized data.

Student Moderator at NQSTS
National Quantum Science and Technology Symposium — *July 2021 - Aug 2021*

Worked as a student volunteer and moderator as a part of the organizing committee of NQSTS 2021, an intiative of IEEE Quantum, IIITH and the Quantum Ecosystems Technology Council of India in association with the Office of the PSA, Govt. of India.

Projects

Games and Computational Complexity
Supervisor: Prof. Kannan Srinathan — *Sep 2020 - Nov 2020*

- Proved the video game 'CELESTE' is NP-complete and also how under certain changes it could have been PSPACE-Complete.
- Presented a dissertation explaining how computing different versions of Nash Equilibrium is PPAD-complete.
- Wrote an introduction to Constraint Logic, as a part on 'Formalisms for Modelling Games', based on original work by Demaine et al.

Pre-print for the above work can be found at arXiv:2012.07678.

Christine
Christine — *Oct 2020*

- Discord-bot that moderates sexual harassment along with toxicity and depressive behavior majorly using sentiment analysis.
- Used 1.6 million tweets for scaling depression from 0 to 4. Python NLTK framework was used for the same.
- **Technologies Used:** Python, Google Cloud, JavaScript, Perspective AI.

Synopsys
Synopsys *Oct 2020*

- Discord-bot that summarizes conversations and records them for future use.
- It extracts data from a chain of conversation, summarizes it and allows the user to have easy access to these stored summaries (via website) for future reference.
- **Technologies Used:** Python, nltk, Firebase and Firestore, Google Cloud, React JS.

Dotabase
Dota2-Analyzer *Sep 2020*

- Analyzer for professional matches in popular game Dota 2.
- Implemented a fully functioning DBMS based on data scraped from OpenDota and built a suitable CLI using Python.
- **Technologies Used:** MySQL, Pymysql, Python.

Mariam: a Linux Shell
Mariam *Aug 2020 - Sep 2020*

- Basic shell/terminal implemented from scratch in C using Linux system calls.
- Includes piping, redirection, signal handling as well as extensive error handling.
- **Technologies Used:** C, Linux, Operating Systems.

Improvements on xv6
Improved xv6 *Aug 2020 - Sep 2020*

- Added new system calls and three new schedulers which can be selected on compile time (FCFS, PBS, MLFQ) to the original MIT xv6 kernal.
- **Technologies Used:** C, Unix, Concurrency, Scheduling, Operating Systems.

Awards

- Highest rating 1795 on Codeforces
- Highest rating 1967 on Codechef
- *First Place Overall* – Kent Hack Enough
- *Best Web Application* – Hack At Home
- Top 6% (National) in Google HashCode 2020
- Certificate of Merit for the National Olympiad in Physics (2019) organized by the Indian Association of Physics Teachers
- Perfect score at the regionals of the Indian Computing Olympiads (2018) organized by the Indian Association for Research in Computing Science

Skills

Primary Languages: C, C++, Python, LaTeX, Bash, x86, Haskell
Quantum: Cirq, Q#, Qiskit
Theorem Provers: Lean, Coq
Web: JavaSrcipt, React, HTML/CSS, MySQL, MariaDB
ML: Tensorflow, Tensorflow Quantum
Miscelleneous: Google Cloud, Azure, Firebase, Linux, Git

Positions of Responsibility

Club Coordinator
Theory Group, IIITH *Sep 2020 - Present*

Responsible for several initiatives of the club including co-starting the club's youtube channel which features talks by research students and alumni.

Moderator
Programming Club, IIITH *May 2020 - June 2021*

Co-created an online platform to promote problem solving during 2020 Pandemic. Also, organized seminars and sessions on algorithms and data structures for the student community.

Overall Coordinator
Literary Club, IIITH *June 2020 - Present*

Co-heading the club and in-charge of hosting and organizing events. Along with being responsible for all club operations, organised a major collective literary event in collaboration with 8 other student bodies of IIITH.

Marketing Coordinator
Electronics and Robotics Club, IIITH *June 2020 - Dec 2020*

Responsible for marketing policies on behalf of the club. Previously associated with events organisation and technical support as well.