Alapan Chaudhuri

Undergraduate Researcher, CSTAR & CQST, IIITH

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Education

International Institute of Information Technology, Hyderabad
B.Tech. (with Honours) in Computer Science and Engineering (8.87/10) *July 2019 - Present*
Teaching Assistant: Automata Theory

Experience

Entanglement Detection
Centre of Quantum Science and Technology, IIITH *Oct 2021 - Present*

- Working with Prof Indranil Chakrabarty on devising machine learning based approaches for quantum entanglement detection.
- Studied the problem of quantifying non-Markovianity of quantum evolutions using quantum resources such as entanglement.

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, colluding and/or coded servers with Prof Prasad Krishnan.

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

Worked as a student moderator for the organizing committee of NQSTS 2021, organized by IEEE Quantum, QETCI and Office of the PSA, Govt. of India.

Projects & Open Source

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

- Proved the video game 'CELESTE' is NP-complete (original work).
- Presented a dissertation explaining computational complexity of different games using constraint logic (by Demaine et al.) or classes like PPAD (under the context of Nash Equilibrium).
- Pre-print for the above work can be found at arXiv:2012.07678.

Cirq
Google QuantumAI (cirq) *Aug 2021 - Present*

- Working on implementing support for OpenQASM3 in Cirq (ongoing).
- Updated `cirq.Circuit` to `cirq.AbstractCircuit` for compatibility.
- Implemented rotation gate and serial concatenation of Kraus Operators (with Zeeshan Ahmed).

Christine
Christine *Oct 2020*

- Discord-bot that moderates sexual harassment along with toxicity and depressive behavior using approaches such as sentiment analysis.
- Used 1.6 million tweets for constructing a working scale to measure depression from text messages. Python NLTK framework was used for the same.
- **Technologies Used:** Python, Google Cloud, JavaScript, Perspective AI.

Technical Projects

Rogue One: a Game
Rogue-One — *Apr 2021*

- Implemented a space-ship battle game using WebGL. Further, designed an animated trailer for the game using Blender.
- **Technologies Used:** JavaScript, WebGL, Blender.

Canswer Mobile App
Caregrades Technologies Pvt. Ltd. — *Feb 2021 - Apr 2021*

- Created a mobile app (published in playstore) for patient engagement and remote connected care along with a similar version designed for hospitals to connect them to patients directly.
- **Technologies Used:** JavaScript, Firebase, React JS, Python.

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.

Awards

- **Ranked *9th*** in ACM ICPC Regionals 2020-21 (Gwalior-Pune)
- Certificate of Merit for the National Olympiad in Physics (2019) organized by the IAPT
- Sports Programming: highest rating 1795 on Codeforces and 1967 on Codechef
- *First Place Overall* – Kent Hack Enough 2020

Skills

Primary Languages: C, C++, Python, LaTeX, Bash, x86, Haskell
Quantum: Cirq, Q#, Qiskit
Web: JavaSrcipt, React, HTML/CSS, MySQL, MariaDB
ML: Tensorflow, Tensorflow Quantum

Positions of Responsibility

Club Coordinator
Theory Group, IIITH — *Sep 2020 - Oct 2021*

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

Interests

Quantum Computation and Information, Programming Language Theory, Algorithms and Optimization