Alapan Chaudhuri Computer Science Undergraduate

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Experience

AYERS LAB, MCMASTER UNIVERSITY | Collaborator

June 2022 - Oct 2022 | Hamilton, Canada

- Worked with Dr Paul Ayers on optimization algorithms for solving the positive semidefinite Procrustes problem, and extending the Procrustes python library.

CENTRE OF QUANTUM SCIENCE AND TECHNOLOGY | Research Assistant

Dec 2021 - Present | Hyderabad, India

- **Adiabatic Quantum Computing**: Working with Prof Shantanav on algorithms to predict avoided crossings for quantum systems under adiabatic evolution.
- **Entanglement Detection**: Working with Prof Indranil on identifying the degree of entanglement of any quantum state, using semi-supervised generative models.

QUALCOMM INNOVATION CENTER | Compiler Engineering Intern

May 2022 - June 2022 | Austin, Texas

- Worked with the LLVM team to improve the Hexagon DSP by switching from building its own decodetree to that provided by QEMU's python infrastructure.

Projects and Open Source

RACKET COMPILER | Functional Programming, Compiler Design, Racket

2022

- Developed a nano pass compiler for a subset of racket language. Optimized register allocation using graph coloring and implemented tail-call elimination.

QUARKSTONE | Python, Rust, Linear and Quadratic Programming

2022

- Building a library for asset pricing and portfolio optimization to port onto a trading terminal for investment research across the Indian financial markets.

PAULIZEE | Qiskit, Python, Quantum Simulation

2021

- Implemented a hybrid Hamiltonian simulation framework using optimized trotter methods and benchmarked it against the default Qiskit implementation for Heisenberg Spin Chain configurations on a 7-qubit IBM quantum computer.

BENCHMARKING GRAPH CLASSIFICATION | PyTorch, Graph Neural Networks

2021

- Designed a maximally powerful GNN under neighborhood aggregation and compared it with Graph Isomorphism Networks and the Weisfeiler-Lehman Test.

CIRQ, GOOGLE QUANTUM AI | Python, Scientific Programming

2021

- Implemented the generic rotation gate, serial concatenation of Kraus Operators and minor structural updates, with Zeeshan Ahmed.

NOSTRADAMUS | Python, Yahoo Finance API, Statistical Learning

2021

- Closely studied 28 stocks across 5 sectors and monitored the behavior of 10913 tickers to explore correlations between stock prices and environmental factors.

CHRISTINE | Python, NLTK, Google Cloud, Perspective AI

2020

- Created a Discord bot to moderate online toxicity. Further, used 1.6 million+ tweets to develop a tool for assessing depression from text messages.

Education

IIIT HYDERABAD

B.Tech. and M.S. in Computer Science and Engineering

July 2019 - Present | Hyd, IN

CGPA: **9.15** (in-major), 8.66 (overall)
Teaching Assisstant: Linear Algebra (Spring '22)
Literary Club Coordinator, NQSTS'21 Moderator

Skills

C/C++ • Python • Haskell • PyTorch
Cirq • Q# • Qiskit • Pennylane • Coq
TensorFlow • JavaScript • React JS

Achievements

ICPC World Finalist: Qualified for the 46th ICPC World Finals. Placed 4th at the Asia West Continent Finals 2021-22.

Ranked 9th in ICPC Asia Regionals 2020-21 from Pune site.

GSOC 2022: Contributed to Open Chemistry (project link).

Megathon 2022: 3rd overall under Stallantis for trip enhancement.

Winner of **Quantum Chemistry Challenge** at QHack 2022 by Xanadu.

Winner of Goldman Sachs Challenge at Texas A&M Datathon 2021.

Certificate of Merit for the 2019 Indian Olympiad Qualifier in Physics.

Publications

Nostradamus: Weathering Worth
PAKDD 2023 (in rev) | arXiv:2212.05933

Classifying CELESTE as NP Complete
CST 2022 | arXiv:2012.07678

Interests

Quantum Computation
Algorithm Design
Formal logic and Programming
Quantitative Finance
Observational and Anectodal Comedy
Songwriting and Composing