Aditya Morolia

CSE Student — Undergrad Researcher (Quantum Computing) at C-STAR, IIIT Hyderabad

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EDUCATION

B.Tech in Computer Science and MS by Research in Computational Natural Sciences   **IIIT Hyderabad**

📅 *July 2017–Present*   📍 *Hyderabad*

CGPA: 8.65

WORK EXPERIENCE

Summer Analyst   **Goldman Sachs**

📅 *June 2021 - July 2021*   📍 *GS Bengaluru, India*

- Worked on SecDB Architecture in the Saral Trading Team, which designs and implements state of the art distributed database systems for SecDB.

Technical Staff   **AICrowd**

📅 *April 2020–July 2020*   📍 *WFH*

- Built a simulator for the purpose of hypothesis testing on our reputation and ranking system in **Python**, then added features on the basis of the observations to the **Rails web app**
- After **winning** the campus **Reinforcement learning** challenge DroneRL, I was responsible for creating a new in house RL challenges.
- Developed a new **Django web app** named AICrowd classrooms.

Teaching Assistant   **IIIT Hyderabad**

📅 *Jan 2020–Present*   📍 *Hyderabad*

- Linear Algebra, Spring 2020 (UG1) and Monsoon 2020 (H2, PG1)
- Introduction to Quantum Information and Computation, Spring 2021 (H2, Elective)
- Automata Theory, Monsoon 2021 (H2, UG2)
- Responsibilities included taking tutorials, setting the assignments and projects, paper corrections and working with students on their projects.

SysAdmin   **Felicity, IIIT Hyderabad**

📅 *Dec 2018–Jan 2019*   📍 *Hyderabad, India*

- Responsible for deploying the websites and utility services like the mailtrain on our server.

Mobile App developer   **BUILDtheWorld**

📅 *April 2019–June 2019*   📍 *THub, Hyderabad, India*

- Developed various features for the **React Native** mobile app

RESEARCH EXPERIENCE

Mitacs Globalink Research Intern   **University of Calgary**

📅 *August 2021 - Present*   📍 *Calgary, Canada*

- I'm working with Prof. Barry C. Sanders on a Quantum Supremacy Proposal for Quantum Annealing over classical Monte Carlo heuristics using intelligent search.

Undergrad Research Assistant   **International Institute of Information Technology (IIIT) Hyderabad**

📅 *May 2019 - Present*   📍 *Hyderabad, India*

- I work with Prof. Indranil Chakrabarty on Quantum Quantum Information Theory.
- I work with Prof. Shantanav Chakrabarty on Quantum Algorithms for Linear Algebra and Machine Learning

Visiting Research Student   **Harish-Chandra Research Institute (HRI) Allahabad**

📅 *Dec 2019 - Jan 2020*   📍 *Allahabad, India*

- Took up a research project on Quantum Coherence and tunnelling advised by Prof. A. K. Pati.

Honours Project on Monte Carlo Sampling   **International Institute of Information Technology (IIIT) Hyderabad**

📅 *January 2021 - May 2021*   📍 *Hyderabad, India*

- Studied Monte Carlo Algorithms, Mixing time of Markov Chains, Ranking and Matchmaking Algorithms for gaming systems, and later worked on formulating a Matchmaking algorithm using Monte Carlo Sampling (with Prof. Girish Varma)

Research Intern   **Indian School of Business (ISB), Mohali**

📅 *June 2019–August 2019*   📍 *WFH*

- Work on basketball game data collection and data analysis with Dr. Siddharth Sharma to derive relation between team performance and pollsters' predictions.

Summer School on Quantum Computing and Quantum Information   Indian Statistical Institute (ISI) Kolata

📅 *May 2019*   📍 *Kolkata, India*

- Summer school was taken by Prof. Guruprasad Kar and his team at PAMU, ISI Kolkata.
- Studied the formalism of quantum mechanics, no cloning, entanglement detection and resource use, key generation and distribution, non-locality, quantum information theory and processing, bell's theorem, quantum cryptography, and quantum computation.

PROJECTS

Face Classification and Verification | *Python, SKLearn*

- The project work included depth understanding as well as implementation of computing eigen-faces required to satisfactorily reconstruct a person in the given dataset (combining 3 different datasets), Face Recognition using kernels and classifiers, Visualization of faces using t-SNE and Face Verification.

Distributed MapReduce | *C++, Boost, MPI*

- C++ implementation of the MapReduce library to handle MapReduce tasks on a distributed system. This library handles worker failures and performs load balancing.

COVID-19 Vaccination Management | *Django, Python, HTML, CSS, JavaScript*

- Wrote a Django WebApp to manage the complete vaccination pipeline. Includes an algorithm to automatically distribute vaccines to states and districts on the basis of Population, number of vaccination centres and rate of change of number of active cases.

C- - Compiler | *C++, Antlr*

- Compiler for a toy language C− inspired by C and Decaf. Includes a parser made using Antlr, custom syntax tree contruction using Visitor Design Pattern, and LLVM IR generation.

Automated Bidding Agent | *Java*

- Made an automated bidding agent for targeted Ad space using Java to compete in a second prize sealed bid auction under limited budget constraints.

Beginner's AI notebook | *Python, SKlearn*

- Implemented standard ML algorithms, including backpropagation, classification and data representation, SVM and kernel tricks along with AI course.

Question Generation from a given corpus using NLP | *NLTK, Spacey, gensim*

- Designed a question generator from the corpus of Science textbooks using NLTK, Spacey, gensim involving concepts of Named Entity Recognition and word2vec in **24 Hours** in a team of 4 for a hackathon

Molecular Dynamics Simulation | *Python*

- Python script to simulate molecular dynamics to calculate macroscopic properties like temperature and pressure using **Minimum image convention** and **Periodic boundary condition** using **Monte Carlo Markov chains methods**

Game Development with Graphics Libraries | *OpenGL (C++) and WebGL(JavaScript)*

- Developed a replica of games like JetpackJoyride and SubwaySurfers using OpenGL (C++) and WebGL(JavaScript) graphics libraries
- Implemented object-oriented programming practices such as inheritance to create different account types and databases.

SKILLS

Programming and scripting: C, C++, Python, Javascript, Bash, Java
Web and Mobile: HTML5, Bootstrap, Django, ReactJS, React-Native, Flask
Misc.: Linux, Git, Docker, Postgres SQL, MySQL, Qskit, Q#, Sklearn, Pytorch, Scipy, SageMath, Latex, Golang, Neo4j

CO-CURRICULARS

- Corporate Relations Head, E-Cell, IIIT-H   April 2019 - May 2020
- Marketing Head, Felicity, IIIT-H   June 2019 - May 2020
- Literary Club Coordinator, IIIT-H   July 2018 - July 2020
- Kickboxing Regional Title Belt winner   June 2015
- Boxing, Swimming, Drumming