Ganesh Devendrappa Vanahalli

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EDUCATION

International Institute of Information Technology, Hyderabad (IIIT-H) Aug 2016 - July 2020

Bachelor of Technology (Honors) in Computer Science & Engineering, CGPA: 8.37, Major: 8.23 *Hyderabad, India*

- *Dean's List - top 5% of class (2018-19)*
- *Dean's Merit List - top 20% of class (2018-19)*

EXPERIENCE

Distributed Systems Lab Aug 2020 - Present

Research Assistant (remote), Delft University of Technology

- Working with **Prof Stefanie Roos** on finding solutions to varied problems that payment channel networks face
- Building various strategies to attack Lightening Network, a layer-two protocol to scale blockchains

Machine Learning Lab July 2019 - Feb 2020

Undergraduate Researcher, IIIT Hyderabad *Hyderabad, India*

- Worked under **Prof Sujit Gujar** on finding a protocol that stabilizes Bitcoin cryptocurrency in transaction fee model
- Developed a transaction processing protocol, a highly effective modification to the existing Bitcoin protocol to fix the issues of unfairness

CSTAR *IIITH* & Mathematics Department *Zhejiang University* June 2019 - April 2020

Undergraduate Researcher, Summer School attendee *Hyderabad, India & Hangzhou, China*

- Worked under **Prof Indranil Chakrabarty** and **Prof Junde Wu** on optimizing the range of parameter values for broadcasting of Quantum Correlations using Network Theory Protocols
- Visited Zhejiang University to attend a summer school by Prof. Lincoln D Carr on complexity theory

Department of Computer Science and Engineering May 2019 - December 2019

Summer Intern, IIT Kanpur *Kanpur, India*

- Worked under **Prof Rajat Mittal** on approximate degree of functions and how to find lower bounds of them using dual polynomials, specifically the Dual Block Method
- Also worked on finding the lower bound of OR function block composed with general function using dual polynomials

IIIT Hyderabad Monsoon 2018, Spring 2019, Spring 2020

Teaching Assistant *Hyderabad, India*

- Courses - Mathematics-III & Linear Algebra
- Responsibilities - teaching, preparign assignments & evaluating quizzes, mid-sems, end-sem and projects

PUBLICATIONS

- Shoeb Siddiqui*, **Ganesh Vanahalli***, Sujit Gujar. BitcoinF: Achieving Fairness for Bitcoin in Transaction-Fee-Only Model. Proceedings of the 19th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2020).

* - equal authors by contribution

SKILLS

Blockchain programming: Solidity, Truffle, Decentralized app
Programming: C, C++, Python, Matlab, Java
Web Dev: HTML/CSS, Javascript, AJAX, NodeJS, Flask, Ruby on Rails
Databases: MySQL, Sqlite
Graphics: OpenGL, WebGL

Projects

Attacks on PCNs and routing protocols
- Currently working as a remote Research Assistant alongside a PhD student to find solutions for the problems faced by Payment Channel Networks
- Working on several attack strategies to exploit PCNs such as Lightening Network and designing solutions for the same
- Also designing efficient attacks on routing protocols such as SPIDER

BitcoinF
- Worked alongside a masters student to find solutions for the problems that Bitcoin would face when it turns into a transaction fee driven cryptocurrency
- Developed a transaction processing protocol, a simple, yet highly effective modification to the existing Bitcoin protocol to fix theissues of unfairness. Tested it through simulations
- It is the first formal attempt at solving the issues of unfairness in a cryptocurrency, while there have been many published works analyzing the model using collected data or using game-theoretic models

Broadcasting of Quantum Correlations in Network Theory setting
- Worked alongside a masters student and several PhD students from other universities on optimizing the range of parameter values for broadcasting of Quantum Correlations using Network Theory Protocols

Quantum Query Complexity
- Worked alongside a masters student on finding the lower bound of OR function block composed with general function using dual polynomials specifically the Dual Block Method

Quantum Algorithm
- Built a Quantum Algorithm to determine if a give graph is 3-colorable
- Documented how the NP-complete problem's hardness shifts as the paradigm shifts

School on Foundations of Quantum Information
- Topics included basics of Quantum Information Theory, Quantum Foundation, Quantum Key Genera- tion and various Cryptographic primitives

Independent study in Quantum Mechanics
- Worked on Quantum Mechanics, temporal aspects in Quantum Mechanics and Perturbation Theory

Mobile Based Voting System
- Lead a team consisting of 25 students, to develop a mobile based voting system as a modern solution for elections in developing countries like India. Project was a part of Engineering Systems course at IIIT-H

AI Bot
- Built heuristic of AI bot that plays Ultimate Tic-Tac-Toe on a 4x4x4x4 grid. Finds certain strategies that is always non-losing (win or draw)

Bash
- Wrote a program in C to simulate bash terminal using system calls. Used threading and multiprocessing to implement various bash functions

Game Development
- Simulated games such as Legend of Zelda, Bomberman and Tunnel Rush using OpenGL in C++, Python and WebGL in Javascript respectively

Selected Coursework

Blockchain & Cryptography: Distributing Trust & Blockchain, Principles of Information Security
Quantum Computing: Quantum Information and Computation
Mathematics: Linear Algebra, Discrete Mathematics, Probability Theory & Complex Analysis
Artificial Intelligence: Statistical Methods in AI, Artificial Intelligence, Optimization Methods
Systems: Operating Systems, Computer System Organization, Database Systems, Distributed Systems

Miscellaneous

Entrance Tests
- All India Rank 357 in JEE Mains (out of greater than 1.2 million candidates)
- All India Rank 8668 in JEE Advanced (out of greater than 0.5 million candidates)

IIIT-H MUN: Member of Organizing Committee in 2016-17
Sports: Represented Batch and House in Table Tennis tournaments