Abhinav Vaishya

Education

July 2018 - June 2023 **Bachelor of Technology (Honours) and Master of Science by Research**, *Computer Science and Engineering*, International Institute of Information Technology, Hyderabad (IIIT-H).
Advisor: Dr. Prasad Krishnan
Thesis Title: Low Complexity Cache-Aided Communication Schemes for Distributed Data Storage and Distributed Computing
Specialization: Algorithms and Theory [Certificate]

Research Experience

July 2023 - Present **Research Associate**, Indian Institute of Science, Bangalore (IISc).
- Quantum Error Correction
- Advisor: Dr. P Vijay Kumar

June 2022 - June 2023 **Research Intern**, Technical University of Munich (Remote).
- Codes for Distributed Storage
- Coding Theory for Blockchains (Literature Review)
- Advisor: Dr. Rawad Bitar
- Took a break from this work because of other commitments

May 2021 - June 2023 **Research Assistant**, IIIT-H.
- Coded Caching via Locally Recoverable Codes (Few results drafted)
- Coded Caching via Subspace Designs (Accepted at IEEE JSAIT, 2023)
- Coded Data Rebalancing for Distributed Storage Systems with Cyclic Storage (Accepted at IEEE ITW, 2022)
- Advisor: Dr. Prasad Krishnan

August 2020 - April 2021 **Undergraduate Researcher**, IIIT-H.
- Coded Data Rebalancing for Distributed Storage Systems
- Advisor: Dr. Prasad Krishnan

May 2019 - June 2020 **Undergraduate Researcher**, IIIT-H.
- A software framework for annotation of manuscript document images (Showcased at a workshop, ICDAR, 2019)
- Advisor: Dr. Ravi Kiran Sarvadevabhatla

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Work Experience

January 2023 - May 2023 **Teaching Assistant**, IIIT-H.
- Information-Theoretic Methods in Computer Science, Spring '23
- Introduction to Coding Theory, Spring '22
- Linear Algebra, Spring '21
- The role involved conducting tutorials, setting and evaluating assignments and exams.

June 2019 - October 2019 **Problem Setter**, Hackerrank.
- Prepared various original programming and algorithmic problems along with strong testcases.

August 2018 - December 2018 **Web Developer**, VLEAD, IIIT-H.
- Worked on building a web application for interactive online learning modules.

Publications

1. Shailja Agrawal, K V Sushena Sree, Prasad Krishnan, **Abhinav Vaishya**, Srikar Kale, "Cache-Aided Communication Schemes via Combinatorial Designs and their q-analogs", IEEE Journal on Selected Areas in Information Theory (JSAIT), 2023. [IEEE][Arxiv]
2. Athreya Chandramouli*, **Abhinav Vaishya***, Prasad Krishnan, "Coded Data Rebalancing for Distributed Data Storage Systems with Cyclic Storage", IEEE Information Theory Workshop, 2022. [IEEE][Arxiv][Slides]

* indicates equal contribution

Course Projects (Selected)

Spring 2021 **Encoding, Decoding, and List Decoding of Reed Solomon Codes (Language: Python 3)**
- Implemented the encoding and decoding procedures of Reed Solomon Codes. Sympy was used in the implementations. This project was a part of the course Topics in Coding Theory.

Spring 2020 **Distributed Algorithms**
- Implemented many graph based and sorting algorithms, a simple single server architecture (supports multiple clients), for distributed systems using OpenMP(C++), MPI(C++), Cuda(C++/Python), and RMI(Java). This project was a part of the course Distributed Systems.

Spring 2020 **Applications of Linear Programming (Language: Python 3)**
- Used Linear Programming for solving various interesting problems such as - Jigsaw Puzzle, Sudoku, Convex Hull, and Largest Circle in a Polygon. This project was a part of the course Optimization Methods.

Spring 2019 **Proxy Server (Language: Python 3)**

- Implemented a client-server model using socket programming along with a proxy server. Blacklisting and caching were also implemented. This project was a part of the course Computer Networks.

Monsoon 2018 **Interactive User Defined Shell (Language: C)**

- Implemented a terminal based shell using C. It supports piping, I/O redirection, signal handling, background and foreground process management, etc. This project was a part of the course Operating Systems.

Relevant Courses

Algorithms and Theory (at IIIT-H): Algorithms, Complexity and Advanced Algorithms, Computation Complexity Theory, Principles of Information Security, Introduction to Coding Theory*, Topics in Coding Theory, Information-Theoretic Methods in Computer Science*, Advanced Mathematical Structures.

Theory (at IISc): Quantum Error Correcting Codes

* indicates that I attended the course as a Teaching Assistant

Skills

Languages: C, C++, Python, MATLAB, Java, Javascript, SQL, Erlang, TeX

Libraries: numpy, scipy, sympy, MPI

Miscellaneous

- Ranked 88th in ACM-ICPC Online Round 2019-20. (Honorable Mention) [Certificate]
- Selected for the Onsite Round of ACM-ICPC Asia Regionals, Amritapuri 2019-20.
- Certificate for Problem Solving (Advanced) by Hackerrank. It covers topics like Data Structures such as Trees, Graph Traversal, using Dynamic Programming and Specialized Algorithms, among others. [Certificate]
- Merit List awardee.