ANIRUDH BADDEPUDI

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EDUCATION

Carnegie Mellon University School of Computer Science (Aug 2017 – May 2021)
B.S. Computer Science, Minor in Mathematics
GPA: 3.90, Dean's List with High Honors

Selected Coursework:

- **General Computer Science:** Theoretical CS Toolkit (PhD), Advanced Algorithms (PhD), Algorithm Design & Analysis, Parallel Data Structures and Algorithms, Functional Programming, Computer Systems, Constructive Logic, Research in Cryptography
- **Statistics and Machine Learning:** Machine Learning (PhD), Advanced Machine Learning and Game Theory (PhD), Probability Theory (Honors), Statistical Inference
- **Mathematics:** Matrix Theory (Honors), Vector Analysis (Honors), Real Analysis, Abstract Algebra, Differential Equations, Discrete Mathematics, Mathematical Finance, Discrete Time Finance

Work Experience

Google Software Engineering Intern
May - Aug 2020

- Re wrote Google Cloud Storage Python libraries to enable concurrency functionality for cloud storage operations. Created approximately x5 speedup in storage library operations (resumable uploads/downloads etc).
- Re-wrote Google Python Authentication libraries and credentials flow which enable Google's server-to-server authentication mechanisms to access all Google Cloud Platform APIs.
- Both libraries used by 100K active developers with 1.2 billion total API calls monthly.

Automation Anywhere Software Engineering Intern
June - Aug 2019

- Constructed tools for the Bot Analytics team that generates real-time statistical insights from bot-generated data.
- Built back-end features to the Robotic Process Automation analytics dashboard such as a search bar with autocomplete features using Elasticsearch.
- Developed and implemented data aggregation algorithms to summarize automation processes using RestAPI framework.

Earth Computing Research Engineer Intern
June - Aug 2018

- Developed and implemented original algorithms to create metrics to measure company product performance - e.g. measuring data center resilience under machine failures by finding number of spanning trees in modified graphs in real-time

Research Experience

Research: Cryptography and Blockchains Advised by Vipul Goyal

Aug 2019-Present

- Working on developing and implementing a smart private ledger, a private blockchain network that facilitates secure and private data storage and retrieval.
- Studying Secure Multi-party computation protocols and Fully Homomorphic Encryption constructions, currently working on running Secure MPC protocols on smart contracts.

Research Project: Algorithmic Game Theory Advised by Fei Fang

Aug 2020-Present

- Research project as a part of 17-759 (Advanced ML and Game Theory) class taken in Fall 2020
- Working on research extending current work on solving Security Games (Attacker-Defender Stackelberg Extensive Form Games) with the introduction of multiple strategic informants.
- Applications in problems related to protecting wildlife and natural resources from activities such as poaching.

Probabilistic and Deep Learning Methods for Sequential Music Generation
Dec 2019

- Extended current music generation techniques by building and testing 3 new generative models based on LSTM Recurrent Neural Networks (RNNs) and Autoencoders
- Designed and implemented a pre-training approach using Autoencoders (dimensionality reduction, reconstructing input vectors) for our best performing model - led to high improvement in model performance compared to baseline and existing models.

Research Project: Numerical Linear Algebra Advised by Jason Howell
May – Aug 2018

- Worked on finding tight lower bound estimates for the smallest eigenvalue of large, sparse, tridiagonal matrices.
- Explored improving initial iterates to non-negative matrix factorization (NMF) algorithms with applications in areas such as text processing
- Applications in partial differential equations and research on solving large, sparse systems of linear equations.

An Original Proof to the Theorem of Quadratic Reciprocity
Aug 2016

- Invited to attend the ROSS Mathematics Program. Constructed an original proof to the Theorem of Quadratic Reciprocity using similar lattice point techniques to Gauss' original proof of the theorem.

Teaching Experience

Carnegie Mellon University School of Computer Science, Teaching Assistant
Aug 2018 - Present

Responsible for leading ~30 member recitation sessions, grading assignments, designing/writing problems, organizing workshops for the following classes:

- 15-451/651 Algorithm Design and Analysis (Spring 2020)
- 15-251 Great Ideas in Theoretical Computer Science (Spring 2019, Fall 2019, Fall 2020)
- 15-151 Mathematics for Computer Scientists (Fall 2018)

Awards

- Dean's list with High Honors (2017, 2018, 2019, 2020)
- Putnam Math Competition Top 500
- 2019 Heap Fellow
- CMU Hackathon Winner
- British Math Olympiad Medallist
- IGSCE Cambridge Mathematics Top of the World Award (Highest Score Worldwide)
- Princeton Singapore Alumni Association Book Award (Given to 2 students in country)
- Outstanding contribution to college service award for developing an extension curriculum for an Elementary School in Singapore

Leadership and Community Involvement

CMU OM (Vice President):

- Organize events on campus, plan events, manage budgets and raise funds for events on campus.

CMU Quant Club (Exec board):

- Responsible for organizing all Quant Club projects and events on campus. Leading a new initiative on quantitative trading, conducting workshops on trading strategies and the markets.

Carnegie Mellon Informatics and Math Competition

- Help organize the competition at CMU. Responsible for writing problems, grading.

CMU Cricket Team (Co-President)

- Lead training sessions and manage club budgets and tournaments.

Technical Skills

- **Languages:** Python, C, Java, SML
- **Technologies:** Elasticsearch, GIT, Google Cloud Platform, Unix, Latex