Anakin Dey

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Education

University of Illinois Urbana-Champaign May 2024
Bachelors of Science in Mathematics, Minor in Computer Science *GPA: 3.91/4.00*

Experience

Undergraduate Research Assistant: *Texas State Math REU* Jun 2023 – Aug 2023

Software Engineering Intern: *CME Group* Jun 2022 – Aug 2022

- Refactored large code bases in order to support multiple file formats and platforms for tracing and logging of messages, resulting in tracing having 20% less impact on the performance of applications
- Used Jenkins, XL Release, and in-house tools to benchmark the performance impact from using the new formats
- Explored the use of open-source dashboards and parsers to better process traces and give new insights to data

Undergraduate Research Assistant: *Learning, Decision, Control, Autonomy Lab* Aug 2021 – Present

- Researching algorithms and heuristics for multi-target and multi-agent planning and movement under multiple constraints as well as deceptive and adversarial movement over graphs
- Combining concepts from heuristic approximation algorithms, Markov decision processes, probability theory, geometry, and graph theory to design new and efficient heuristics to use with various algorithms
- Benchmarking algorithms in Python and using Matplotlib, NetworkX, and OSMnx to create diagrams and charts
- Maintaining high code quality with various tools and workflows such as Black, pytest, Flake8, and mypy

Software Engineering Intern: *SiteIQ* May 2021 – Aug 2021

- Improved the accuracy of status reports from multiple fueling stations using Python and JavaScript by streaming and parsing data sources such as two-wire serial and ZMODEM files
- Identified error codes and data that were not described in given documentation but present in 50% of devices and logged them for further analysis by the team
- Presented findings to managers and coworkers with multiple levels of technical understanding

Course Assistant: *UIUC* Jan 2021 – Present

- Course Assistant for Introduction to Computer Science (Jan 2021 - May 2021), Discrete Structures (Aug 2021 – Present), Introduction to Algorithms (Jan 2022 – Dec 2022) and Models of Computation (Jan 2023 - Present)
- Teaching theoretical computer science concepts such as state machines, divide-and-conquer, dynamic programming, and graph algorithms by presenting topics in a clear and concise manner
- Holding office hours and helping students in class forums of 400+ students with both concepts and homework

Publications

Post-Disaster Repair Crew Assignment Optimization Using Minimum Latency
Anakin Dey, Melkior Ornik (IEEE ISC2 2022)

- Designed a new multi-agent heuristic algorithm to solve a weighted path planning problem in the context of outage restoration after natural disasters which was up to 50% better than existing heuristics
- Implemented and tested a graph class and algorithms in Python using pytest and Coverage.py for code validation
- Paper on arXiv and source code on GitHub

Extracurriculars

Founder & President: SIGma | Special Interest Group for Math and Algorithms | cstheory.org

- Founded club to teach theoretical computer science and mathematics to students of various backgrounds
- Creating weekly meetings covering ideas such as efficient binary generation, decidability and Turing Machines, state machines, and other mathematical concepts with the goal of making them as intuitive as possible

Admin: SIGPwny | Special Interest Group for Security | sigpwny.com

- Hosted 2 meetings on cryptographical concepts including block ciphers, RSA, Diffie-Hellman, and elliptic-curve cryptography, complete with multiple challenges, to over 70 people per meeting
- Created cryptography challenges and reverse engineering for UIUCTF 2021 / 2022 for over 1400 participants and Fall CTF 2021 / 2022 for over 300 participants

Technical Skills

Languages: Python, Java, C++, JavaScript, TypeScript, Agda, C
Tools / Frameworks: Bash, Git, JUnit, mypy, pytest, Matplotlib, NetworkX, Numpy, GDB, Catch2, Node.js, Pandas, Jira, Grafana