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Anirudh Gupta

CSE Undergrad at IIT Delhi

GitHub

Education

B.Tech. in CSE, Indian Institute of Technology, Delhi, CGPA: **8.97/10** *Aug 2019 — May 2023*
CBSE, Class XII, Bhavan Vidyalaya School, Panchkula, Percentage - **94.2%** *Mar 2019*

Scholastic Achievements

- **Grandmaster (Red Coder)** on codeforces, (Rated **2425**), **World rank 606** among 100K Programmers and **National Rank 9**.
- **National Olympiads:** Qualified for **INMO** (Indian National Mathematics Olympiad) and **INOI** (Indian National Olympiad of Informatics) and secured rank **27** at the regional level in **RMO** (Regional Mathematics Olympiad).
- **Technothlon**: (School Championship organized by IIT Guwahati) Secured a Rank within the **top 50** among 1 million students.
- **Programming Contest Achievements**:
  ACM ICPC Regionalist
  Qualified for the Amritapuri Regionals and secured a rank of **9** in 2022
  Qualified for the Gwalior-Pune Regionals and secured a rank of **11** in 2022
  Qualified for the Kanpur Regionals and secured a rank of **22** in 2021
  World Rank 16 in Codeforces Round 658 among 14600 Participants.

Internships

Anomaly Detectors in Cyber-Physical Systems , Dr. Berkay Celik, Purdue University (*May 2021 - Aug 2021)*
- Investigated attacks against special CPS, Industrial Control Systems (ICS) including **DoS, Gaussian, Replay attacks**.
- Analyzed defense approaches (largely ML-based **Anamoly detectors**) that protect systems against adversarial attacks.
- Developed **adversarial attack** on ICS with white box access to their anomaly detectors using **gradient-based** methods.

Sprinklr Inc. ,Product Engineer (*June 2022 - Aug 2022)*
- Analyzed HTTP requests on AWS S3 buckets and objects and collected data using AWS Cloudwatch to achieve cost reduction.
- Implemented the data structure trie in java which stored various metrics of data access and achieved scalability by storing the data in persistent memory using serialization and deserialization.
- Streamed data from MongoDB to Elastic Search using kafka connect in java and analyzed the resiliency in case of server breakdowns.

Projects

Market Making Trading Algorithm (*Feb-Apr 2022)*
- Developed a market making trading algorithm that would place multiple limit orders equally on both bid and ask side.
- Order prices and quantity were calculated based on the current inventory, spread and weighted average of bids and asks.
- Executed the script using coindcx APIs in python for Bitcoin and Ethereum and achieved a volume of **300K** per hour.

Fair Division of Indivisible Goods and Chores , Prof. R. Vaish (*Jan-Apr 2022)*
- Analysed various valuation classes and fairness criteria's in fair division problem and introduced few new notions in this domain.
- **Proved existence guarantees** for achieving fair division under different settings of fairness criteria and valuation classes.
- Developed an efficient algorithm to achieve stronger fairness criteria **(Ex-ante EF + Ex-post EFX) in lexicographic valuations**.

Integrity and confidentiality of ML models in wearable devices , Prof. R.sen (*Aug-Nov 2021)*
- Improved the current implementation for kernel integrity check to find malware faster (**6x**) keeping other metrics the same.
- Performed probabilistic analysis between run-time and security to improve code speed (**31% faster**) without affecting other metrics.

Implementing Kernel Shell , Prof. S.Bansal (*Jan-Apr 2022)*
- Implemented parts of the kernel shell and added various functionalities like **MMIO**, **system calls**, and shell rendering
- Extended it to support **fibers**, **co-routines** and **multicores** with **starvation handling** to perform many computations simultaneously

2 Player Maze Game , Prof. R. Sen (*June - July 2021)*
- Built a 2 player maze game using **SDL** library in **C++**. Added various special features like powerups, defense and attack.
- Implemented **TCP socket** programming so that the game can be played over a network and also added sound effects.

Taxi Scheduling Problem , Prof. R.Paul (*Aug-Nov 2021)*
- Automated the task of a taxi agent that has pick up and drop passengers in a grid world according to some reward policy.
- Implemented **Value iteration** and **Policy iteration** for offline learning and **SARSA** and **Q-learning** for online learning of the agent.

Chat Application , Prof. H.Saran (*Sept-Oct 2021)*
- Implemented a secure chat application in python that supports encrypted data transfer between any number of users