Abhinav Dutta

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AbhinavDutta

Education

2019-2023 **Indian Institute of Technology, Patna**, *B.Tech Computer Science and Engineering.*
GPA: **9.10**/10.00

Experience

2023-Present **Microsoft Research India**.
Research Fellow, AI Infrastructure Group
Advisors: Dr. Sanjeev Krishnan, Dr. Ramachandran Ramjee, Dr. Nipun Kwatra
- Identified flaws in existing methods of evaluating compressed LLMs using accuracy/perplexity. Proposed better **distance metrics** for the same. **Accepted at NeurIPS 2024**
- Worked on coming up with better quantized model based on the above finding that better meet user expectations on model output quality.

2021-2022 **ACTG Lab**, *Tel Aviv University.*
Summer Project Student
Advisor: Prof. Ron Shamir
- Worked on using **syncmers** to improve the performance (roughly by 8% at medium compression and 25% mutation) of long read mappers like **Minimap2** by modifying how genomes were indexed.
- Generalized the syncmers scheme, introduced new metrics of evaluating their efficiency and theoretically proved their validity. **Accepted at PLOS Computation Biology, 2022.**

Summer 2022 **School of Computer Science**, *McGill University.*
Researh Intern (MITACS GRI program)
Advisor: Prof. Xujie Si
- Used Gumtree (a code differencing tool) to analyze code edits in MOOC programming assignments, identifying the most modified AST nodes to pinpoint challenging code areas that helps to identify difficulties faced by students.

Publications

- **Accuracy Is Not All You Need**
  Abhinav Dutta, Sanjeev Krishnan, Nipun Kwatra, Ramachandran Ramjee
  38th Conference on Neural Information Processing Systems (**NeurIPS 2024**)
- **Parameterized syncmer schemes improve long-read mapping**
  Abhinav Dutta*, David Pellow*, Ron Shamir (* equal contribution)
  PLOS Computational Biology, 2022

Honours and Awards

2023 Won the Antigranular ML Privacy Competition (€3000).
2022 Globalink Research Internship (GRI) awarded by MITACS, Canada, ($7500).
2019 Ranked 9th out of 150k in West Bengal Joint Entrance Examination.
2019 Ranked 1734th out of 1 million in JEE Mains and 2312th out of 150k in JEE Advanced.
2018 Kishore Vaigyanik Protsahan Yojana (KVPY) fellowship awarded by Indian Govt. (Ranked 39th out of 150k candidates).
2017 National Talent Scholarship (NTS) awarded by Indian Govt. (top 0.1 % of 800k candidates).

Research Projects

2023 Clustering Smart Contracts based on Vulnerabilities.
Guide: Prof. Raju Halder, IIT Patna, Bachelor's Thesis
Proposed a method to speed up formal verification of a large batch of smart contracts by including a preprocessing step - where such documents are clustered based on edit distance of their bytecodes.

Key Coursework

- **Math**: Real and Complex Analysis, Linear Algebra and Differential Equations, Probability Theory and Random Processes, Mathematical Modeling
- **Computer Science**: Algorithms, Switching Theory, Formal Languages and Automata Theory, Computer Architecture, Database, Operating Systems, Computer Networks, Computer Graphics, Blockchain and Cryptocurrency, Artificial Intelligence, Foundations of Machine Learning, Deep Learning, Computer Security, Formal Methods for Analysis and Verification
- **Physics**: Introductory Physics (classical mechanics), Engineering Optics, Vacuum Science and Techniques
- **Economics**: Microeconomics, Macroeconomics

Extracurriculars

- Co-ordinator of Computer Science Club of IIT Patna
  Conducted sessions on Machine Learning among freshmen and sophomore students
- Member of Student Mentorship Program
- Mentored 6 CS freshmen helping them mainly with their academic problems

Skills

- **Programming Languages**: C , C++ , Python , CUDA , OCaml , Solidity
- **Tools**: Pytorch , OpenMP , Flex , Git , MySQL, OpenGL, Docker