Abhay Singh

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education

Cornell University, Ithaca, NY
M.S. in Computer Science — Aug 2021 – May 2023
B.S. in Computer Science (Honors), *Summa Cum Laude*, GPA: 4.14/4.30 — Aug 2018 – May 2021

coursework
† = head teaching assistant

CS 6241: Data Science Numerics	ECE 6970: Statistical Distances	CS 6670: Computer Vision
ORIE 6510: Probability	CS 4780: Machine Learning †	CS 4820: Algorithms †
MATH 4130: Analysis I (Honors)	MATH 4315: Linear Algebra	CS 4850: Math Foundations

preprints & publications

Edge Proposal Sets for Link Prediction (under submission)
Abhay Singh, Qian Huang, Sijia Linda Huang, Omkar Bhalerao, Horace He, Ser-Nam Lim, Austin Benson

Combining Label Propagation and Simple Models Out-performs GNNs (ICLR 2021)
Qian Huang, Horace He, Abhay Singh, Ser-Nam Lim, Austin Benson

Better Set Representations For Relational Reasoning (NeurIPS 2020)
Qian Huang, Horace He, Abhay Singh, Yan Zhang, Ser-Nam Lim, Austin Benson

professional experience

Citadel, Global Quantitative Strategies, Chicago, IL
Incoming Quantitative Research Intern, Portfolio Optimization Team — June 2022 – Aug 2022

Citadel, Global Quantitative Strategies, Chicago, IL
Software Engineering Intern, Portfolio Optimization Team — June 2021 – Aug 2021

- Deployed statistical monitoring tool to assess data quality and detect anomalies in a variety of inputs used in formulated portfolio optimization problem
- Built framework to efficiently study a large collection of optimization problems, used by researchers to improve solution robustness and latency in portfolio optimization

Yext, New York, NY
Software Engineering Intern — May 2020 – Aug 2020

- Designed and integrated static code analysis tool used firm-wide on over 80% of codebase to scan vulnerable Java code at compile-time
- Wrote multi-threaded Golang script to determine unprotected customer apps that downloads and parses terabytes of API log data on-the-fly via AWS S3, and makes remote-procedure calls to fetch app data by API key; improved performance by 8x relative to previous solution
- Integrated webhooks to automate modification of company repository permissions using Github's REST API, notifying teams automatically via Slack and email

Morgan Stanley, New York, NY
Technology Summer Analyst — June 2019 – Aug 2019

- Architected and implemented end-to-end data pipeline to process and analyze over 800,000,000 entries of financial data daily with highly optimized, parallelized Python scripts, using NumPy and Pandas
- Reduced mainframe consumption by 90%, from 5000 to 500 CPU-seconds, saving tens of millions of dollars in annual costs
- Created and deployed firm-wide DevOps web tool to analyze large text-based datasets

projects

1-Lipschitz Deep Equilibrium Models

- Presented method to enforce uniqueness and existence of a fixed point solution in a neural network representing an iterative solver, which is done by constraining 1-Lipschitzness of the model

Few-Shot Clustering Instance Segmentation (FS-CIS) Net

- Designed novel model architecture to perform proposal-free few-shot instance segmentation in autonomous driving scenarios, speeding up inference with comparable performance to existing methods

Continual Learning with Lottery Tickets

- Proposed and demonstrated effectiveness of novel training scheme to resist catastrophic forgetting, a phenomena in which a model overfits to the most recently seen data in a multi-task learning setting

Xi Compiler

- Wrote optimized compiler in Scala for language Xi, in team of 4; approximately 10,000 lines of code
- Includes lexing, parsing, type-checking, intermediate code generation, various optimizations including dataflow analysis, and emitting assembly instructions with non-trivial register allocation

languages & technologies

Python, Java, OCaml, Scala, Go, Julia, C/C++, Bash, JavaScript, SQL
PyTorch, Keras/TensorFlow, Git, Jupyter, Docker, Bazel, Gradle, Terraform