Abhay Singh

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education

Cornell University, Ithaca, NY
B.S. in Computer Science, GPA: 4.15/4.00 — Aug 2018 – May 2022

coursework

∗ = in progress
† = teaching assistant

CS 6670: Computer Vision	CS 4780: Machine Learning†	CS 4820: Algorithms†
CS 4120: Compilers	CS 4410: Operating Systems	CS 3110: Functional Programming
MATH 4130: Analysis I (Honors)∗	MATH 4315: Linear Algebra∗	CS 4850: Math Foundations
BTRY 3080: Probability	CS 3410: Systems Programming	CS 2110: Data Structures & OOP

experience

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 4x 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

Cornell University Artificial Intelligence, Ithaca, NY
Undergraduate Researcher — Sept 2019 – present

- Conduct research on learning representations of sets and graphs for robust performance on relational reasoning tasks, aiming for publications at top conferences

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

Cornell Unmanned Air Systems, Ithaca, NY
Computer Vision and DevOps Lead — Oct 2018 – present

- Designed and implemented custom object detection and classification model (Mask R-CNN variant with multi-head output) in multi-task learning setting on collected aerial imagery dataset, in PyTorch
- Lead all computer vision tasks on team, with individual efforts directly increasing classification task accuracy by 32% and object detection mAP IoU by over 80%

publications

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

projects

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

- Designed novel neural network architecture to perform proposal-free few-shot instance segmentation, showcasing results in graduate-level course, CS 6670: Computer Vision
- Validated approach on PASCAL-5i dataset, showing comparable performance to few-shot Mask R-CNN inspired methods with significant speedups at inference time

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

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 most recently seen data

CamelTrouble

- Created real-time multiplayer browser game in OCaml, transpiled to JavaScript, in team of 3

languages & technologies

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