

Abhay Singh

contact

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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  

(NeurIPS 2020)

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

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

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