

# 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<sup>†</sup>

CS 4820: Algorithms<sup>†</sup>

CS 5414: Distributed Systems\*

CS 4410: Operating Systems

CS 4120: Compilers

CS 4850: Math Foundations

CS 3110: Functional Programming

CS 2110: Data Structures & OOP

MATH 4130: Analysis I (Honors)\*

MATH 2940: Linear Algebra

BTRY 3080: Probability

## 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 Vision and Learning**, 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

*Vision 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

**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
- Implemented procedural map generator that randomly creates valid maps to play on
- Programmed user events and class abstractions: unifying model, controller, and view in MVC design

**Virtual Stock Market** 

- Deployed RESTful web app in Python using Flask that simulates stock market trading with live prices and paper money, storing transactions with SQL database

## languages & technologies

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