

Muhammad Osama Sakhi

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Education

Georgia Institute of Technology

Atlanta, Georgia

MASTER OF SCIENCE IN COMPUTATIONAL SCIENCE & ENGINEERING

Aug 2017 - Dec 2019

- **GPA:** 3.85
- **Coursework:** Computer Vision, Deep Learning, Computational Data Analysis, Numerical Linear Algebra, Machine Learning for Trading, Computational Chemistry, Quantum Mechanics, Modeling & Simulation, Algorithms

Georgia Institute of Technology

Atlanta, Georgia

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

Aug 2013 - May 2017

- **GPA:** 3.86
- **Concentrations:** Devices & Intelligence
- **Coursework:** Machine Learning, Natural Language Processing, Artificial Intelligence, Design and Analysis of Algorithms, Robotics & Perception, Systems & Networks, Digital Design Lab, Prototyping Intelligent Appliances

Skills

Artificial Intelligence	Graph Search Algorithms, Probabilistic Inference, Particle Filtering, Markov Decision Processes
Machine Learning	Deep Learning, Q-Learning, Self-supervised Learning, Object Detection, Image Classification
Programming	Python, C, C++, SQL, Java, Golang, JavaScript, HTML, MATLAB
Frameworks	PyTorch, Scikit-Learn, Pandas, OpenCV, SimPy, Spark
Other	AWS, GCP, Docker, Kubernetes, REST APIs, LaTeX

Research

The REDUCE Project

Dr. Munmun De Choudhury

GT SOCIAL DYNAMICS & WELLBEING LAB

Jul 2019 - Present

- Created language model embeddings for social media data to feed into time-series model to forecast weekly suicide attempts
- Trained regression model using language features from millions of Tweets to serve as one learner in final ensemble approach
- Collaborating with teammates to determine additional time-series streams that may aid the forecasting problem

Facebook SUMO Challenge

Dr. Frank Dellaert & Dr. Ren

RESEARCH ASSISTANT

Sep 2018 - Mar 2019

- Trained a Faster-R-CNN network on 360 Degree RGB-D images to localize bounding boxes in 2D
- Recovered 3D bounding box predictions from 2D object detections for 100+ categories to place 2nd in SUMO Challenge
- Contributed to baseline methods for SUMO dataset paper with collaborators from Stanford and Princeton. Paper is on-hold pending resolution of legal disputes on the curation of the dataset by Facebook
- Started extension of deformable convolutions for 3D voxel inputs using PyTorch

Computing Betweenness Centrality

Dr. Oded Green

HIGH PERFORMANCE COMPUTING LAB

Aug 2016 - May 2017

- Ported algorithm for computation of betweenness centrality on static graphs onto NVIDIA GPUs using cuStinger framework

Experience

Georgia Institute of Technology

Atlanta, Georgia

HEAD TEACHING ASSISTANT FOR INTRO. TO ARTIFICIAL INTELLIGENCE

Aug 2019 - Present

- Managed a team of 17 Teaching Assistants responsible for all grading and projects for 450 undergraduate students
- Developed entirely new mass auto-grader system with built-in plagiarism detector to reduce grading time for each TA by 85%
- Created extensive new review guides for all core course concepts: Graph Search Algorithms, Reinforcement Learning, Probabilistic Inference, Neural Networks, and Decision Trees
- Served as guest lecturer on Particle Filtering for a class section with 300 students
- Organized and lead review sessions with co-TAs to better prepare students for exams and projects

The Home Depot

Smyrna, Georgia

COMPUTER VISION INTERN

May 2019 - Aug 2019

- Fine-tuned 20+ models to extract fine-grained features from furniture images to enable training of a generative model that could produce aesthetically compatible furniture collections
- Developed a reusable framework for quickly aggregating images from the various data sources, performing data cleanup and augmentations, fine-tuning ResNet/VGG models, and evaluating using F1 scores and confusion matrices

DukeTIP

Houston & Atlanta

INSTRUCTOR

Jun 2018 - Jul 2018

- Taught a total of 40 students for four weeks across two courses: Modern Programming and Artificial Intelligence
- Designed syllabi, conducted parent-teacher conferences and crafted assignments spanning five core topics: Fundamentals of Python Programming, Web Development, Graph Search Algorithms, Machine Learning, and Natural Language Processing

Pindrop

Atlanta, Georgia

SOFTWARE ENGINEER

Jun 2017 - Jun 2018

- Automated a data collection task that consumes 90 days' worth of data for researchers to create adaptive fraud detection models
- Optimized memory consumption for a new service to use 75% less memory than previous implementations
- Created new framework for continuous deployment of fraud detection models to production systems
- Migrated database records from Postgres to Redis and used custom key-value encoding to optimize lookup times

Georgia Institute of Technology

Atlanta, Georgia

TA FOR INTRO. TO ARTIFICIAL INTELLIGENCE

Fall 2016, Spring 2019

- Lead review sessions to help students better understand course concepts in preparation for projects and exams
- Graded coursework, proctored exams, held weekly office hours to ensure students understood course material and projects

Pindrop

Atlanta, Georgia

SOFTWARE ENGINEERING INTERN

May 2016 - Aug 2016

- Designed database performance experiment to help determine which relational database scaled appropriately for the expected load of 1 million requests/day
- Helped re-architect existing monolithic back-end API server with smaller, independent micro-services

The Home Depot

Atlanta, Georgia

RESEARCH & DEVELOPMENT INTERN

Mar 2015 - Aug 2015

- Designed path planning algorithm for semi-autonomous floor cleaning bot to traverse store aisles
- Utilized Computer Vision and Optical Character Recognition libraries to scrape Driver's License information from images
- Created handwriting recognition Android app to allow for quicker product searches and checkout
- Developed a walkie-talkie Android application that communicates using WebSockets to relay audio messages in real time

BitPay

Atlanta, Georgia

SOFTWARE ENGINEERING INTERN

May 2014 - Aug 2014

- Integrated analytics system throughout BitPay application to monitor site responsiveness and activity for 35,000 merchants
- Designed database schemas and executable utilities to enable automated daily financial settlements of \$1M to merchants

Standard Code

Atlanta, Georgia

WEB DEVELOPER INTERN

Oct 2013 - May 2014

- Developed internal project milestone management platform using MySQL and Ruby on Rails

Projects

Cross-Domain Context Prediction

Georgia Tech

GROUP LEAD

Sep 2019 - Present

- Extending Carl Doersch's self-supervised context prediction approach to visual representation learning by predicting relative direction of patches from aligned images in two different domains
- Researching related works, defining problem statement, and planning evaluation metrics to compare performance of our models against Carl Doersch's models
- Implementing Doersch's AlexNet inspired network architecture and performing ablation studies to compare how using varying levels of ImageNet pre-training affects overall model performance on cross-domain image retrieval
- Presenting findings and methodology to other graduate students with backgrounds in Deep Learning and Computer Vision

The Humor Genome Project

Dr. Lew Lefton

DATABASE TEAM LEAD

Aug 2015 - Dec 2015

- Developed web application that crawls Reddit pages for jokes and recommends jokes for users to view and rate
- Create database schemas for jokes and reviews to enable future linguistic exploration of jokes

Presentations

Generative Adversarial Network Paper Discussion

Atlanta, Georgia

DISCUSSION LEAD

Sep 2019

- Reflected on the strengths of the GAN paper by Ian Goodfellow to contrast a colleague who presented on the weaknesses of the paper
- Presented the concept of GANs and the intuitions that went into its development to an audience of 50 graduate students

TEDxGeorgiaTech Spring Conference

Atlanta, Georgia

FINALIST STUDENT SPEAKER

Apr 2019

- Chosen as the sole GT student to return as a speaker for April 2019 Conference in front of an audience of 400

TEDxGeorgiaTech Fall Speaker's Salon

Atlanta, Georgia

STUDENT SPEAKER

Nov 2018

- Selected among 70 applicants to deliver a TED talk in front of a crowd of 200 students
- Presented on the importance of mentorship and on inspiring students to find their passions

Extracurriculars

TEDxGeorgiaTech

Atlanta, Georgia

STUDENT SPEAKER, PANEL MODERATOR

Sep 2018 - Nov 2019

- Selected among a crowded field of candidates to delivered TEDx talks twice in front of crowds of over 200 TEDxGeorgiaTech conference attendees
- Served as moderator for a panel of board members representing TEDxAtlanta, TEDxUGA and TEDxEmory discussing the challenges of hosting TEDx events

Georgia Tech RoboJackets

Atlanta, Georgia

SOFTWARE TEAM

Sep 2015 - Feb 2016

- Utilized Arduino with Lego Bricktronics components to build simple robots that navigate without colliding into obstructions
- Developed firmware to interact with updated hardware for autonomous soccer-playing robots for International RoboCup competition

Georgia Tech IEEE

Atlanta, Georgia

WEBMASTER

Aug 2014 - Apr 2015

- Developed completely new public site that allows all officers to post updates using just Markdown

Startup Exchange

Atlanta, Georgia

MEMBER

Sep 2013 - May 2014

- Attended weekly meetings and learned about the challenges of running a startup, from ideation to funding to intellectual property to maintaining a user base

Georgia Tech Student Government Association

Atlanta, Georgia

SUSTAINABILITY COMMITTEE MEMBER

Sep 2013 - May 2014

- Established sustainability reward system for club events across campus to promote green habits

Honors & Awards

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| 2019 | 2nd Place , Facebook SUMO Challenge 3D Object Detection Track |
| 2017 | Highest Honors , Georgia Institute of Technology Spring 2017 Graduation |
| 2016 | Recipient , Faculty Honors |
| 2015 | Recipient , Faculty Honors |
| 2014 | Scholarship Recipient , Asian & Pacific Islander American Scholarship Fund & Wells Fargo Scholarship |