Sid Gupta

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Education

University of Toronto · B.Sc Sept. 2017 – May 2022

Computer Science Specialist, Math Minor · Final two years GPA: 3.73

Coursework: Machine Learning · Neural Networks · Probablistic Learning · Computer Vision
Natural Language Processing · Algorithms · Security · Operating Systems

Research experience

Agglutination Scoring for COVID-19 RDTs and Blood Typing May 2021 - Present

University of Toronto Toronto, ON

Supervisor: Alex Mariakakis

- Developed versatile machine learning systems for analyzing images from a new stream of COVID-19 and blood-typing RDTs (rapid diagnostic tests)
- Engineered a software system to pre-process rapid-test images using Open-CV, generate hand-crafted features, and train various machine-learning models using Scikit-SDK and Keras
- Built a website for human annotators to create minimal-noise and unbiased datasets; features include the ability to flag labels as uncertain, monitor points of disagreement, and easily include human feedback

Contour-guided Image Completion with Perceptual Grouping Toronto ON

University of Toronto May 2020 - Present

Supervisor: Dirk Bernhardt Walther & Morteza Rezanejad

- Co-first author of a computer vision paper that expands a probabilistic algorithm for contour completion
- Integrated this algorithm with state-of-the-art image inpainting models (EdgeConnect, GatedConv) in TensorFlow, and achieved a statistically significant SSIM improvement
- Extending this work with insights from Deep Image Prior, to show how state-of-the-art neural networks (U-Net, ResNet) can extract prior perceptual shape information

Software engineering experience

Apple Jan 2020 - Apr 2020

Software Engineering Intern Typescript · GraphQL · PostgreSQL · React Cupertino, CA

- Built a ticketing API service that reads errors from hardware devices, and assigns tasks to internal engineers
- Implemented a 'ticket search' feature with GraphQL query and mutation endpoints; enabling a client to query for tickets by attributes such as device code, unit #, build version, etc.
- Connected ticket generating sources to use this API, and built a React frontend to display search results

Intel May 2019 - Dec 2019

Software Engineering Intern C++ · C · Make · Bash · FPGAs San Jose, CA

- Built a C++ model that can track the speed of a hardware chip (i.e, number of clock cycles for completion)
- Successfully integrated this software model onto hardware, after reading the technical chip design, and modifying Makefiles in a codebase compilation with 15K+ lines

Research Papers (In submission)

1. A. Sklavounos, J. Lamanna, D. Modi, **S. Gupta**, J. Callum, A. Mariakakis, A. Wheeler "Digital Microfluidic Hemagglutination Assays for Blood Typing, Donor Compatibility Testing, and Hematocrit Analysis"
2. M. Rezanejad*, **S. Gupta***, C. Gummalaru, R. Marten, J. Wilder, M. Gruninger, D.Walther "Contour-guided Image Completion with Perceptual Grouping"

Projects & Leadership

Aphrodite - Data Science Lead Scikit-SDK · Pandas · React · Node Sept 2020 - Present

- Co-engineered a web platform for university students, where they can fill out a personality survey with 75 questions, and get matched with another student through a compatibility algorithm
- Received over 30,000 sign-ups, and afterwards visually presented a data report showing metrics about personality, diversity, and community building, to spark research discussions
- Working on machine learning systems that extract personality insights from this dataset of 30,000+ students

Cough Motion TensorFlow · Keras · Arduino Jan 2021 - Present

- Re-connected an audio cough-detection VGG model to additionally process IMU motion data from the head, with the aim of reducing false-positive rates
- Setup Tensorboard to run a hyperparameter grid-search, and visualize IMU motion embeddings and weights
- Collected initial data using specialized hardware; planning an in-depth study for further data collection

Interpreting iTracker TensorFlow · Keras March 2021 - May 2021

- Applied interpretability algorithms on a state-of-the-art eye-tracking model called iTracker – a variation of AlexNet which intakes images of the left pupil, right pupil, and face
- Disconnected iTracker to intake images from only one pupil, and applied DeepDream and SmoothGrad to see the change in pupil position when adjusting the target screen coordinates

University of Toronto - Teaching Assistant Jan 2019 - Present

- TA for three first year computer science courses (CSC165, CSC110, & CSC111)
- Led tutorials; managed an online course forum for 700+ students; graded course assignments & exams

Awards and recognition

- Recipient of UofT's DCS Research Award, valued at $4,000
- Second-place winner with two teammates in a UofT start-up accelerator, winning $10,000 in company funding
- Nominated for UofT's "Best CS TA" award after receiving outstanding recognition from the students
- Recognized for 100+ volunteer hours helping food banks & community centres during university studies

Skills

- **Languages**: Python · C · C++ · Java · TypeScript
- **Technologies**: GraphQL · Node · Django · React · Redux · MongoDB
- **AI / ML**: PyTorch, TensorFlow, Keras, NumPy, Pandas, OpenCV, Scikit-SDK