Nolan Dey

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SKILLS

Research: Python, PyTorch, Jax, TensorFlow, Nengo, Keras, SKLearn, MatPlotLib, NumPy, SciPy, Pandas, MATLAB
Infrastructure: SLURM, GCP, AWS, Docker, Kafka, Terraform, PostgreSQL, Git, Linux, GraphQL, MongoDB
Software Engineering: Node, React, Redux, Javascript, multiprocessing, Objective-C, Ember, D3, Rails, Scala

EDUCATION

MASc in Systems Design Engineering — University of Waterloo Sep. 2019 - Present
Supervisors: Bryan Tripp, Graham Taylor, Alexander Wong
Research Topic: Neural network explainability
Courses: Simulating Neurobiological Systems, Neural Networks, Advanced Image Processing, Time Series Modelling
GPA: 92.5/100 (4.0/4.0)

BASc in Systems Design Engineering (Honours) — University of Waterloo Sep. 2014 - Apr. 2019
Exchange term at Lund University (Lund, Sweden)
GPA: 82.1/100 (3.7/4.0), Graduated with Distinction

PUBLICATIONS

Identifying and interpreting tuning dimensions in deep networks
Shared Visual Representations in Human & Machine Intelligence NeurIPS Workshop, 2020
Nolan S. Dey, J. Eric Taylor, Bryan P. Tripp, Alexander Wong, Graham W. Taylor

37,000 Human-Planned Robotic Grasps With Six Degrees of Freedom
IEEE Robotics and Automation Letters, 2020
Victor R. Osorio, Rajan Iyengar, Xueyang Yao, Preshish Bhattachan, Adrian Ragobar, **Nolan Dey**, Bryan Tripp

EXPERIENCE

Research Assistant — Vector Institute (Toronto, Canada) Oct. 2020 - Present
- Working with Prof. Daniel Roy (UofT), Prof. Mihai Nica (UoGuelph), and Mufan Li (UofT) to investigate a first-order correction to the neural tangent kernel which may address some its inadequacies
- Working with Dr. Eric Taylor (Vector Institute) and Prof. Graham Taylor (UofGuelph) to develop a psychology-inspired quantitative method for evaluating popular neural network explainability techniques

Teaching Assistant — University of Waterloo (Waterloo, Canada) Jan. 2020 - Present
- Full TA for SYDE 462 (Systems Design Capstone Project 2), full TA for SYDE 461 (Systems Design Capstone Project 1), full TA for SYDE 361 (Engineering Design), and half TA for SYDE 223 (Algorithms and Data Structures)

Machine Learning Research Intern — Mind Foundry (Oxford, UK) Jun. 2018 - Aug. 2018
- Worked under Prof. Stephen Roberts to develop a method to predict the training time and memory usage of machine learning algorithms given a dataset and hyperparameters, using SKLearn, MatPlotLib, GCP

Machine Learning & Web Intern — Apple (Cupertino, USA) Sep. 2017 - Dec. 2017

- Identified and automated a costly labelling process with image classifier using SKLearn, MATLAB, NumPy
- Created a scheduling application with Ember, Rails, and D3 which improved internal workflows

Data Science Intern — Capital One (Kitchener, Canada) Jan. 2017 - Apr. 2017
- Developed and deployed a distributed event data pipeline that processed 480 MB/s and saved $200k/year
- Leveraged Python, Scala, Docker, Terraform, Ansible, AWS, Kafka, Snowplow, and PostgreSQL in pipeline

Full-Stack Developer Intern — Parabol (Remote) Sep. 2016 - Dec. 2016
- Remotely contributed to open-source web-app using Node, React, Redux, RethinkDB, GraphQL

Software Engineering Intern — Connected (Toronto, Canada) May 2016 - Aug. 2016
- Developed microservices using Node, React, MongoDB, CloudFoundry, and pair programming

iOS Developer Intern — Kik (Waterloo, Canada) Sep. 2015 - Dec. 2015
- Wrote major social sharing feature in Objective-C for an app with over 200M users

Quality Assurance Engineering Intern — Kik (Waterloo, Canada) Jan. 2015 - Apr. 2015
- Rigorously tested new features, conducted usability testing, and worked with developers to find issues

PROJECTS

Actor-Critic Reinforcement Learning using Spiking Neurons
Nolan Dey
- Released the only open-source implementation of "Reinforcement Learning Using a Continuous Time Actor-Critic Framework with Spiking Neurons" by Frémaux et al. using Nengo and OpenAI Gym

Synthesizing Preferred Inputs for Deep Neurons via GANs
Nolan Dey*, Nick Torenvliet*, Austin Kothig*
- Released the only modern open-source implementation of "Synthesizing the preferred inputs for neurons in neural networks via deep generator networks" by Nguyen et al. using PyTorch (originally Caffe 1.X)

Graph Convolutional Neural Network Explainability
Nolan Dey
- Released the only open-source implementation of "Explainability Methods for Graph Convolutional Neural Networks" by Pope & Kolouri et al. using PyTorch Geometric and RDKit

SYDE 2019 Class Survey
Nolan Dey*, Jason Manson-Hing*
- Surveyed 55 respondents from my undergraduate class with questions related to demographics, academics, internships, lifestyle, and post-graduation plans
- Published a detailed analysis of the survey results with 109 graphs and open-sourced my code to help future classes conduct similar surveys

VOLUNTEERING

Organizer - Deep Learning Paper Club Oct 2019 - Present
- Facilitate a collaborative setting where researchers can present, understand, and discuss exciting papers

Founder - Carols for Cans Dec 2012 - Dec 2019
- Annually organized event where students sing Christmas carols and ask for food donations
- Donated over 10k of food items to GTA food banks since 2012, with 588 students participating