Shea Cardozo

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RESEARCH INTERESTS

I am broadly interested in representation learning, particularly applied to computer vision. Topics of interest include self-supervised and unsupervised learning, generalization in deep learning, multimodal generative modelling, and explainable and interpretable AI.

EDUCATION

2021 - 2022	**Master of Science in Applied Computing** Data Science Concentration	University of Toronto
2017 - 2021	**Bachelor of Mathematics in Statistics** Co-operative Program. Dean's Honours.	University of Waterloo

Relevant Coursework:

- Computer Vision for Robotics — Prof. Steven Waslander
- Online Learning and Sequential Decision Theory — Prof. Daniel Roy
- Neural Network Training Dynamics — Prof. Roger Grosse
    - Course Research Project: 'Gradient Grafting for Second-Order Optimizers'
- Machine Learning for Vision as Inverse Graphics — Prof. Anthony Bonner
    - Course Research Project: 'Knowledge Distillation for Barlow Twins'

SKILLS

Programming Languages	Proficiency with Python, R, and C++. Experience with Java, C#, DART, Haskell, Scheme (Racket), SQL, VBA, HTML/CSS.
Deep Learning Frameworks	Proficiency with PyTorch. Experience with Jax, TensorFlow
Development and Deployment	Git, Linux, AWS, GCP, VSCode, RStudio, Jupyter Notebooks

PUBLICATIONS

- Shea Cardozo, Gabriel Islas Montero, et al. 2022. *Explainer Divergence Scores (EDS): Some Post-Hoc Explanations May be Effective for Detecting Unknown Spurious Correlations.* Presented at the AIMLAI workshop at the 31st ACM International Conference on Information and Knowledge Management (CIKM 2022). Available at https://arxiv.org/abs/2211.07650

INDUSTRY EXPERIENCE

Machine Learning Scientist — May 2022 - Mar 2023
Tenyks

- Proposed an evaluation criteria for the usage of post-hoc explanations of neural networks to detect dependence on spurious correlations, grounded in information theory. Experimentally verified our proposed method across a number of settings. Compiled and submitted our work as a workshop paper.
- Formulated and implemented a novel 'influential training examples' approach to explaining deep learning object detection models based off of existing work limited to classification tasks.

Data Scientist - Claims AI Team   Sept. 2020 - Dec. 2020
Intact Insurance

- Helped construct a pipeline to automatically classify insurance documents from image and text data using an ensembled 'ResNet' convolutional neural network and 'BERT' transformer neural network.
- Experimented with multi-objective non-gradient optimization methods such as the 'NSGA-II' genetic algorithm to optimize model prediction thresholds to mark unclassified documents for manual review.

Data Scientist - Analytics   May 2020 - Aug. 2020
Noom Inc.

- Specified and fit an autoregressive time series model with seasonal effects to predict the influx of user support tickets to ensure sufficient resource availability.
- Trained and benchmarked a set of 'GloVe' vector embeddings constructed from internal food data to improve user meal recommendation and tracking.

Actuarial Analyst - DataLab Division   Sept. 2019 - Dec. 2019
Intact Insurance

- Worked as part of the 'Rating Revolution' team to replace the existing generalized linear models used in home insurance pricing with 'XGBoost' gradient-boosted decision tree models
- Created a Python visualization tool to analyze how different pricing models impact wider financials.

Associate Actuarial Programmer   Jan. 2019 - Apr. 2019
Moodys Analytics

- Implemented highly performance sensitive financial calculations into our insurance software platform using the C++ programming language, with focus on long-term maintainability.
- Expanded UI functionality to more transparently display to clients how financials are calculated.

Personal Projects

Adversarial Conditional UNET

- Trained a UNET model to generate adversarial examples using the CIFAR-10 dataset to fool a variety of state-of-the-art image classification models, inspired by existing work in adversarial denoising.
- Verified trained model can conduct targeted attacks on models not used in training with only marginal decrease in success rate, indicating successful generalization of the generated adversarial examples.

Landscape Style-Transfer

- Created an Android application that employs a CycleGAN style-transfer model to transform natural landscape photos from the camera into images that resemble portraits.
- Employed a 'Flask' RESTful API to transfer photographs taken on the application on the local mobile device to the model hosted on a remote server.

This JoJo Does Not Exist

- Trained a StyleGAN2 image generation model to generate faces that resemble characters from the manga "JoJo's Bizarre Adventure", using a custom dataset scraped using a 'Selenium' Python bot.
- Employed a Google Cloud Platform VM to train model for 72 hours on a Linux GPU instance.

Trump Tweet Generator

- Fine-tuned the GPT-2 338M language model on former US President Donald Trump's twitter feed.
- Built a web app using the 'Flask' Python package to display generated tweets.