

# Shea Cardozo

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## RESEARCH INTERESTS

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

## EDUCATION

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2021 - 2022	<b>Master of Science in Applied Computing</b> Data Science Concentration	University of Toronto
2017 - 2021	<b>Bachelor of Mathematics in Statistics</b> 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

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

## PUBLICATIONS

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- 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

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<b>Machine Learning Scientist</b> Tenyks	May 2022 - Dec. 2022
<ul style="list-style-type: none"><li>• 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.</li><li>• 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.</li></ul>	

## **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**

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## **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.