

CAMERON VOLOSHIN

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EDUCATION

California Institute of Technology (Caltech)

Computational and Mathematical Sciences, Doctor of Philosophy
Reinforcement Learning: Policy Learning with Constraints & Off-Policy Policy Evaluation

Expected: 2023

Advisor: Professor Yisong Yue

California Institute of Technology (Caltech)

Applied and Computational Mathematics, Bachelor of Science
Relevant coursework in Machine Learning and Control/Dynamical Systems

Jun 2017

GPA: 3.9

PUBLICATIONS

1. **Voloshin, C.**, Verma, A., Yue, Y. "Eventual Discounting Temporal Logic Counterfactual Experience Replay". Under Review 2023.
2. **Voloshin, C.**, Le, H. M., Chaudhuri, S., Yue, Y. "Policy learning under LTL constraints". NeurIPS, 2022.
3. **Voloshin, C.**, Jiang, N., Yue, Y. "Minimax model learning". AISTATS, 2021.
4. **Voloshin, C.**, Le, H. M., Jiang, N., Yue, Y. "...off-policy policy evaluation for reinforcement learning". NeurIPS 2021
5. Le, H. M., **Voloshin, C.**, Yue, Y. "Batch policy learning under constraints". ICML 2019

FELLOWSHIPS

1. 2022-2026 National Science Foundation (NSF) Fellow
2. 2020-2022 Caltech Kortschak Fellow

POSTERS & WORKSHOPS

1. Poster at NeurIPS 2022. "Policy learning under LTL constraints"
2. Poster at AISTATS 2021. "Minimax model learning"
3. Poster at ICML 2020. "Minimax model learning"
4. Poster at ICML 2019, Real World Sequential Decision Making Workshop. "Empirical study of off-policy policy evaluation for reinforcement learning"
5. Poster at RLDM 2019. "Batch policy learning under constraints"
6. Poster at ICML 2019. "Batch policy learning under constraints"

TEACHING ASSISTANTSHIPS

1. Introduction to MATLAB and Mathematica *Apr – Jun 2015*
2. Number Theory and Graph Theory *Sep – Dec 2015*
3. Applied Linear Algebra *Sep – Dec 2016*
4. Complex Analysis, Ordinary and Partial Differential Equations *Jan – Jun 2016, Jan – Mar 2017*

AWARDS

2015 Caltech Fredrick J. Zeigler Memorial Award Excellence in scholarship among mathematicians.

INDUSTRY EXPERIENCE (Machine Learning)

Argo, AI (Self-Driving Cars), Acquired by Ford/VW

June 2022 – Nov 2022

Research Intern/Consultant in Motion Planning, Los Angeles, CA

- Build tools to verify the robustness of the deployed autonomous vehicle's behavior
- Build ML models to replicate and replace complex heuristics in motion planning

Activision (Video Games)

Jan 2021 – Jan 2022

Machine Learning Consultant, Los Angeles, CA

- Oversee development of recommendation systems for automatic personalization/distribution of messages and advertisements:
 - Contextual Bandits, Collaborative Filtering
 - Vowpal Wabbit, ScikitLearn
- Build tools to gauge effectiveness and iterate on the recommendation engine:
 - Backtesting (off-policy evaluation), A/B testing
- Lead hiring of a team of data scientists to maintain the systems, and managed several interns through ML projects.

EsportsOne (Esports Startup)

Feb 2019 – Oct 2020

Machine Learning Engineer, Los Angeles, CA

- Process and collect video game data (events, game state, etc.) in real-time for online amateur and professional esports games
- Lead development of machine learning and computer vision models using:
 - Template matching, convolutional and generative adversarial neural networks, Kalman filtering, optical text recognition

- o OpenCV, Tensorflow, Tesseract
- Develop backend pipelines to run the models at scale:
 - o Reading data stream via Streamlink, processing images with machine learning tools, cleaning noisy output for consistency, updating internal game state, sending game state via AWS simple notification service to Couchbase.
- Collaborate with backend engineers to package pipeline into Docker, listen to when a game starts via AWS Lambda, and trigger pipeline start (run on AWS EC2) for each game.
- Develop active learning system using human labeling for data-rich but label-poor problems.
 - o React/Node (with Express) for frontend/backend for human labeler, Tensorflow for active learning.
 - o Develop, calibrate, and test pre-game and in-game win-probability models for data science team.

CivicScape, LLC (GovTech Startup)

Apr 2017 – Nov 2018

Machine Learning Researcher & Data Scientist, Chicago, IL

- Maximize exploitation of spatio-temporal features of crime, weather, and infrastructure data with deep learning for emergency responder resource allocation.
- Collaborate with domain experts (police, researchers) to engineer data features from raw data for effective prediction.
- Develop and maintained backend pipelines including:
 - o Data storage (PostgreSQL with PostGIS)
 - o Preprocessing to normalize disparate datasets into a single uniform dataset
 - o Predicting crime probabilities using convolutional neural networks and ensembling
 - o Automated performance analysis and validation (precision-recall curves, ROC curves on hold-out and validation sets)
- Create a distributed system for preprocessing data to be able to complete predictions within designated time constraints
 - o Data is split and parsed by a team of EC2 instances and then models are created on multiple instances and combined.
- Plan technical strategy in collaboration with data science and backend engineering leads.
- Lead technical pitches for client sales pitches.

INDUSTRY EXPERIENCE (Finance)

Ekistic Ventures (Venture Capital)

Sep 2016 – Nov 2018

Associate, Chicago, IL

- Build business proofs-of-concepts
- Perform technical due diligence on potential portfolio companies.
- Advise portfolio companies on direction and vision of underlying technology.

Lazard Frères & Co., LLC (Investment Banking)

May – Aug 2016

Mergers & Acquisitions Investment Banking Intern, Los Angeles, CA

- Completed deals: Callaway acquisition of Ogio (\$75.5 million).
- Model operations, leveraged buyout, discounted cash flow, precedent transactions, and public comparables.
- Perform buy-side due diligence to assist client in understanding acquisition details.

Grosvenor Capital Management (Hedge Fund)

Jul – Sep 2015

Intern, Chicago, IL

- Develop factor models to support risk management team in determining clients' underlying market exposure.
- Build hedge fund leverage prediction tool using fixed income exposure, foreign exchange, and equity asset classes.
- Collaborate with colleague to develop algorithm automating email attachment classification to minimize outsourcing.

CSS, LLC (Trading Firm)

Jun – Jul 2015

Intern, Chicago, IL

- Study risk arbitrage (rights offerings, warrants, stock and cash) and convertible bond arbitrage. Traded whole vs. sum-of-parts.
- Model theoretical value of convertible bond with 20/30-day soft call provision via Monte-Carlo simulations of moving window Parisian-like barrier options. Significantly improved convertible bond team's estimation method.
- Leverage market inefficiency insights to design new trading strategy using machine learning to identify winning trades.