

Bryan Pui Yin Chan

Kindred AI

University of Toronto

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Research Interest

I am currently a Reinforcement Learning Researcher at Kindred AI. My goal is to identify and develop principled methods to enable agents to quickly learn and adapt. My research interests include Reinforcement Learning (RL), Robotics, Meta Learning, and Continual Learning.

Education

- **Master of Science in Applied Computing** 2018 – 2019

University of Toronto

Courses: Deep Reinforcement Learning, Imitation Learning, Edge Computing, SSD Analysis, Storage Systems

Research Project: Average Reward Reinforcement Learning for System Optimization in Robotics Application

Supervised by: Prof. Florian Shkurti, Prof. Animesh Garg, Dr. James Bergstra

- **Bachelor of Science in Computer Science (Honours)** 2013 – 2018

University of Toronto Scarborough

Courses: Machine Learning & Data Mining, Artificial Intelligence, Algorithm Design & Analysis, Data Structures Design & Analysis, Computability & Computational Complexity, Operating System

Research Experience

- **Reinforcement Learning Researcher**

Kindred AI

April 2020 – Present

- Formulate real-life robotics manipulation tasks and research on RL algorithms to solve the tasks.
- Develop RL training and deployment pipeline for production setting.
- Develop simulated version of robotics manipulation tasks, allowing the team to quickly verify the problem formulation and proposed algorithms.

- **AI Engineer**

Kindred AI

May 2019 – December 2019

- Researched on off-policy learning, experience replay variants, and average reward RL to enhance business products. Notably, a novel research on a model-based average reward RL method that optimizes policy gradient defined by the stationary distribution of the current policy.
- Enabled RL experiments in production by introducing a racing mechanism to A/B test between the training policy and baseline policy. The racing mechanism, implemented with Thompson Sampling, maintains production performance while allowing data collection using both policies.

Publications

- O. Limoyo, B. Chan, F. Maric, B. Wagstaff, A. R. Mahmood and J. Kelly, "Heteroscedastic Uncertainty for Robust Generative Latent Dynamics," in IEEE Robotics and Automation Letters, doi: 10.1109/LRA.2020.3015449.

Research Projects

- **Meta Learning DAgger (MetaL DAgger)**

University of Toronto

- Novel research on learning a direct mapping between behavioral cloning weights and after DAgger weights. Similar to MAML, learned mapping can be used as a weight initialization for similar tasks.

- **Cache Replacement using RL**

University of Toronto

- Formalized cache replacement problem as a contextual bandit problem. Learned an agent that performs better than LRU & LFU in certain workload traces.

- **Meta Learning RL**
University of Toronto
 - Reproduced results from RL², SNAIL, and MAML papers in multi-armed bandit and tabular MDP.
- **Evaluating TPCC Workload on File Systems**
University of Toronto
 - Analyzed the overhead of blocktrace, block access pattern, and throughput on TPCC benchmark over EXT4, BTRFS, and F2FS.

Teaching Experience

- **Sessional Lecturer**
University of Toronto
 - CSCC11: Introduction to Machine Learning and Data Mining – 1 appointment.
- **Teaching Assistant**
University of Toronto
 - CSC384: Introduction to Artificial Intelligence – 1 appointment.
 - CSCD84: Artificial Intelligence – 3 appointments.
 - CSCC73: Algorithm Design & Analysis – 1 appointment.
 - CSCC63: Computability & Computational Complexity – 1 appointment.
 - CSCC24: Principles of Programming Languages – 2 appointments.
 - CSCC11: Introduction to Machine Learning and Data Mining – 2 appointments.
 - CSCB63: Design and Analysis of Data Structures – 2 appointments.
 - CSCB36: Introduction to the Theory of Computation – 2 appointments.
 - CSCA67: Discrete Mathematics for Computer Scientists – 2 appointments.
 - CSCA08: Introduction to Computer Science I – 1 appointment.
 - MATA22: Linear Algebra I for Mathematical Sciences – 1 appointment.
 - MATA36: Calculus II for Physical Sciences – 1 appointment.
 - MATA33: Calculus for Management II – 4 appointments.
 - MATA32: Calculus for Management I – 4 appointments.

Industry Experience

- **Programmer Analyst**
Ontario Teachers' Pension Plan

September 2015 – December 2015
 May 2016 – August 2016
 May 2016 – August 2017

 - Developed internal web services and deployment pipelines; analyzed code complexity and software design.
 - Optimized applications using parallel programming and graph algorithms for data retrieval.
- **Quality Assurance Analyst**
RPM Technologies

January 2015 – April 2015

 - Improved automation test scripts' accuracy and efficiency.

Technical Skills

- **Programming:** Python, C, JavaScript, Java, C#, MATLAB, Bash, PowerShell
- **Machine Learning:** PyTorch, TensorFlow
- **Web:** HTML, CSS, Node.js, Express, React, Angular, .NET

Grants/Awards

- Mitacs Accelerate Research Grant: 15000 CAD