Tim Tse

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RESEARCH INTERESTS

I am broadly interested in the areas of machine learning, statistics and optimization. Specifically in my recent work, I have been working on statistical models for systems identifications, Bayesian belief tracking for directed exploration and stochastic policy optimization, all for the purpose of sample efficient model-based reinforcement learning/control.

EDUCATION

Master of Mathematics (Computer Science) 09/2015 – 05/2019 (expected)
University of Waterloo, Waterloo, ON
Supervisors: Pascal Poupart and Edith Law
Thesis: Model-based Bayesian Sparse Sampling for Sample Efficient Control

Bachelor of Applied Science, Electrical & Computer Engineering 09/2010 – 04/2015
University of Toronto, Toronto, ON

RESEARCH EXPERIENCE

Research Intern, Huawei Noah's Ark Lab Montreal
Mentors: Zhitang Chen
Working on the intersection between causal inference and RL; exploring additive noise models for deconfounding variables in state dynamics. 01/2019 – present
Mentors: Ali Vahdat and Vahid Partovi Nia
Applying statistical, DL and RL models to communication network optimization. 09/2018 – 12/2018

Graduate Student, University of Waterloo 09/2015 – 05/2019 (expected)
Supervisors: Pascal Poupart and Edith Law
Investigating methods to increase the sample efficiency of (deep) reinforcement learning algorithms.

Summer Research Student, University of Toronto summer 2015
Supervisor: Keith Vanderlinde
Received NSERC USRA to work on The Canadian Hydrogen Intensity Mapping Experiment.

Summer Research Student, University of Toronto summer 2011
Supervisor: Tarek Abdelrahman
Customized clang/LLVM compiler to support GPU-oriented languages of hiCUDA and openACC for the purpose of accelerating C code execution using GPUs.

INDUSTRY EXPERIENCE

Software Engineer 04/2013 – 04/2014
Marin Software, San Francisco, CA (Co-op Assignment)
Worked on data ETL (Extract, Transform, Load), quality assurance automation and feature implementation for task automation.

COURSE PROJECTS

A Replication of Matrix Completion Algorithms 09/2016 – 01/2017

- Studied and replicated state-of-the-art algorithms for matrix completion including gradient descent, two-block alternating minimization and stochastic gradient descent.
- Experimentally evaluated the recovery powers of each algorithm on large matrices with various reveal rates.
- Experimentally verified the theoretical conditions necessary for exact matrix recovery.

A Hybrid Human-Machine System for Generating Melody Scores From Audio 09/2015 – 09/2016

- Given that music transcription remains difficult for fully automated algorithms, this work seeks to investigate whether an intermediate human-machine system could prove to be a viable solution.
- Designed and implemented a novel UI interface that allows the crowd to transcribe audio into melody scores.
- Ran experiments on Amazon Mechanical Turk and analyzed resulting data to assess the viability of our method.

Kaggle: The Allen AI Science Challenge 09/2015 – 01/2016

- Implemented a bidirectional LSTM model that answered multiple choice questions from a standardized 8th grade science exam.
- Compared the LSTM model against an information retrieval approach that consisted of querying the top choices using Apache Lucene and then making a selection based on a Word2vec distance metric.

Mobile Facial Recognition for Individuals with Prosopagnosia 09/2014 – 05/2015

- Surveyed the medical field in search for appropriate engineering applications.
- Designed and implemented a mobile facial recognition app for the Android OS to aid face recognition in patients afflicted by prosopagnosia, a medical condition wherein the ability to recognize familiar faces is impaired.

CONFERENCE PUBLICATIONS

T. Tse, J. Salamon, A. Williams, H. Jiang and E. Law. "Ensemble: A Hybrid Human-Machine System for Generating Melody Scores From Audio" In: *Proc. 17th International Society for Music Information Retrieval Conference (ISMIR)*. New York City, NY, 2016.

WORKSHOP PAPERS

Williams, A. C., Bradshaw, J., Schaekermann, M., **Tse, T.**, Callaghan, W., & Law, E. "The Big Picture: Preserving Context in the Decomposition of Complex Expert Tasks" In: *1st Workshop on Microproductivity at SIGCHI 2016*. San Jose, CA, 2016.

HONORS & AWARDS

Math Domestic Graduate Award Scholarship	2016
NSERC – Undergraduate Student Research Awards	2015
4^{th} Year Capstone Design Project - The CNIB Hochhausen Prize ($1500)	2015
University of Toronto Dean's Honour List	2010 - 2015

TEACHING ASSISTANTSHIPS

CS 885 – Reinforcement Learning	Spring 2018
CS 486/686 – Introduction to Artificial Intelligence	Winter 2018
CS 432 – Business Systems Analysis	Fall 2017
CS 489/698 – Introduction to Machine Learning	Spring 2017

CS 486/686 – Introduction to Artificial Intelligence	Winter 2017
CS 486/686 – Introduction to Artificial Intelligence	Fall 2016
CS 486/686 – Introduction to Artificial Intelligence	Spring 2016
CS 116 – Introduction to Computer Science 2	Winter 2016
CS 246 – Object-Oriented Software Development	Fall 2015

LINKS

Website: https://tsetimmy.github.io/
Github: https://github.com/tsetimmy