Kenny Young

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Education	PhD candidate with Richard Sutton in Computing Science, University of Alberta
	Expected graduation date: April 2024
	Obtained MSc Computing Science, University of Alberta, 2019 (4.0 GPA)
	Obtained BSc Honors Computing Science, University of Alberta, 2016 (4.0 GPA)
	Obtained BSc Honors Mathematical Physics, University of Alberta, 2014 (3.9 GPA)

Relevant Work Experience

Machine Learning Intern at Borealis AI Vancouver, May-September 2020
Supervisors: Mohammad Ahmed and Andreas Lehrmann
  Explored and developed methods for obtaining calibrated uncertainty estimates in deep neural networks.

Subject Matter Expert at Coursera, January-August 2019
Supervisors: Martha White and Adam White
  Prepared scripts for the University of Alberta reinforcement learning specialization (https://www.coursera.org/specializations/reinforcement-learning).

Machine Learning Researcher at Borealis AI Edmonton, January-April 2018
Supervisor: Matt Taylor
  Primarily worked on meta-learning based hyperparameter tuning for reinforcement learning control. I presented a paper on this work at IJCAI 2019.

Research Assistant at University of Alberta, Summer 2015
Supervisor: Ryan Hayward
  Primarily developed a C++ program to efficiently solve positions in a variant of the board game Hex. I presented a paper on this work at the International Conference on Computers and Games 2016.

Research Assistant at University of Alberta, Summer 2013
Supervisors: Carsten Krauss and Kalpana Singh
  Programmed camera control, computer vision and database interface software for the Sudbury Neutrino Observatory calibration camera system.

Research Philosophy

I'm broadly interested in uncovering the general principles behind intelligent behaviour and figuring out how to implement them algorithmically. To this end, I am currently particularly interested in exploring the potential of model-based reinforcement learning and planning to allow agents to synthesize their experiences into novel predictions in order to efficiently learn how to act in the world. I am fascinated by recent advances in large language models but believe reinforcement learning and planning remain the most promising general techniques to enable agents to autonomously self-improve beyond what is possible by imitation of human-generated data and direct human feedback.

Relevant Software Projects

Github page: https://github.com/kenjyoung

MinAtar: Miniaturized ATARI Games for Reinforcement Learning Experiments
  (https://github.com/kenjyoung/MinAtar)
AlphaZero style learning on procedurally generated mazes using the MCTX framework
  (https://github.com/kenjyoung/mctx_learning_demo)
DreamerV2 implemented in JAX with support for multiple random seeds on one GPU
  (https://github.com/kenjyoung/dreamerv2_JAX)
Learning to play Hex with deep Q-learning
  (https://github.com/kenjyoung/Neurohex)

Programming and Software	Python, JAX, PyTorch, TensorFlow, theano, C++, git, LaTeX
Publications	Google Scholar Page: https://scholar.google.com/citations?user=zI2uHi8AAAAJ

Kenny Young, Aditya Ramesh, Louis Kirsch, Jürgen Schmidhuber, *The Benefits of Model-Based Generalization in Reinforcement Learning.* International Conference on Machine Learning (2023). https://arxiv.org/abs/2211.02222

Tian Tian, **Kenny Young**, Richard S. Sutton, *Doubly-Asynchronous Value Iteration: Making Value Iteration Asynchronous in Actions.* Conference on Neural Information Processing Systems (2022). https://arxiv.org/abs/2207.01613

Kenny Young, *Hindsight Network Credit Assignment: Efficient Credit Assignment in Networks of Discrete Stochastic Units.* Association for the Advancement of Artificial Intelligence Conference (2022). https://ojs.aaai.org/index.php/AAAI/article/view/20874

Kenny Young, Baoxiang Wang, Matthew E. Taylor, *Metatrace Actor-Critic: Online Step-Size Tuning by Meta-gradient Descent for Reinforcement Learning Control.* International Joint Conferences on Artificial Intelligence (2019). https://arxiv.org/abs/1805.04514

Kenny Young, Tian Tian, *MinAtar: An Atari-Inspired Testbed for Thorough and Reproducible Reinforcement Learning Experiments.* The Multi-disciplinary Conference on Reinforcement Learning and Decision Making (2019). https://arxiv.org/abs/1903.03176

Kenny Young, Richard S. Sutton, *Learning What to Remember with Online Policy Gradient Over a Reservoir.* NeurIPS Workshop on Reinforcement Learning under Partial Observability (2018). https://www.ias.informatik.tu-darmstadt.de/uploads/Team/JoniPajarinen/RLPO2018_paper_7.pdf

Craig Sherstan, Brendan Bennett, Dylan R. Ashley, **Kenny Young**, Adam White, Martha White, Richard S. Sutton, *Comparing Direct and Indirect Temporal-Difference Methods for Estimating the Variance of the Return.* Conference on Uncertainty in Artificial Intelligence (2018). http://auai.org/uai2018/proceedings/papers/35.pdf

Craig Sherstan, **Kenny Young**, Dylan Ashley, Brendan Bennett, Adam White, Martha White, Rich Sutton, *Direct Estimation of the Variance of the λ-Return with Temporal-Difference Methods.* The Multi-disciplinary Conference on Reinforcement Learning and Decision Making (2017). https://arxiv.org/abs/1801.08287

Kenny Young, Ryan Hayward, Gautham Vasan, *Neurohex: A Deep Q-learning Hex Agent.* IJCAI Computer Games Workshop (2016). https://arxiv.org/abs/1604.07097

Kenny Young, Ryan Hayward, *A Reverse Hex Solver.* International Computer Games Association conference (2016). https://arxiv.org/abs/1707.00627

Unpublished Work	**Kenny Young**, Richard S. Sutton, *Iterative Option Discovery for Planning, by Planning.* arXiv preprint arXiv:2310.01569 (2023). https://arxiv.org/abs/2310.01569

Kenny Young, Richard S. Sutton, *Understanding the Pathologies of Approximate Policy Evaluation when Combined with Greedification in Reinforcement Learning.* arXiv preprint arXiv:2010.15268 (2020). https://arxiv.org/abs/2010.15268

Kenny Young, *Variance Reduced Advantage Estimation with δ Hindsight Credit Assignment.* arXiv preprint arXiv:1911.08362 (2019). https://arxiv.org/abs/1911.08362

Kenny Young, *Learning What to Remember: Strategies for Selective External Memory in Online Reinforcement Learning Agents.* Master's Thesis (2019). https://era.library.ualberta.ca/items/7b9ed64d-9fc6-4cce-9ed7-d4bd8f91892d

Select Courses Completed	**Reinforcement Learning Theory:**
	Instructor: Csaba Szepesvari
	   Mathematical analysis of the reinforcement learning problem and algorithms.
	Stochastic Approximation:
	Instructors: Ajin Joseph and Martha White
	   Mathematical foundations for analysis of many machine learning algorithms.
	Deep Learning:
	Instructor: Dale Schuurmans
	   Developments in deep learning and insights from the instructor's own research.
	Bandit Algorithms:
	Instructor: Csaba Szepesvari
	   Theoretical analysis and application of algorithms for bandit problems.

Academic Honors	Andrew Stewart Memorial Graduate Prize, 2023 Alberta Graduate Excellence Scholarship, 2022 Alberta Innovates Graduate Student Scholarship, 2019 NSERC-Canada Graduate Scholarship-Doctoral, 2019 NSERC-Canada Graduate Scholarship-Master's, 2017 Queen Elizabeth II Graduate Scholarship, 2017 NSERC-Undergraduate Student Research Award, 2016 NSERC-Undergraduate Student Research Award, 2015 NSERC-Undergraduate Student Research Award, 2013
Reviewing Work	NeurIPS (2019, 2020, 2021) ICML (2020, 2021) ICLR (2020, 2023) AAAI (2020, 2021)
Hobbies	Rock Climbing Skiing Hiking