Ryan Faulkner, Research Engineer

London, United Kingdom, +44 7384239794, ryan.art.faulkner@gmail.com

PROFILE

I am a Machine Learning and Artificial Intelligence researcher & engineer specialising in embodied AI, multi-modal foundation models, memory, and reinforcement learning. My goal is to understand the biases inherent in learning and the general properties of information systems that can be termed intelligent; namely, those that are capable of reasoning, planning, and acting conditional on language communication and a structured world model.

EMPLOYMENT HISTORY

Mar 2015 — Present

Research Engineer, Google Deepmind — London

I have worked on a range of research projects in this role which include, but are not limited to, the following topics: embodied agents, language modelling, generalist agents, reinforcement learning, and memory systems. My work is driven by research outcomes involving close work with collaborators, planning cycles, experimentation, and clear communication of results through presentations and papers. I have also done extensive technical work building scalable neural network libraries and modules, setting up data pipelines and datasets for model training, and improving experimentation tools.

Mar 2013 — Jan 2015

Data Engineer, Flickr (Yahoo!) — San Francisco

Implemented low level instrumentation of all Flickr web & API traffic and I led the design and implementation of a distributed data storage and pipeline architecture to feed into user facing visualisation and reporting analytics.

Oct 2010 — Mar 2015

Researcher, Wikimedia Foundation — San Francisco

I built an end-to-end system to support analytics for Wikimedia 2010 and 2011 online annual Fundraisers and carried in-depth analyses and statistical modelling of donor data and web traffic. I also designed and executed experiments on the Wikipedia editor community data, analysing editing trends to establish an understanding of editor behaviour for growth and engagement on the website.

Sep 2008

Research Assistant, McGill University — Montreal

Completed Masters studies in Computer Science with a specialisation in Machine Learning. In particular my research focus was deep belief networks and reinforcement learning.

Advisor: Doina Precup, https://rl.cs.mcgill.ca/people/doina-precup/

Jan 2010

Course Lecturer, McGill University — Montreal

"Computers in Engineering".

Course topics included introduction to programming in C and Fortran, numerical methods for function approximation, root finding, and integral estimation, pointers, arrays, sorting and searching. Held two lectures per week with office hours.

Sep 2009 — Dec 2009

Teaching Assistant, McGill University — Montreal

"Data Structures and Algorithms",

Course topics included linked lists, stacks, queues, heaps, trees, divide and conquer, greedy algorithms, dynamic programming, graph search, network flow, and asymptotic analysis of running time. Marked assignments and tests, and held office hours weekly.

Jan 2009 — Apr 2009

Teaching Assistant, McGill University — Montreal

"Introduction to Computing".

Course topics included Java programming, classes and objects, conditional and iterative constructs, arrays, strings, records. Marked assignments and tests, and held office hours weekly.

EDUCATION

Sep 2008 — Oct 2010 | Msc., McGill University | Montreal

Thesis Masters in Computer Science. and Machine Learning

GPA 3.90 / 4.0

Thesis: https://escholarship.mcgill.ca/concern/theses/9w032340f

Sep 2000 — May 2005 | BASc, University of Toronto | Toronto

Bacherlor degree in Computer Engineering

GPA 3.01 / 4.0

SELECT PUBLICATIONS

Scaling Instructable Agents Across Many Simulated Worlds. SIMA Team, (2024). The 4th Wordplay: When Language Meets Games @ ACL 2024. https://openreview.net/forum?id=fNDGd6pqOg

Solving Reasoning Tasks with a Slot Transformer. R Faulkner, D Zoran (2022). arXiv preprint arXiv:2210.11394. https://arxiv.org/pdf/2210.11394.

Rapid Task-Solving in Novel Environments. Samuel Ritter, Ryan Faulkner, Laurent Sartran, Adam Santoro, Matthew Botvinick, and David Raposo. In: International Conference on Learning Representations. 2021. URL: https://openreview.net/forum?id=FmvpFpn_0q.

Generalization of reinforcement learners with working and episodic memory. M. Fortunato, M. Tan, R. Faulkner, S. Hansen, A. Puigdomènech Badia, G. Buttimore, C. Deck, J. Z. Leibo, and C. Blundell. Advances in neural information processing systems, 32, 2019.

Interval timing in deep reinforcement learning agents. B. Deverett, R. Faulkner, M. Fortunato, G. Wayne, and J. Z. Leibo, in Advances in Neural Information Processing Systems, 2019, pp. 6686–6695.

Openspiel: A framework for reinforcement learning in games. Marc Lanctot, Edward Lock hart, Jean-Baptiste Lespiau, Vinícius Flores Zambaldi, Satyaki Upadhyay, Julien Pérolat, Sriram Srinivasan, Finbarr Timbers, Karl Tuyls, Shayegan Omidshafiei, Daniel Hennes, Dustin Morrill, Paul Muller, Timo Ewalds, Ryan Faulkner, János Kramár, Bart De Vylder, Brennan Saeta, James Bradbury, David Ding, Sebastian Borgeaud, Matthew Lai, Julian Schrittwieser, Thomas W. Anthony, Edward Hughes, Ivo Danihelka, and Jonah Ryan-Davis. CoRR, abs/1908.09453, 2019. URL http://arxiv.org/abs/1908.09453.

Relational Recurrent Neural Networks, A. Santoro, R. Faulkner, et al, in: Proceedings of Advances in Neural Information Processing Systems, 2018, pp. 7299–7310.

Relational inductive biases, deep learning, and graph networks. Battaglia Peter W., Hamrick Jessica B., Bapst Victor, Sanchez-Gonzalez Alvaro, Zambaldi Vinicius, Malinowski Mateusz, Tacchetti Andrea, Raposo David, Santoro Adam, *Faulkner Ryan, Gulcehre Caglar, Song Francis, Ballard Andrew, Gilmer Justin, Dahl George, Vaswani Ashish, Allen Kelsey, Nash Charles, Langston Victoria, Dyer Chris, Heess Nicolas, Wierstra Daan, Kohli Pushmeet, Botvinick Matt, Vinyals Oriol, Li Yujia, Pascanu Razvan (2018) arXiv preprint arXiv:1806.01261

Grounded language learning in a simulated 3d world. Karl Moritz Hermann, Felix Hill , Simon Green, Fumin Wang, Ryan Faulkner, Hubert Soyer, David Szepesvari, Wojciech Marian Czarnecki, Max Jaderberg, Denis Teplyashin, Marcus Wainwright, Chris Apps, Demis Hassabis and Phil Blunsom (2017). arXiv preprint arXiv:1706.06551. https://arxiv.org/abs/1706.06551.

Etiquette in wikipedia: Weaning new editors into productive ones. Faulkner, R., Walling, S., Pinchuk, M., 2012. In: Proceedings of the Eighth Annual International Symposium on Wikis and Open Collaboration. WikiSym '12. ACM, New York, NY, USA, pp. 5:1–5:4. URL http://doi.acm.org/10.1145/2462932.2462939

Dyna planning using a feature based generative model. Faulkner, R., Precup, D.: In: Lee, H., Ranzato, M., Bengio, Y., Hinton, G.E., LeCun, Y., Ng, A.Y. (eds.) Advances in Neural Information Processing Systems (NIPS) Workshop, pp. 10–19. MIT Press, Cambridge, MA, USA (2010)