EDWARD HU

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EDUCATION

Université de Montréal, Montréal, QC, Canada — Jan 2022 – Present
Doctor of Philosophy in Computer Science
- Advised by Yoshua Bengio
- Cumulative GPA: 4.00/4.00

Johns Hopkins University, Baltimore, MD — Class of 2019
Bachelor of Science in Cognitive Science, Computer Science
- Advised by Benjamin Van Durme
- Cumulative GPA: 3.96/4.00
- Member of Upsilon Pi Epsilon, Omega Psi

HONORS / SCHOLARSHIPS

Graduate Fellowship in AI 2023, CA$10,000 — Université de Montréal
University nomination for Apple Scholars in AI/ML 2023 — Université de Montréal
Best paper award with a prize of US$1,000 — ICLR 2022 Workshop
Departmental Honors in Cog. Sci., Comp. Sci. — Johns Hopkins University

RESEARCH EXPERIENCE

Mila, Université de Montréal — Jan 2022 – Present
Montréal, Quebec, Canada
PhD Student
- Research principled approaches to robust reasoning
- Developed GFlowNet-EM, a new algorithm for fitting compositional latent variable models with an intractable posterior, such as non-context-free grammars
- Worked on the theoretical foundation of generative flow networks (GFlowNets), a novel framework for training amortized samplers of compositional objects

Microsoft Research AI / Microsoft Azure AI, — Sept 2019 – Dec 2021
Microsoft Corporation, Redmond, WA
AI Resident / Researcher
- Researched the fundamentals of deep learning, principled approaches to large-scale machine learning, and its practical deployment
- Drove early research integration of OpenAI GPT-3 as one of the 8 members of the Microsoft-OpenAI partnership onsite engineering team
- Led research collaborations with CMU and OpenAI, resulting in two publications, one at ICLR 2022 and the other at NeurIPS 2021
- Generated 2 pending U.S. Patents as the lead inventor and published 5 papers at major conferences including a best paper for the Trustworthy ML workshop at ICLR 2020

Center for Language and Speech Processing, — Jan 2018 – Aug 2019
Johns Hopkins University, Baltimore, MD
Research Assistant
- Researched paraphrase generation and monolingual rewriting with applications in data augmentation and plagiarism detection
- Built ParaBank, the largest English paraphrase dataset at the time with more than 4 billion generated tokens
- Developed an lexically-constrained decoding algorithm 5 times more efficient than the best prior approach while being more accurate

- Implemented features including improved lexically-constrained decoding and decoding by sampling in AWS Sockeye

SELECTED PUBLICATIONS

- **GFlowNet-EM for Learning Compositional Latent Variable Models**
- *Edward Hu**, N. Malkin*, M. Jain, K.E. Everett, A. Graikos, Y. Bengio — Preprint
- **GFlowNet Foundations** — JMLR 2023
  Yoshua Bengio*, Salem Lahlou*, Tristan Deleu*, *Edward Hu*, Mo Tiwari, Emmanuel Bengio
- **LoRA: Low-Rank Adaptation of Large Language Models**
  *Edward Hu**, Y Shen*, P. Wallis, Z. Allen-Zhu, Y. Li, S. Wang, W. Chen — ICLR 2022
- **Tuning Large Neural Networks via Zero-Shot Hyperparameter Transfer**
  G. Yang*, *Edward Hu**, I. Babuschkin, S. Sidor, X. Liu, D. Farhi, N. Ryder, J. Pachocki, W. Chen, J. Gao — NeurIPS 2021
- **Feature Learning in Infinite-Width Neural Networks**
  Greg Yang, *Edward Hu* — ICML 2021
- **Improved Image Wasserstein Attacks and Defenses** *(Best Paper)*
  Edward Hu, Adith Swaminathan, Hadi Salman, Greg Yang — ICLR 2020 Workshop
- **Randomized Smoothing of All Shapes and Sizes**
  G. Yang, T. Duan, *Edward Hu*, H. Salman, I. Razenshteyn, J. Li — ICML 2020
- **Large-scale, Diverse, Paraphrastic Bitexts via Sampling and Clustering**
  Edward Hu, A. Singh, N Holzenberger, M. Post, B. Van Durme — CoNLL 2019
- **Improved Lexically-Constrained Decoding for Translation and Monolingual Rewriting** — NAACL 2019
  Edward. Hu, H. Khayrallah, R. Culkin, P. Xia, T. Chen, M. Post, B. Van Durme
- **ParaBank: Monolingual Bitext Generation and Sentential Paraphrasing via Lexically-constrained Neural Machine Translation** — AAAI 2019
  Edward Hu, Rachel Rudinger, Matt Post, Benjamin Van Durme

ONLINE ARTICLES

- **µTransfer: A technique for hyperparameter tuning of enormous neural networks**
  Edward Hu, Greg Yang, Jianfeng Gao — Microsoft Research Blog **(Link)**
- **On infinitely wide neural networks that exhibit feature learning**
  Edward Hu, Greg Yang — Microsoft Research Blog **(Link)**

OPEN-SOURCE REPOSITORIES

- **mup:** principled model parametrization for hyperparameter transfer — (700+ stars)
  Maintainer — github.com/microsoft/mup/
- **lora**: efficient model adaptation — (400+ stars)
  Maintainer — github.com/microsoft/lora/

Updated on 2/5/2023