Alexander Ku

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Education

MS in Electrical Engineering & Computer Science, UC Berkeley, 2018
BA in Computer Science, UC Berkeley, 2017

Research Interests

My research focuses on understanding how abstract structures enable inductive reasoning in people and machine learning models. In particular, I'm interested in the relationship between natural language supervision and the formation of abstract structures. As a result, my projects alternates between engineering large multimodal models, trained on Google-scale data, and analyzing them from a cognitive lens.

Previously I worked on computational biology and genomics.

Professional Positions

Research Software Engineer, Google Research, Since December 2018
    Grounded language understanding and image generation.

Research Intern, Google Brain, Summer 2018 and Summer 2017
    Variant calling, genome assembly, and image generation.

Graduate Student Researcher, UC Berkeley, Fall 2016 to Spring 2018
    Computational cognitive science and computational biology.

Graduate Student Instructor for Data 8, UC Berkeley, Fall 2017 and Fall 2016
    Foundations of data science.

Graduate Student Instructor for CS 188, UC Berkeley, Spring 2017
    Introduction to artificial intelligence.

Publications

Journal articles

J Yu, Y Xu, JY Koh, T Luong, G Baid, Z Wang, V Vasudevan, **A Ku**, Y Yang, BK Ayan, B Hutchinson, W Han, Z Parekh, X Li, H Zhang, J Baldridge, Y Wu (2022). Scaling autoregressive models for content-rich text-to-image generation. *Under reivew*.

R Poplin, P Chang, D Alexander, S Schwartz, T Colthurst, **A Ku**, D Newburger, J Dijamco, N Nguyen, PT Afshar, SS Gross, L Dorfman, CY McLean, MA De-Pristo (2018). A universal SNP and small-indel variant caller using deep neural networks. *Nature Biotechnology, 36 (10), 983*.

Conference papers

A Kamath, P Anderson, S Wang, JY Koh, **A Ku**, A Waters, Y Yang, J Baldridge, Z Parekh (2022). A New Path: Scaling Vision-and-Language Navigation with Synthetic Instructions and Imitation Learning. *Under reivew*.

J Yu, X Li, JY Koh, H Zhang, R Pang, J Qin, **A Ku**, Y Xu, J Baldridge, Y Wu (2021). Vector-quantized image modeling with improved vqgan. *Tenth International Conference on Learning Representations (ICLR'21)*.

A Ku, P Anderson, J Pont-Tuset, J Baldridge (2021). Pangea: The panoramic graph environment annotation toolkit. *Proceedings of the Second Workshop on Advances in Language and Vision Research (NAACL'21 ALVR)*.

M Zhao, P Anderson, V Jain, S Wang, **A Ku**, J Baldridge, E Ie (2021). On the evaluation of vision-and-language navigation instructions. *The 16th Conference of the European Chapter of the Association for Computational Linguistics (EACL'21)*.

A Ku*, P Anderson*, R Patel, E Ie, J Baldridge (2020). Room-Across-Room: Multilingual Vision-and-Language Navigation with Dense Spatiotemporal Grounding. *Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP'20)*.

H Huang*, V Jain*, H Mehta, **A Ku**, G Magalhaes, J Baldridge, E Ie (2019). Transferable Representation Learning in Vision-and-Language Navigation. *Proceedings of the IEEE International Conference on Computer Vision (ICCV'19)*.

G Magalhaes, V Jain, **A Ku**, E Ie, J Baldridge (2019). Effective and General Evaluation for Instruction Conditioned Navigation using Dynamic Time Warping. *Advances in Neural Information Processing Systems Workshop on Visually Grounded Interaction and Language (NeurIPS'19 ViGIL)*.

V Jain*, G Magalhaes*, **A Ku***, A Vaswani, E Ie, J Baldridge (2019). Stay on the Path: Instruction Fidelity in Vision-and-Language Navigation. *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics (ACL'19).*

N Parmar*, A Vaswani*, J Uszkoreit, Ł Kaiser, N Shazeer, **A Ku**, D Tran (2018). Image Transformer. *Proceedings of the 35th International Conference on Machine Learning (ICML'18).*

JC Peterson, JW Suchow, K Aghi, **AY Ku**, TL Griffiths (2018). Capturing human category representations by sampling in deep feature spaces. *Proceedings of the 40st Annual Conference of the Cognitive Science Society (CogSci'18).*

Open Source Software

DeepVariant: github.com/google/deepvariant
    Analysis pipeline for calling genetic variants from DNA sequencing data.

Nucleus: github.com/google/nucleus
    Python and C++ library for processing genomics data in TensorFlow.

Pangea: github.com/google-research/pangea
    Web toolkit for annotating in interactive virtual environments.