Jack Hessel

Research Scientist @ The Allen Institute for AI

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Education

Ph.D., Computer Science
Cornell University
August 2014 - August 2020
Advised by Professor Lillian Lee
Natural Language Processing and Machine Learning
Thesis: Learning from Multimodal Web Data

B.A., Computer Science and Math/Statistics
Carleton College
September 2010 - June 2014
Magna Cum Laude
Honors in Computer Science

Publications

Refereed Conference Publications

Rowan Zellers*, Ximing Lu*, **Jack Hessel***, Youngjae Yu, Jae Sung Park, Jize Cao, Ali Farhadi, and Yejin Choi. "MERLOT: Multimodal Neural Script Knowledge Models." NeurIPS 2021 (Oral; top 1% of submissions).

Jack Hessel, Ari Holtzman, Maxwell Forbes, Ronan Le Bras, and Yejin Choi. "CLIPScore: A Reference-free Evaluation Metric for Image Captioning." EMNLP 2021.

Jack Hessel and Alexandra Schofield. "How effective is BERT without word ordering? Implications for language understanding and data privacy." ACL 2021.

Jack Hessel and Lillian Lee. "Does my multimodal model learn cross-modal interactions? It's harder to tell than you might think!" EMNLP 2020.

Jack Hessel, Zhenhai Zhu, Bo Pang, and Radu Soricut. "Beyond Instructional Videos: Probing for More Diverse Visual-Textual Grounding on YouTube." EMNLP 2020.

Gregory Yauney, **Jack Hessel**, and David Mimno. "Domain-Specific Lexical Grounding in Noisy Visual-Textual Documents." EMNLP 2020.

Jack Hessel, Lillian Lee, and David Mimno. "Unsupervised Discovery of Multimodal Links in Multi-image, Multi-sentence Documents." EMNLP 2019.

Jack Hessel, Bo Pang, Zhenhai Zhu, and Radu Soricut. "A Case Study on Combining ASR and Visual Features for Generating Instructional Video Captions" CoNLL 2019.

Jack Hessel and Lillian Lee. "Something's Brewing! Early Prediction of Controversy-causing Posts from Discussion Features." NAACL 2019.

Jack Hessel, David Mimno, and Lillian Lee. "Quantifying the Visual Concreteness of Words and Topics in Multimodal Datasets." NAACL 2018.

Jack Hessel, Lillian Lee, and David Mimno. "Cats and Captions vs. Creators and the Clock: Comparing Multimodal Content to Context in Predicting Relative Popularity" WWW 2017.

Jack Hessel, Chenhao Tan and Lillian Lee. "Science, AskScience and BadScience: On the Coexistence of Highly Related Communities." ICWSM 2016.

Jack Hessel, and Sherri Goings. "Using Reproductive Altruism to Evolve Multicellularity in Digital Organisms." ECAL 2013.

Refereed Workshop Publications

Jack Hessel, and David Mimno. "Aligning Images and Text in a Digital Library." Computer Vision in Digital Humanities Workshop @ DH 2017.

Jack Hessel, Alexandra Schofield, Lillian Lee, and David Mimno. "What do Vegans do in their Spare Time? Latent Interest Detection in Multi-Community Networks." Networks Workshop @ NeurIPS 2015.

Jack Hessel, Nicolas Savva, and Kimberly J Wilber. "Image Representations and New Domains in Neural Image Captioning." Vision/Language Workshop @ EMNLP 2015.

Albright, Evan, **Jack Hessel**, Nao Hiranuma, Cody Wang, and Sherri Goings. "A Comparative Analysis of Popular Phylogenetic Reconstruction Algorithms." MICS 2014.

Employment

Research

Research Scientist, *Allen Institute for Artificial Intelligence* July 2021 – present

Postdoctoral Young Investigator, *Allen Institute for Artificial Intelligence* Oct 2020 – July 2021
Host: Yejin Choi.
Working on commonsense reasoning, vision and language, etc.

Research Intern, *Google Research* Summer 2019, Summer 2018
Hosts: Bo Pang and Zhenhai Zhu.
Worked with the natural language understanding team on video language joint learning: this work was published at *CoNLL, 2019* and *EMNLP 2020*.

Research Intern, *Facebook, Inc.* Summer 2017
Host: Amit Bahl.
Worked with the Core Data Science team on personalized language modeling, and cross-modal retrieval.

Research Intern, *Twitter, Inc.* Summer 2016
Host: Clément Farabet.
Worked with the Cortex Team as their first intern on large-scale/multimodal node embeddings in graphs, language modeling, and engagement prediction.

Research Intern, *Washington University, St. Louis REU* Summer 2013
Host: Kilian Weinberger.
Contributed to a GPU support vector machine package that accompanies Tyree et al.'s "Parallel Support Vector Machines in Practice." 2014.

Teaching

Invited Visiting Instructor, *Computer Science Dept., Carleton College* Spring 2019
Lead instructor of Natural Language Processing and Mathematics of Computer Science; 30+ students in each class

Teaching Assistant, *Cornell University* Various
Language and Information, 2016; Machine Learning for Data Science, 2015; Intro to Computer Graphics, 2014

Honors, Invited Talks, and Grants

Academic Honors

Top Reviewer Recognition Various
ACL 2018+2020, EMNLP 2018+2019, CoNLL 2019, ICML 2020

Pitt Digital Humanities graduate speaker series speaker 2018

MICS Conference Best Paper Award 2014

Phi Beta Kappa, Beta of Minnesota 2014

Sigma Xi Inductee, Carleton College Chapter 2014

Invited Talks

University of Pittsburgh: "(at least) Two Conceptions of Visual-Textual Grounding" 2020
Allen Institute for AI: "The Promise and Perils of Learning Grounding from Visual-Textual Web Data." 2020
UNC Chapel Hill: "The Promise and Perils of Learning Grounding from Visual-Textual Web Data." 2020
Rutgers University: "Multimodal Grounding from User-generated Web Content." 2019
SRI International: "Multimodal Grounding from User-generated Web Content." 2019
Cornell University: PhD Colloquium, "Unsupervised Learning From Multimodal Documents." 2019
University of Pittsburgh: "Grounding Images from a Digital Library in their Textual Contexts." 2018
Cornell University: Two Guest Lectures for CS4300, "Practical Unsupervised Learning" 2015
Carleton College: "The Role of Altruism on Kickstarter" 2014

Grants

Zillow Data Science Grant (with David Mimno: $85K) 2018

Nvidia Hardware Grants (with David Mimno and Lillian Lee) 2018, 2015

Service

Program Committees/Reviewing

Conference/Journal Review Comittees

ACL 2016, 2017, 2018, 2019, 2020, 2021
EMNLP 2017, 2018, 2019, 2020, 2021
ICML 2020, 2021
NeurIPS 2021
ICLR 2021
NAACL 2018, 2019, 2021
AACL 2020
CoNLL 2019, 2020, 2021
JAIR 2020
PLOS One 2020
ICWSM 2018
EACL 2017, 2021
AAAI 2017

Workshop/Grant Reviewer

Black in AI @ NeurIPS: 2017, 2018, 2019, 2020
Student Research Workshop @ NAACL: 2018
Student Research Workshop @ ACL: 2020, 2021
Student Research Workshop @ EACL: 2021
Noisy User-generated Text @ EMNLP: 2018, 2019, 2020
Practical ML 4 the Developing World @ ICLR: 2020
BlackAIR 2021

Volunteer Service

Lesson Planner and Volunteer, *Expand Your Horizons @ Cornell* Spring 2015, 2014
Planned for and taught at a one-day conference for 7th-9th grade girls to encourage interest in math and science.

Volunteer Elementary School Teacher, Fall 2014
Volunteered once per week teaching 2-5th grade students how to code using code.org

Development Experience

Open Source Contributions

Developed a TreeLSTM in `TensorFlow2`: this neural network dynamically changes its topology on a per-example basis (`https://github.com/jmhessel/recursive_nn_tf2`)

Developed `fmpytorch` in 2017 (150+ stars on GitHub): a cythonized implementation of second order factorization machines in `pytorch` (`https://github.com/jmhessel/fmpytorch`)

Developed `fightingwords` in 2015 for comparing word usage rate differences between corpora; used in several refereed publications (`https://github.com/jmhessel/FightingWords`)

Pull requests merged to *Keras*, and *Gensim*, and *tensorflow*

Technical Skills

Machine Learning Skills: Various machine learning/statistical toolkits/languages (e.g. sklearn, Tensorflow, PyTorch, R, etc.). Experience working with large, multi-faceted datasets.

Development Skills: Object-oriented programming (Python, Java, C++), parallel programming experience on CPUs + GPUs + TPUs, experience with various languages, development environments, version control systems, operating systems.

References

Available upon request