JOSHUA T. ABBOTT

Computational cognitive scientist specializing in using psychological theory to improve machine learning models.

EXPERIENCE

University of Melbourne Fall 2018 - Winter 2020
Postdoctoral Research Fellow in Cognitive Science *Melbourne, Australia*

- Developed and led data-science research projects investigating semantic variation in word meanings across world cultures: curating datasets from sources in cognitive anthropology, ethnobiology, and ornithology, and using ML methods for analysis.
- Joint-led an international collaboration investigating how cognitive models of human generalization and few-shot learning can improve ML methods of recommendation and evaluation (e.g., in books, music, etc.).

Max Planck Institute for Human Development Fall 2017 - Summer 2018
Postdoctoral Fellow in Adaptive Rationality *Berlin, Germany*

- Developed and led research projects (with graduate students, postdocs, and senior PIs) investigating how the topology of semantic embedding spaces affects forecasting models of human judgment and decision making.
- Investigated systemic biases of acceptance in JDM conference abstract submissions by utilizing various NLP methods.

University of California, Berkeley Fall 2010 - Summer 2017
Research Scientist in Artificial Intelligence and Graduate Student Researcher *Berkeley, CA*

- As a Research Scientist in the Berkeley AI Research (BAIR) Lab, I led projects investigating how to transform deep neural network (CNN) representations closer to human semantic space representations (recovered from similarity judgments).
- As a Graduate Student Researcher, I led over 20 projects on behavioral modeling in categorization and language usage, exploring the effects of different semantic embeddings: utilizing theories and large-scale experiments from psychological sciences to build better ML models for recommendation and computer vision systems that behave more like people do.

RELEVANT SKILLS

Languages: Python, C/C++/C#, MATLAB
ML Tools: (Computer Vision) pytorch, tensorflow, opencv; (NLP) huggingface, spaCy; (Data Science) scikit-learn, pandas
Misc: linux, git, latex, mysql, php, mturk experiments

EDUCATION

University of California, Berkeley 2016
Ph.D. in *Cognitive Science,* Advisor: *Thomas L. Griffiths*

University of Cambridge 2010
M.Phil in *Computer Science,* Advisor: *Zoubin Ghahramani*

New College of Florida 2009
B.A. *(Honors)* in *Computer Science*

SELECTED PAPERS

J.C. Peterson, J.T. Abbott, and T.L. Griffiths. (2018). Evaluating (and improving) the correspondence between deep neural networks and human representations. *Cognitive Science.* 42(8), 2648-2669. (Computational Modeling Prize in Perception and Action).

- Transforming CNN feature spaces towards more human-like semantic spaces based on human similarity judgments, providing a method to better capture how human experts conceptually represent novel domains from pixel space.

Y. Jia, J.T. Abbott, J.L. Austerweil, T.L. Griffiths and T. Darrell. (2013). Visual concept learning: combining machine vision and Bayesian generalization on concept hierarchies. In *Advances in Neural Information Processing Systems* 26.

- Combines a CNN perceptual model with a Bayesian generalization model based on how people learn concepts from only a few positive examples, utilized on a PR-2 robot to learn how to group individual objects into higher-level categories.

J.T. Abbott, K.A. Heller, Z. Ghahramani, and T.L. Griffiths. (2011). Testing a Bayesian measure of representativeness using a large image database. In *Advances in Neural Information Processing Systems* 24.

- Developed an efficient algorithm to rank elements in sets of images representing a concept, computing how good of an example each element is of the concept. Can be used as a method of novelty detection.