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Proceedings of the Annual Meeting of the Cognitive Science Society

Title

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Permalink

Journal

Authors

Sucevic, Jelena
Mitrovic, Jovana

Publication Date

2021

Copyright Information

Peer reviewed

Can algorithms learn from babies? Exploring how infant learning can inform and inspire unsupervised learning algorithms

Jelena Sucevic
University of Oxford, Oxford, United Kingdom

Jovana Mitrovic
DeepMind, London, United Kingdom

Abstract

Most of the recent success in machine learning has been achieved in supervised learning and predicated on the availability of large amounts of labelled training data. On the other hand, effectively using readily available unlabelled data has proven a much more difficult endeavour. In contrast to algorithms, infants spontaneously learn from the available sensory information without explicit instructions, supervision or feedback. Thus, infant learning can be viewed as a highly successful approach to unsupervised learning. In this work, we explore the parallels between infant learning and recent successes of unsupervised machine learning in the area of contrastive learning. We examine how the principles of infant learning and developmental cognitive neuroscience can inform and inspire the development of novel contrastive learning algorithms. We focus on the phenomenon of category learning and explore how these principles can be applied to better understand and improve contrastive methods.