UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

Exploiting Embodied Simulation to Detect Novel Object Classes Through Interaction

Permalink

Journal

Authors

Krishnaswamy, Nikhil
Ghaffari, Sadaf

Publication Date

2022

Peer reviewed

Exploiting Embodied Simulation to Detect Novel Object Classes Through Interaction

Nikhil Krishnaswamy
Colorado State University, Fort Collins, Colorado, United States

Sadaf Ghaffari
Colorado State University, Fort Collins, Colorado, United States

Abstract

In this paper we present a novel method for a naive agent to detect novel objects it encounters in an interaction. We train a reinforcement learning policy on a stacking task given a known object type, and then observe the results of the agent attempting to stack various other objects based on the same trained policy. By extracting embedding vectors from a convolutional neural net trained over the results of the aforementioned stacking "play," we can determine the similarity of a given object to known object types, and determine if the given object is likely dissimilar enough to the known types to be considered a novel class of object. We present the results of this method on two datasets gathered using two different policies and demonstrate what information the agent needs to extract from its environ- ment to make these novelty judgments.