Vector-Symbolic Representations for Visual Scene Analysis

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Submitter Eric Weiss

Affiliation UC Berkeley

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Presentation Abstract Summary Biological visual processing systems must be able to rapidly interpret a complex visual signal which, due to body and eye motion, constantly and abruptly changes. How this sequence of images and the corresponding body or eye movements are parsed through time into a coherent model of the state of the environment remains a mystery. We introduce a novel framework for encoding images as high-dimensional complex vectors that enables us to integrate multiple glimpses into a single description of the scene and that can support visual reasoning. We demonstrate the algorithm on a moderately difficult extension of the MNIST dataset requiring sophisticated spatial reasoning.

Co-author Information

* Presenting Author

First Name	Last Name	Affiliation	E-mail
Eric *	Weiss *	UC Berkeley	eaweiss@berkeley.edu
Bruno	Olshausen	UC Berkeley	baolshausen@berkeley.edu

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