

Learning Viewpoint Invariant Representations of Faces in an Attractor Network

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Abstract

In natural visual experience, different views of an object tend to appear in close temporal proximity as an animal manipulates the object or navigates around it. We investigated the ability of an attractor network to acquire view invariant visual representations by associating first neighbors in a pattern sequence. The pattern sequence contains successive views of faces of ten individuals as they change pose. Under the network dynamics developed by Griniasty, Tsodyks & Amit (1993), multiple views of a given subject fall into the same basin of attraction. We use an independent component (ICA) representation of the faces for the input patterns (Bell & Sejnowski, 1995). The ICA representation has advantages over the principal component representation (PCA) for viewpoint-invariant recognition both with and without the attractor network, suggesting that ICA is a better representation than PCA for object recognition.