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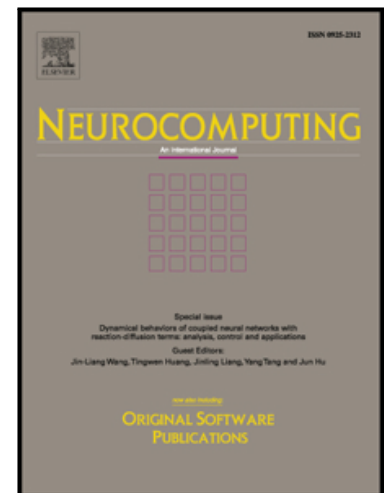
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Exponential Discriminative Metric Embedding in Deep Learning

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Abstract

With the remarkable success achieved by the Convolutional Neural Networks (CNNs) in object recognition recently, deep learning is being widely used in the computer vision community. Deep Metric Learning (DML), integrating deep learning with conventional metric learning, has set new records in many fields, especially in classification task. In this paper, we propose a replicable DML method, called Include and Exclude (IE) loss, to force the distance between a sample and its designated class center away from the mean distance of this sample to other class centers with a large margin in the exponential feature projection space. With the supervision of IE loss, we can train CNNs to enhance the intra-class compactness and inter-class separability, leading to great improvements on several public datasets ranging from object recognition to face verification. We conduct a comparative study of our algorithm with several typical DML methods on three kinds of networks with different capacity. Extensive experiments on three object recognition datasets and two face recognition datasets demonstrate that IE loss is always superior to other mainstream DML methods and approach the state-of-the-art results.

Keywords: Deep metric learning, Object recognition, Face verification, Intra-class compactness, Inter-class separability

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