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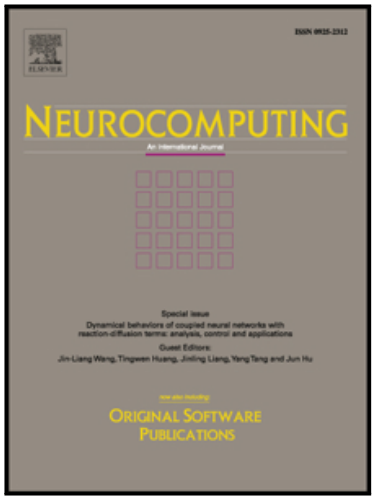

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Kernel group sparse representation classifier via structural and non-convex constraints

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Abstract

In this paper, we propose a new classifier named kernel group sparse representation via structural and non-convex constraints (KGSRSN) for image recognition. The new approach integrates both group sparsity and structure locality in the kernel feature space and then penalties a non-convex function to the representation coefficients. On the one hand, by mapping the training samples into the kernel space, the so-called norm normalization problem will be naturally alleviated. On the other hand, an interval for the parameter of penalty function is provided to promote more sparsity without sacrificing the uniqueness of the solution and robustness of convex optimization. Our method is computationally efficient due to the utilization of the Alternating Direction Method of Multipliers (ADMM) and Majorization-Minimization (MM). Experimental results on three real-world benchmark datasets, i.e., AR face database, PIE face database and MNIST handwritten digits database, demonstrate that KGSRSN can achieve more discriminative sparse coefficients, and it outperforms many state-of-the-art approaches for classification with respect to both recognition rates and running time.

Keywords: sparse representation, locality constraint, group sparse, kernel

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