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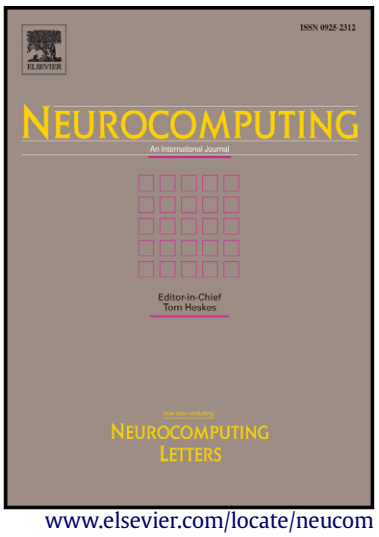

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A Locally Weighted Sparse Graph Regularized Non-negative Matrix Factorization Method

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Abstract

Owing to the well interpretation ability, Non-negative Matrix Factorization (NMF) has attracted much attention from computer vision and machine learning communities. However, the standard NMF adopts a least square error function as the empirical likelihood term in the model, which is sensitive to the noise and outliers. So, it is not robust in practice. To overcome this problem, we propose a noise robust NMF method named as Locally Weighted Sparse Graph regularized Non-negative Matrix Factorization (LWSG_NMF). Since many real-world noises can be broadly decomposed into the dense Gaussian random noise and the sparse block noise, we propose a sparse noise assumption. Based on this assumption, we reformulate the empirical likelihood term of the standard NMF by explicitly imposing a sparse noise term. Meanwhile, a locally weighted sparse graph regularization term is also incorporated in our model to exploit the local geometric structure information of data. Different from the other existing graph-based methods, we take the effect of noise into account in learning our graph regulariza-

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