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Hypergraph p-Laplacian Regularization for Remotely Sensed Image Recognition

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Abstract

Graph-based and manifold-regularization (MR)-based semisupervised learning, including Laplacian regularization (LapR) and hypergraph LapR (HLapR), have achieved prominent performance in preserving locality and similarity information. However, it is still a great challenge to exactly explore and exploit the local structure of the data distribution. In this paper, we present an efficient and effective approximation algorithm of hypergraph p-Laplacian and then propose hypergraph p-LapR (HpLapR) to preserve the geometry of the probability distribution. In particular, hypergraph is a generalization of a standard graph while hypergraph p-Laplacian is a nonlinear generalization of the standard graph Laplacian. The proposed HpLapR shows great potential to exploit the local structures. We integrate HpLapR with logistic regression for remote sensing image recognition. Experiments on UC-Merced data set demonstrate that the proposed HpLapR has superior performance compared with several popular MR methods including LapR and HLapR.

Keywords

Author Keywords: [Hypergraph](#); [manifold learning](#); [remote sensing](#); [semisupervised learning \(SSL\)](#); [p-Laplacian](#)

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