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Abstract

Due to the storage and computational efficiency of hashing technology, it has proven a valuable tool for large scale similarity search. In many cases, the large scale data in real-world lie near some (unknown) low-dimensional and non-linear manifold. Moreover, Manifold Ranking approach can preserve the global topological structure of the data set more effectively than Euclidean Distance-based Ranking approach, which fails to preserve the semantic relevance degree. However, most existing hashing methods ignore the global topological structure of the data set. The key issue is how to incorporate the global topological structure of data set into learning effective hashing function. In this paper, we propose a novel unsupervised hashing approach, namely Manifold-Ranking Embedded Order Preserving Hashing (MREOPH). A manifold ranking loss is introduced to solve the issue of global topological structure preserving. An order preserving loss is introduced to ensure the consistency between manifold ranking and hamming ranking. A hypercubic quantization loss is introduced to learn discrete binary codes. The information theoretic regularization term is taken into consideration for preserving desirable properties of hash codes. Finally, we integrate them in a joint optimization framework for minimizing the information loss in each processing. Experimental results on three datasets for semantic search clearly demonstrate the effectiveness of the proposed method.

Keywords: Manifold ranking, Hashing, Image semantic retrieval

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