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Multi-Bin Search: Improved Large-Scale Content-Based Image Retrieval

Abdelrahman Kamel, Yousef B. Mahdy, Khaled F. Hussain

Abstract:

The challenge of large-scale image retrieval has been recently addressed by many promising approaches. In this work, we propose a new approach that jointly optimizes the search accuracy and time by using binary local image descriptors, such as BRIEF and BRISK, and binary hashing methods, such as Locality Sensitive Hashing (LSH) and Spherical Hashing. We propose a Multi-bin search method that highly improves the retrieval precision of binary hashing methods. Also, we introduce a reranking scheme that increases the retrieval precision, but with a slight increase in search time. Evaluations on the University of Kentucky Benchmark (UKB) dataset show that the proposed approach greatly improves the retrieval precision of recent binary hashing approaches.

Keywords:

Image retrieval, Binary Hashing, Multi-bin search

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(2)

Multi-Bin Search: Improved Large-Scale Content-Based Image Retrieval.

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Abstract:

The challenge of large-scale content-based image retrieval (CBIR) has been recently addressed by many promising approaches. In this work, a new approach that jointly optimizes the search precision and time for large-scale CBIR is presented. This is achieved using binary local image descriptors, such as BRIEF or BRISK, along with binary hashing methods, such as Locality-Sensitive Hashing and Spherical Hashing (SH). The proposed approach, named Multi-Bin Search, improves the retrieval precision of binary hashing methods through computing, storing and indexing the nearest neighbor bins for each bin generated from a binary hashing method. Then, the search process does not only search the targeted bin, but also it searches the nearest neighbor bins. To efficiently search inside targeted bins, a fast exhaustive-search equivalent algorithm, inspired by Norm Ordered Matching, has been used. Also, a result reranking step that increases the retrieval precision is introduced, but with a slight increase in search time. Experimental evaluations over famous benchmarking datasets (such as the University of Kentucky Benchmarking, the INRIA Holidays, and the MIRFLICKR-1M) show that the proposed approach highly improves the retrieval precision of the state-of-art binary hashing methods.

Keywords:

Content-based image retrieval · Multi-Bin search · Binary descriptors · Binary hashing

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(3)

Two Illuminant Estimation and User Correction Preference

Dongliang Cheng, Abdelrahman Kamel, Brian Price, Scott Cohen, Michael S Brown

Abstract:

This paper examines the problem of white-balance correction when a scene contains two illuminations. This is a two step process: 1) estimate the two illuminants; and 2) correct the image. Existing methods attempt to estimate a spatially varying illumination map, however, results are error prone and the resulting illumination maps are too low-resolution to be used for proper spatially varying white-balance correction. In addition, the spatially varying nature of these methods make them computationally intensive. We show that this problem can be effectively addressed by not attempting to obtain a spatially varying illumination map, but instead by performing illumination estimation on large sub-regions of the image. Our approach is able to detect when distinct illuminations are present in the image and accurately measure these illuminants. Since our proposed strategy is not suitable for spatially varying image correction, a user study is performed to see if there is a preference for how the image should be corrected when two illuminants are present, but only a global correction can be applied. The user study shows that when the illuminations are distinct, there is a preference for the outdoor illumination to be corrected resulting in warmer final result. We use these collective findings to demonstrate an effective two illuminant estimation scheme that produces corrected images that users prefer.

Keywords:

White Balancing

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