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Co.Vi.Wo.: Color Visual Words Based on Non-Predefined Size Codebooks

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Title:	Co.Vi.Wo.: Color Visual Words Based on Non-Predefined Size Codebooks
Year:	2012
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Abstract:	N Due to the rapid development of information technology and the continuously increasing number of available multimedia data, the task of retrieving information based on visual content has become a popular subject of scientific interest. Recent approaches adopt the bag-of-visual-words (BOVW) model to retrieve images in a semantic way. BOVW has shown remarkable performance in content-based image retrieval tasks, exhibiting better retrieval effectiveness over global and local feature (LF) representations. The performance of the BOVW approach depends strongly, however, on predicting the ideal codebook size, a difficult and database-dependent task. The contribution of this paper is threefold. First, it presents a new technique that uses a self-growing and self-organized neural gas network to calculate the most appropriate size of a codebook for a given database. Second, it proposes a new soft-weighting technique, whereby each LF is classified into only one visual word (VW) with a degree of participation. Third, by combining the information derived from the method that automatically detects the number of VWs, the soft-weighting method, and a color information extraction method from the literature, it shapes a new descriptor, called color VWs. Experimental results on two well-known benchmarking databases demonstrate that the proposed descriptor outperforms 15 contemporary descriptors and methods from the literature, in terms of both precision at K and its ability to retrieve the entire ground truth.

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