Multi Resolution Wavelet Decompositions for Content based Image Retrieval

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ABSTRACT

We present a method for searching in an image database using a query image that is similar to the intended target. The query image may be a hand- drawn sketch or a potentially low-quality) scan of the image to be retrieved. Our searching algorithm makes use of multiresolution wavelet decompositions of the query and database images. The coefficients of these decompositions are distilled into small "signatures" for each image. We introduce an "image querying metric" that operates on these signatures. This metric essentially compares how many significant wavelet coefficients the query has in common with potential targets. The metric includes parameters that can be tuned, using a statistical analysis, to accommodate the kinds of image distortions found in different types of image queries. The resulting algorithm is simple, requires very little storage overhead for the database of signatures, and is fast enough to be performed on a database of 20,000 images at interactive rates (on standard desktop machines) as a query is sketched. Our experiments with hundreds of queries in databases of 1000 and 20,000 images show dramatic improvement, in both speed and success rate, over using a conventional L1, L2, or color histogram norm.