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Dynamic Two-Stage Image Retrieval from Large Multimodal Databases

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Abstract. Content-based image retrieval (CBIR) with global features is notoriously noisy, especially for image queries with low percentages of relevant images in a collection. Moreover, CBIR typically ranks the whole collection, which is inefficient for large databases. We experiment with a method for image retrieval from multimodal databases, which improves both the effectiveness and efficiency of traditional CBIR by exploring secondary modalities. We perform retrieval in a two-stage fashion: first rank by a secondary modality, and then perform CBIR only on the top-K items. Thus, effectiveness is improved by performing CBIR on a 'better' subset. Using a relatively 'cheap' first stage, efficiency is also improved via the fewer CBIR operations performed. Our main novelty is that K is dynamic, i.e. estimated per query to optimize a predefined effectiveness measure. We show that such dynamic two-stage setups can be significantly more effective and robust than similar setups with static thresholds previously proposed.