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Similar Image Retrieval under Representation Constraints

Context

The exponential growth of acquired digital images in numerous domains like environmental studies, entertainment, social networks, biometrics, and medical diagnosis applications among others, is rapidly showing the limitations of existing information retrieval approaches. Difficulties are accentuated given that although higher resolution images are acquired, conventional computing resources are not capable of implementing efficient similar image retrieval approaches. This implies that data should be represented in alternative simplified manners, without having an impact on retrieval results. However, those alternative image representations can induce significant results variability. The objective of the project is to investigate the effect of representation constraints on image retrieval results.

Requested work

The proposed work is structured in three parts. The first part consists on analyzing the main approaches to handle dynamic scale reduction from 16 bit to 8 bit in order to preserve spatial image information, as well as spatial resolution reduction from high to medium and low. The second part of the work concerns the application and evaluation of global descriptors (texture, wavelets, moments, etc.) for image retrieval on original and scale reduced images (simplified representations). The third part is related to the analysis of previous results in order to define a combination approach of the most performant descriptors. Public image databases will be used to conduct analyses, according to the examined strategies. Analyses will systematically compare results obtained on complete and reduced data images.

A prototype platform needs to be developed in C, C++, Matlab, Java or Python, depending on the student's programming experience.

Key words: variability reduction, image indexing, global descriptors, retrieval, visual similarity.

Duration: 5 – 6 months (subject proposed on July 5th, 2016).

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