

2010

Accelerating Image Retrieval Using Binary Haar Wavelet Transform on the Color and Edge Directivity Descriptor

Chatzichristofis, Savvas A.

Institute of Electrical and Electronics Engineers (IEEE), United States

<http://hdl.handle.net/11728/10160>

Downloaded from HEPHAESTUS Repository, Neapolis University institutional repository

Accelerating Image Retrieval using Binary Haar Wavelet Transform on the Color and Edge Directivity Descriptor

Savvas A. Chatzichristofis¹ Yiannis S. Boutalis^{1,2} Avi Arampatzis¹

¹Department of Electrical & Computer Engineering,
Democritus University of Thrace, Xanthi, Greece

²Department of Electrical, Electronic and Communication Engineering,
Chair of Automatic Control, University of Erlangen-Nuremberg, Germany
{schatzic, ybout, avi}@ee.duth.gr

Abstract—In this paper, a new accelerating technique for content-based image retrieval is proposed, suitable for the Color and Edge Directivity Descriptor (CEDD). To date, the experimental results presented in the literature have shown that the CEDD demonstrates high rates of successful retrieval in benchmark image databases. Although its storage requirements are minimal, only 54 bytes per image, the time required for the retrieval procedure may be practically too long when searching on large databases. The proposed technique utilizes the Binary Haar Wavelet Transform in order to extract from the CEDD a smaller and more efficient descriptor, with a size of less than 2 bytes per image, speeding up retrieval from large image databases. This descriptor describes the CEDD, but not necessarily the image from which is extracted. The effectiveness of the proposed method is demonstrated through experiments performed with a known benchmark database.

Keywords—CEDD; Image Retrieval; Large Scale Databases

approach of approximate similarity search was proposed in [4]. The idea at the basis of this technique is that when two objects are very close one to each other they ‘see’ the world around them in the same way.

In order to achieve image retrieval from large scale databases, the representation of images by Latent Dirichlet Allocation (LDA) [9] models for content-based image retrieval is studied in [2]. Image representations are learned in an unsupervised fashion, and each image is modeled as a mixture of its depicted topics or object parts.

The present paper proposes a different approach for searching in large databases. First of all, in order to ensure quality of the results, the Color and Edge Directivity Descriptor (CEDD), proposed in [10], [11], is utilized. The size of this descriptor is 54 bytes/image. Subsequently, the Binary Haar Wavelet Transform [12] applied on the CEDD