IMAGE RETRIEVAL AND CONTENT INTEGRITY VERIFICATION BASED ON MULTIPURPOSE IMAGE WATERMARKING SCHEME

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Abstract. *This paper presents a multipurpose image watermarking scheme which embeds robust and fragile watermarks in the wavelet domain for image retrieval and content integrity verification simultaneously. The proposed scheme consists of two main phases, the offline process and the online retrieval process. In the offline process, the feature vector is extracted from each image as the robust watermark to be embedded in the low frequency subband and a copyright signature is used as the fragile watermark to be embedded in the high frequency subband. The online retrieval process consists of three sub-processes, i.e., query feature computation, watermark extraction and feature vector matching. Since the features are embedded in the image data, it is unnecessary to compute the features but only to extract it from the watermarked image. A series of experiments are carried out on a watermarked image database and the simulation results demonstrate the advantages of the proposed watermarking scheme.*
Keywords: Image retrieval, Content authentication, Multipurpose image watermarking

1. **Introduction.** With the development of computer, multimedia and network technologies, the amount of visual information available in digital format has grown exponentially recently, which has resulted in information explosion and has exceeded the limit of human's acceptability. The introduction of the World Wide Web and the increased memory capacity allow the storage of large amounts of digital data to be possible, especially for huge image databases. Therefore, two important issues have arisen. First, the need to handle queries and browse in large image databases has become a hotspot. Content-based image retrieval, which uses visual contents to search images from large scale image databases according to users' interests, has been an interesting and rapid developing research area since the 1990's. Both large research teams (for instance, the QBIC project at IBM and the ADVENT project at Columbia University) and small project groups in the academic world have devoted themselves to this task. The second problem is that, as multimedia data is stored in digital formats, it is easy to modify and forge their content