MULTIPURPOSE IMAGE HASHING BASED ON MULTISTAGE VECTOR QUANTIZATION

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Abstract. *Perceptual image hashing has become an emerging solution for image indexing, authentication and watermarking. A perceptual image hash function maps a digital image into a fixed length binary string known as the hash value, which is invariant under changes to the image that is perceptually insignificant. In this paper, a multipurpose image hashing scheme based on Multi-Stage Vector Quantization (MSVQ) is proposed for both copyright protection and content authentication. The original gray-level image is first segmented into non-overlapping blocks. Each block is encoded by a two-stage vector quantizer to generate two indices, one for copyright protection and the other for content authentication. The obtained two index tables are then transformed into two binary images based on specific mapping functions. Finally, the authentication mark and permuted copyright logo are respectively XOR-ed with the two binary images to obtain final authentication and protection fingerprints. Compared with the existing DCTVQ based multipurpose hashing scheme, we provide two new mapping functions and our hashing process is much faster. Experimental results show the effectiveness of the proposed method.*

Keywords: Perceptual hashing, Perceptual image hash function, Copyright protection, Content authentication, Multi-stage vector quantization

1. **Introduction.** With the rapid development of Internet, computer and multimedia technologies, it becomes easier and easier to generate, store, transmit and reproduce digital images, video clips, audio clips and 3D models, and thus several serious issues have emerged. On the one hand, multimedia data can be easily tampered with and hence content authentication techniques are strongly required to verify the authenticity of the media content. On the other hand, valuable digital artworks may be losslessly reproduced and arbitrarily distributed, and thus copyright protection techniques are urgently demanded to protect the intellectual property rights. In addition, efficient search of desired multimedia content from the huge multimedia database is also a great challenge. In general, the methods used for content authentication and copyright protection can be classified into three categories: digital signature-based, watermark-based [1-7] and perceptual hash-based [8-16]. A digital signature is the additional information that is