Robust Hashing for Image Authentication Using Zernike Moments and Local Features

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***Abstract* — A robust hashing method is developed for detecting image forgery including removal, insertion and replacement of objects, and abnormal color modification, and for locating the forged area. Both global and local features are used in forming the hash sequence. The global features are based on Zernike moments representing luminance and chrominance characteristics of the image as a whole. The local features include position and texture information of salient regions in the image. Secret keys are introduced in feature extraction and hash construction. While being robust against content-preserving image processing, the hash is sensitive to malicious tampering and therefore applicable to image authentication. The hash of a test image is compared with that of a reference image. When the hash distance is greater than a threshold τ_1 and less than τ_2, the received image is judged as a fake. By decomposing the hashes, the type of image forgery and location of forged areas can be determined. Probability of collision between hashes of different images approaches zero. Experimental results are presented to show effectiveness of the method.**

***Index Terms* — forgery detection, image hash, perceptual robustness, saliency, Zernike moments**

(To appear in *IEEE Transactions on Information Forensics and Security*)