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Python Image Forgery Detection using MD5 and OpenCV

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Abstract

One of the simplest ways of digital image forgery is a copy-move attack. The copy-move process consists of three stages: copy selected image fragment from one place, transform it using some image processing algorithm and paste it to another place of the same image. Two main approaches to copy-move detection exist nowadays: feature-based and hash-based. Most of the algorithms are developed according to the feature-based approach, whereas the hash-based approach is used only for plain copy move detection (when the copied image fragment is not transformed). However, the main advantage of hash-based algorithms is low computational complexity. In this paper, we propose a hash-based copy-move detection algorithm that can be applied to transformed duplicates detection due to a special preprocessing procedure. This procedure implements initial image transformation to incorporate the changes (affine transforms are not considered in this paper), produced by a transform algorithm on the second stage. Several preprocessing procedures are compared during experiments: image intensity range reduction, gradient calculation, expansion in orthonormal basis, adaptive linear contrast enhancement and local binary pattern.