

Scalable Watermarking for Image Authentication

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Abstract—Semi-fragile watermarks are used for image authentication and to detect undesirable changes to the watermarked image, while remaining largely unaffected by allowed changes such as compression. Most semi-fragile algorithms that tolerate compression assume that the parts of the image lost in compression have a negligible effect on its “meaning” and an attacker who successfully tampers with those parts cannot make a meaningful change to the image.

Scalable compression allows a single compressed image to be decompressed to produce a variety of images that have been scaled to suit the display or bandwidth requirements of the user. However, some highly scaled images contain only a small part of the original image, and so the assumption used by most semi-fragile algorithms breaks down, as an attacker who can tamper freely with all other parts of the image will be able to make meaningful changes to its content. Thus we need a watermark that tolerates the loss of large parts of the image due to scaling, but also detects tampering with those parts. We propose a semi-fragile watermarking algorithm for authentication of scalable JPEG2000 compressed images. It produces no false alarms when applied to an untampered image, or a resolution or quality scaled version thereof, but detects tampering under other manipulations and is secure against mark transfer and collage attacks.