A ROTATION, SCALE AND TRANSLATION RESILIENT PUBLIC WATERMARK

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ABSTRACT

Watermarking algorithms that are robust to the common geometric transformations of rotation, scale and translation (RST) have been reported for cases in which the original unwatermarked content is available at the detector so as to allow the transformations to be inverted. However, for public watermarks the problem is significantly more difficult since there is no original content to register with. Two classes of solution have been proposed. The first embeds a registration pattern into the content while the second seeks to apply detection methods that are invariant to these geometric transformations. This paper describes a public watermarking method which is invariant (or bares simple relation) to the common geometric transforms of rotation, scale, and translation. It is based on the Fourier-Mellin transform which has previously been suggested. We extend this work, using a variation based on the Radon transform.

The watermark is inserted into a projection of the image. The properties of this projection are such that RST transforms produce simple or no effects on the projection waveform. When a watermark is inserted into a projection, the signal must eventually be back projected to the original image dimensions. This is a one to many mapping that allows for considerable flexibility in the watermark insertion process.

We highlight some theoretical and practical issues that affect the implementation of an RST invariant watermark. Finally, we describe preliminary experimental results.