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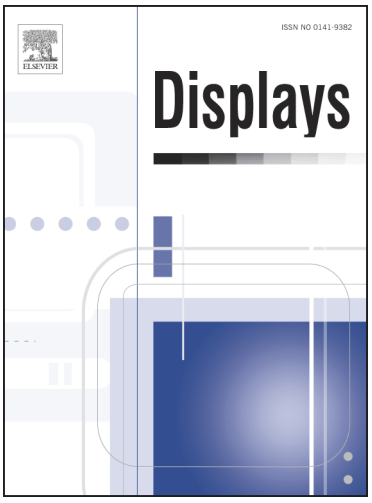

Detection of Seal and Signature Entities with Hierarchical Recovery based on Watermark Self Embedding in Tampered Digital Documents

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Detection of Seal and Signature Entities with Hierarchical Recovery based on Watermark Self Embedding in Tampered Digital Documents

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Abstract

A novel framework is proposed in this paper for detection of seal and signature entities with hierarchical recovery capability based on self-embedding watermarking. First of all, the entities of importance called authentication entities are identified in the documents. Once these entities are located, they are made secure via integrity check bits. The authentication is performed at the pixel level through three integrity check bits based on pixel value, location, and neighborhood. The recovery information from these authentication entities is extracted and embedded after encryption in multiple locations throughout the document. In case of tampering, the tampered regions are detected as well as localized and reverse mapping is performed to fetch the recovery information for reconstruction of the tampered regions. To validate the efficacy of the proposed framework, a number of experiments have been conducted with multiple documents and different attack scenarios. The imperceptibility of the watermarked and recovered documents has been evaluated using Peak Signal to Noise Ratio (PSNR) and Structural Similarity Index (SSIM) metrics.

Keywords:
Detection of Signature, Detection of Seals, Hierarchical Recovery, Self-embedding, Integrity Check Bits, Tampering Detection

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