Abstract

Multiple watermark Eembedding and blind extraction scheme in wavelet-spatial domains based on ROI

Watermarking in medical images is a new area of research. It has the potential of being a value-added tool for medical confidentiality protection, patient-related information hiding, and information retrieval. Medical image watermarking requires extreme care when embedding additional data within the medical images because the additional information must not affect the image quality as this may cause misdiagnosis. In this paper we present a scheme that depends on the extraction of the ROI (region of interest) and its use as a watermark to be embedded twice first as a robust watermark in the RONI (region of non interest) in the wavelet domain and again as a fragile watermark in the ROI in the spatial domain. Moreover multiple watermarks such as the physician's digital signature and EPR (Electronics Patient Record) are embedded in the RONI in wavelet domain depending on a private key. In our work we use MRI brain images with a brain tumor as the ROI. The experimental results showed that the watermarked image has a PSNR of about 47db and our work is robust to JPEG compression, ROI removal, addition of an additional tumor to the image and some geometrical attacks such as image rotation.