Design of high performance copyright protection watermarking based on lifting wavelet transform and bi empirical mode decomposition

ABSTRACT

This paper developed new and efficient image watermarking scheme for copyright protection based on Lifting wavelet transform (LWT) and Bi- dimensional Empirical Mode Decomposition (BEMD). A LWT has been selected because it is fast, less computational cost and maintains the integrity of the recovered watermark. The BEMD transform can separate the image from the most robust to the least sensitive or fragile frequency bands. This advantage is utilised in this study for the purpose of embedding the watermark in the robust part of BEMD, i.e. the residue (r). In addition, the embedding process has been performed in the low sub-band of LWT decomposed image as the low sub-band is more robust to image processing such as JPEG compression. The robust watermark which is grey scale image is decomposed using DWT to enhance the security and select only high sub-band as it has less impact on the quality of the watermarked image. As a result, the original image's visual quality can be preserved and the concealed watermark could be successfully retrieved even if the watermarked images have undergone severe attacks like JPEG, rotation, Gamma correction, filtering, additive noise, translation, shearing, and scaling. Furthermore, the improved scheme offers greater robustness against many image processing operations, in comparison to the current schemes about copyright protection.