Perbandingan Teknik Watermarking Citra Digital Menggunakan DWT-SVD dan RDWT-SVD

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ABSTRAK

Watermarking merupakan salah satu metode yang dikembangkan dalam hal kepemilikan data, misalnya citra digital. Teknik waterwarking terbagi menjadi domain frekuensi (contoh DWT) dan domain spasial (contoh SVD). Masing-masing memiliki karakteristik yang berbeda. Berdasarkan penelitian, DWT lebih tahan terhadap serangan. Sedangkan SVD memiliki nilai singular dengan stabilitas yang baik, namun ia tidak tahan terhadap serangan. Untuk itu biasanya SVD digabungkan dengan teknik domain frekuensi (contoh DWT-SVD). Meskipun demikian, penggunaan DWT akan menghasilkan noise pada watermarked image. Masalah tersebut dapat diatasi dengan RDWT (RDWT-SVD). Kualitas dari watermarked image diukur menggunakan Peak Signal to Noise Ratio (PSNR) sedangkan kualitas extracted watermark image diukur menggunakan Correlation Coefficient (CC). Penelitian ini mendeskripsikan hasil kualitas watermarked image dari masing-masing algoritma menggunakan hasil pengukuran PSNR. Citra RGB dengan format JPG disisipkan dan menghasilkan citra dengan format JPG, BMP, PNG dan TIFF. Sedangkan untuk proses ekstraksi dikombinasikan dengan beberapa serangan seperti gaussian noise, salt & peppers noise, speckle noise, penambahan dan pengurangan brightness serta contrast. Penelitian ini juga mendeskripsikan hasil kualitas extracted watermark image dari masing-masing algoritma menggunakan hasil pengukuran CC.

Kata Kunci   :   watermarking, citra, DWT, RDWT, SVD

Comparison of Watermarking Methods in Digital Image Using DWT-SVD and RDWT-SVD

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ABSTRACT

Watermarking is one of the methods developed in terms of ownership of data, such as digital image. Waterwarking technique is divided into the frequency domain (for example DWT) and spatial domain (for example SVD). Each has different characteristics. Based on research, DWT is more resistant to attack. While SVD singular value with good stability, but it is not resistant to attack. For that usually SVD combined with frequency domain techniques (for example DWT-SVD). Nevertheless, the use of DWT will result in watermarked image noise. These problems can be overcome by RDWT (RDWT-SVD). The quality of the watermarked image was measured using the Peak Signal to Noise Ratio (PSNR) while the quality of the extracted watermark image is measured using the Correlation Coefficient (CC). This study describes the results of watermarked image quality of each algorithm using PSNR measurement results. RGB image to JPG format is inserted and produces images with JPG, BMP, PNG and TIFF. As for the extraction process combined with some attacks like Gaussian noise, salt & peppers noise, speckle noise, the addition and subtraction of brightness and contrast. This study also describes the results of extracted watermark image quality of each algorithm using CC measurement results.

Keyword   :   watermarking, image, DWT, RDWT, SVD