

Abstract

Medical image in digital form has two major things, they are copyright protection and integrity constraint. The ownership of medical image must be known correctly and the tampering of image must be detected. The solution from that problem is multiple watermarking. In this final project, the multiple watermark consists of annotation watermark and fragile watermark. Annotation watermark defines the ownership of medical image. Whereas, fragile watermark can detect the tampering on image.

The annotation watermark and fragile watermark are embedded separately into different regions of the image. The annotation watermark is embedded into the border pixel of image using a robust embedding method in wavelet transformation. Whereas the fragile watermark is embedded into the central region of image using Hash Block Chaining method which is a fragile embedding technique. The performance parameters in this final project are Peak Signal to Noise Ratio (PSNR), Bit Error Rate (BER) and Mean Opinion Score (MOS). The PSNR and BER are objective parameters, whereas the MOS is subjective parameter. Testing has been done by analyzing the quality of watermarked image and the quality of extracted watermark image after tampering. The attacks are sharpening, gaussian noise and JPEG compression.

The result of the testing is that annotation watermark has more robustness about gaussian noise attack and JPEG compression attack if the watermark is embedded in LL subband. And the embedding in HH subband is more robust to sharpening attack. While the fragile watermark can detect the tampering although that tampering is very small. The dimension of block that is used in HBC does not influence the PSNR of watermarked image and extracted watermark image.

Keyword : multiple watermark, wavelet, hash block chaining