Abstract

Mobile Payment Authentication is an important aspect of ensuring the security of financial transactions in today's digital world. This research investigates the enhancement of Mobile Payment Authentication through the use of innovative QR codes in combination with the DCT-DWT Digital Watermarking Scheme. Currently, people can easily make payment transactions via *QR code* on *smartphone*. This convenience poses many security risks in its use. Attackers can find loopholes to commit crimes in payment transactions and cause many business people to experience economic losses. Therefore, it is very important to develop a strong mobile payment authentication system. To solve the problems above, this final project proposes the development of a *image watermarking* algorithm using a combination approach *discrete cosine transform* (DCT) and *discrete wavelet transform* (DWT) to increase the robustness of *qr code* used in mobile payment transactions. and see the results of the robustness of the *QR code* . In this final project we will present a *image watermarking* scheme that will be used to protect *QR code* used in *mobile payment transactions* by embedding images, implemented in a combination of DCT and DWT which is then carried out before transmission through the network to increase security capabilities and make it impenetrable to attackers. The effectiveness of this method is evaluated using three main metrics: *Mean Squared Error* (MSE), *Peak Signal-to-Noise Ratio* (PSNR), and *Structural Same Index Measure* (SSIM). For embedded data, the DCT-DWT scheme produces values of 65.41 MSE, 33.89 PSNR, and 0.64 SSIM. Next, this research analyzes the extraction of watermarking data from images. The results show promising results with an MSE scheme of 0.34, a high PSNR score of 52.71, and an extraordinary SSIM score of 0.99. This study contributes to the advancement of mobile payment authentication by presenting a new approach that combines QR codes and DCT-DWT digital watermarking. The low MSE values as well as the high PSNR and SSIM values after watermark extraction underscore the feasibility and robustness of the proposed method, demonstrating its potential to enhance mobile payment transaction security.

Keywords: Digital Watermarking, QR code, Discrete Wavelet Transform, Discrete Cosine Transfor, Authentication System, Mean Squared Error, Peak

Signal-to-Noise Ratio, Structural Similarity Index Measure