INVESTIGATION ON PERCEPTUAL AND ROBUSTNESS OF LSB DIGITAL WATERMARKING ON HALAL LOGO AUTHENTICATION

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ABSTRACT

In Malaysia, Halal Certificate can only be issued by Jakim. For the time being, there is no specific method to verify authentication of Halal Certificate displayed at food or service premises. Watermarking technique however, offered a solution for authenticity of the data and copyright protection. In this paper, an investigation on perceptual and robustness of least significant bit (LSB) digital watermarking scheme on Halal Logo authentication is implemented using MATLAB software. LSB digital watermarking scheme allows pixel value modification by dividing its entire bit leaving most significant bit (contains most information) and least significant bit (contains less information). These small modifications offer a high perceptual transparency to the watermarked image. A Quick response (QR) code with message is generated as an embedded watermark image for Halal Logo. The watermarked image quality is measured based on Peak signal-to-noise (PSNR), mean square error (MSE), and Normalized Cross-Correlation (NC). The investigation shows the scheme provided high PSNR performance which is between 12 to 22 dB with Gaussian noise added. The scheme successfully shows the ability to retrieve the embed watermark even though the cover image visual quality is degraded with 50 % Gaussian noise variance. The reliability of the scheme is proven when it successfully to produce an acceptable 0.8442 NC value. The observation on perceptibility shows 51 dB of PSNR with 0.4714 MSE.

Keywords — Least Significant Bit (LSB), Digital watermarking, Grayscale images, Halal logo, QR code, PSNR.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

The development of different types of advanced technologies has made human life become more comfortable and convenient. Internet and digital multimedia are among the technologies that enable people to easily communicate and share their work or data. The rapidly development of internet recent years have made possible for an activities such as create, copy, transmit and distribute digital data[1]. Nonetheless, privacy is very important in order to protect some private data about the work. Data privacy or data protection is closely related between collection and distribution of technology, data, details of data and legal issues. As more digital data and system are connected to the internet, data privacy and data protection has become increasingly important[2]. Basically, data security means protection of digital data from unauthorized users or hackers and providing high security to prevent data alteration. A reliable copyright data protection should be established to overcome the problems associated with digital data and unauthorized replication data problem. There are many different ways of protecting digital data such as encryption, copy protection, header marking and visible marking. All of these methods have their own strength and weaknesses.