APPLICATION OF IMAGE WATERMARKING FORDIGITAL AL-QURAN

WAN NOORMAHERAN BINTI WAN HUSSIN DEGREE OF MASTER OF ENGINEERING, UKM (2020)

Advent growth in information and communication technologies have promulgated the needs of securing digital media. Demands in accessing the digital media while on the go has sparked Quran readers to install the Quran mobile apps on their smartphone. However, there is no secured mechanism to legalize its contents credentials. To make it worse, getting access to authentic sources of Quran database that available escalates the complication in the development of Quran mobile apps at the mobile developer side. For the time being, Malaysia government has introduced Smart Quran mobile apps as an official Quran apps without any counterfeit protection. By lacking security control, it will expose the contents to tampering attack, falsified contents including jeopardizing the Islamic institutional fame, recognition bodies reputation which ultimately may deviate the Muslim faith. To populate the gap, this dissertation develops an application of image watermarking technique to protect the digital Quran image. The study presents new blind RGB image watermarking using Fibonacci Transform in frequency domain, accomplished through either Discrete CosineTransform (DCT) or Discrete Wavelet Transform (DWT). The first scheme manipulates the Y and Cb Then, 2D DCT, components of segmented 8x8 Al-Quran image blocks. blocks quantization and re-arrange the image in zig zaq manner is applied.Next, the middle band frequency coefficients is selected. The blocks with minimum value will be forwarded to the next step to mark the embedding area later. The least significant bit (LSB) of the middle band frequency of the cover image will be substituted by the 8 iterationsof Fibonacci-transformed-watermark image. After that, inverse zig zag and inverse DCT is applied towards both The final watermarked image is obtained once channels. the YCbCr watermarked image is recombined and converted back into RGBform. While the second scheme utilize only R component of the Al-Quran image, performing 2 levels 2D DWT towards LL decomposition which then this part of an image is replaced with the 20 iterations of Fibonacci-transformed-watermark image. DWT embedding is achieved through alpha blending technique. After the DWT inverse processes, the final watermarked image is accomplished once the R, G and B components are recombined. The extraction process for both of the schemes is similar to the above embedding except it is completed in a reverse order with known-block key during Fibonacci's Inverse process. The algorithm is developed using Matlab software. Performance of the method used is measured to ensure the effectiveness towards 10 samples of Quran images. The average PSNR value of thewatermarked image in scheme 2 or DWT is 92.13 dB, higher than the DCT hadspecifiedthat DWT which is 53.86 dB.The results the deliversexcellenceimage quality than DCT. The verification is done via the extraction of the MOHA license image. Thus, forgery cases in digital Quran apps shall be overcome.