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ScienceDirect

Procedia Computer Science 115 (2017) 423–430

Procedia Computer Science

www.elsevier.com/locate/procedia

7th International Conference On Advances In Computing & Communications, ICACC 2017, August 22-24, 2017, Cochin, India

An Efficient Watermarking Technique for Biometric Images

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Abstract

This paper provides a good way of digital watermarking framework using biometric image as watermark by the application of homomorphic encryption system. Thus, it provides data confidentiality and also authenticity. Here, the biometric image is watermarked inside the standard benchmark images. The robustness of the watermarks in the image are verified through measurement of Peak Signal-to-noise ratio (PSNR), Correlation coefficient (CC%), and noise test. The biometric images are obtained by subtracting watermarked images with benchmark images.

Peer-review under responsibility of the scientific committee of the 7th International Conference on Advances in Computing & Communications.

Keywords: Biometric Image; Watermarking; Homomorphic encryption; Homomorphic decryption; Compression

1. Introduction

Digital watermarking is a technique that embeds digital information inside a carrier signal. Recently, Watermarking has been an active area of research. These watermarks can be used to verify the authenticity or integrity of the carrier signal or can be used to show the identity of its owner. The images can be stored in cloud based storages. Here the privacy has to be taken into account. Thus, the image is encrypted using homomorphic encryption scheme and can be accessed by intended persons by decrypting it using homomorphic decryption scheme. Now, Homomorphic cryptosystem has been widely used all over the public cloud. In homomorphic cryptosystem, the user can perform operations on the encrypted data without decrypting the data and get the same result as performed on the original data. Thus, it maintains confidentiality over the cloud based storages.

This paper is organized as follows, Firstly, related work specifies the research regarding digital watermarking,

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1877-0509
Peer-review under responsibility of the scientific committee of the 7th International Conference on Advances in Computing & Communications
10.1016/j.procs.2017.09.101

image compression, cloud challenges,homomorphic encryption that was done earlier and the proof shows us about the emerging cryptography usage in data integrity and cloud storage security. Secondly, the proposed model clear picture about the proposed method of image encryption and the sample results are shown. Finally, result and analysis shows that in order to provide the efficiency of our work key space analysis, key sensitivity analysis, Histogram analysis, PSNR analysis, MSE analysis, correlation analysis, Noise analysis are performed.

2. Related Work

Watermarking are also used for providing security for securely storing medical images inside the image of the patient. To maintain the confidentiality and reduce the mishandling of the patient data, Double Watermarking of PET images using patient ID and ECG signal is proposed [1]. The efficient homomorphic encryption is proposed and it allows to perform calculations on the data stored by encrypting it. The efficiency of homomorphic property of the algorithm is analysed [2]. The Image compression algorithm using 2D wavelet transform[9] provides a way of compressing the image. The analysis of any work tells us the efficiency of the designed model.The Key space analysis , Key sensitivity analysis, time analysis , Peak signal to noise ratio , Mean square error analysis , Correlation co-efficient analysis are used in the image encryption scheme[3].An image histogram illustrates how pixels in an image are distributed by graphing the number of pixels.Analysis was done earlier and presented us that for any plain image,the cipher image should be in sucha a way that it should generate a uniform histogram[4].Key sensitivity analysis and histogram analysis are performed to check the efficiency of the existing algorithms[5].Correlation analysis[6] and PSNR & MSE analysis[7] are considered to be more prominent for image encryption.Based on this study, we are proceeding our work on security of medical images using Homomorphic Encryption scheme.

3. Proposed Framework

The proposed methodology watermarks a benchmark image with a biometric image using homomorphic scheme. This contains encryption and decryption phase. Fig 1 shows the framework of the methodology.

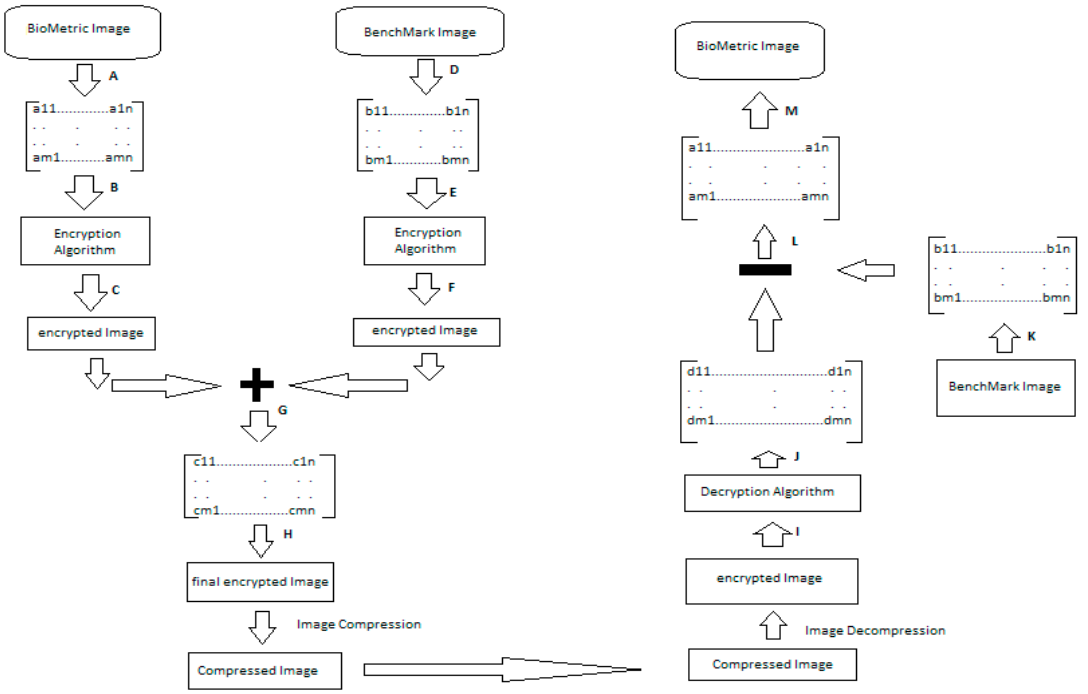

Fig 1. Biometric Image Watermarking Framework