Image Compression and Encryption: An Overview

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Abstract : Existing methods when describe Compression there is no consideration of security, similarly when it describe encryption there is no consideration of size i.e. compression. Image Compression is concerned with minimizing the number of bit required to represent an image. Image Encryption is hiding image from unauthorized access with the help of secret key that key can be private or public. In this paper the simultaneous image compression and encryption algorithm used by different researchers are categorised and analysed with reference to the performance evaluation parameters.

1. Introduction

In the field of image processing we have to deal with huge amount of data. The general problem of image compression is to reduce the amount of data required to represent a digital image and the basis of the reduction process is the removal of spatial and psychovisual redundancies. The compression can be lossless or lossy. If the reconstructed image from the compressed image is identical to the original image then it is a lossless compression otherwise it is a lossy compression.

However alone compression is not sufficient as it has an open access, anybody can access it. So if it is desired that it can be accessible only by authorized person it should be encrypted as well. The encryption can be performed either using Symmetric key cryptography or by using Asymmetric key cryptography. If same key is used for encryption and decryption then it is called as Symmetric key cryptography and if the different key is used for encryption and decryption then it is called as Asymmetric key cryptography.

The paper contains categorisation and evaluation of simultaneous image compression and encryption schemes used by different authors. They are categorised based on the order of the two processes viz. Compression and Encryption.

The paper is organised as follows: Section 2 discusses the classification of image compression and encryption schemes. In section 3 the research work of different authors are described and categorised based on the order of the two processes viz. compression and encryption. Section 4 describes the analysis of the research work based on the performance evaluation factors. Finally in Section 5 the conclusion is discussed.

2. Classification and Description of Image Compression and Encryption Schemes

In the literature it has been seen that the image compression & encryption is carried out in any one of the following three ways:

1. Compression followed by Encryption (CE)
In this sequence an intruder have less cleave to access image but encryption may again increase the size.
2. Encryption followed by Compression (EC)
In this sequence size is not again increased but an intruder may have more clues to access the image.
3. Joint Compression and Encryption (JCE)
This approach is recently used which may be fast as compared to previous two but procedure is complicated.
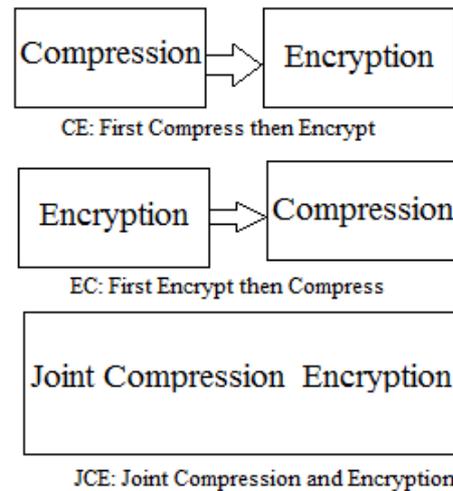
The said categories are shown in figure 1.

Figure 1. Classification of Compression and Encryption Scheme