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# A Survey on Encryption-then-Compression Systems using Grayscale Image Encryption with Watermarking

Vinay Sonone<sup>1</sup>, Saurabh Ghantellu<sup>1</sup>, Salman Dandu<sup>1</sup>, Shyamsundar Pawar<sup>1</sup>, Prof. Devyani Bonde<sup>2</sup>

BE Students, Department of Computer Engineering, Savitribai Phule Pune University, Pune, India<sup>1</sup>

Professor, Department of Computer Engineering, Savitribai Phule Pune University, Pune, India<sup>2</sup>

**ABSTRACT:** In recent years, there is a rapid development in the multimedia and network technologies in computer era. Transmission of multimedia data over the network leads the major issues of security, privacy and data size. Images are widely used and the major issues are how to protect the image and also reduce size of the image in order to maximize the network utilization. Various techniques are there in order to secure the image and to reduce the size of the image. Security and privacy are not considered in the earlier Image compression techniques. To provide the privacy and security, the encryption is applied as well as compression reduces the data size. So that, to overcome the issues in multimedia and network technologies, compression is combined with encryption. In order to get better network utilization, the encrypted images are compressed. An efficient image Encryption Then Compression system is designed. In proposed scheme a block scrambling based encryption algorithm is used to encrypt the image in order to get high security.

**KEYWORDS:** Encryption-then-Compression, Block scrambling encryption algorithm, Encryption, decryption, loss less Compression, decompression, security.

### I. INTRODUCTION

Image processing is a process of conversion of image into digital format and it perform some operations on it, in order to get an enhanced image or to extract some useful information from it. signal dispensation in which input is image is a type of image processing, like video frame or photograph and output may be image or characteristics associated with that image. Usually Image Processing system includes treating images as the two dimensional signals while applying already the set signal processing methods to them. With the rapid development of the multimedia technology and network technology, the security of multimedia becomes more and more important, since multimedia data are transmitted over open networks more and more frequently. Security of data to maintain its confidentiality, proper access control, integrity and availability is a major issue in data communication. Typically, security on which rely is necessary to content protection of digital images and videos. Encryption then compression schemes which is a scheme which use for multimedia data need to be specifically designed to protect multimedia content and fulfill the security requirements for a particular multimedia application. For example, the real-time encryption of an entire video frame stream using classical ciphers requires heavy computation due to the large amounts of data involved, but many multimedia applications require security on a lower level, this can be achieved the selective encryption that leaves some perceptual information after encryption.

Image Encryption then compression system is the process of converting an image into unreadable format so that it can be transmitted over the network safely. Its reverse process is image decryption, which is used to convert the unreadable format of an image to the original image and for this the receiver have to use the key for the encrypted data. Image compression is defined as a process of reducing the image size in accordance to some loss of information. JPEG and JPEG 2000 These are the two most widely used image compression techniques. Security of data to maintain its



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## II. RELATED WORK

Literature survey is the most important step in any kind of research. Before start developing we need to study the previous papers of our domain which we are working and on the basis of study we can predict or generate the drawback and start working with the reference of previous papers.

In this section, we briefly review the related work on Encryption then Compression using grayscale image encryption for JPEG images. In this paper, an image encryption scheme based on Multiple-level blocks scrambling is proposed. The image is first decomposed into non-overlapping, blocks and scrambling of these blocks is done by using 2D Cat Transform [1]. In this Paper, proposed image encryption technique this includes scrambling and diffusion stages. In scrambling stage, Input Image undergoes row scrambling and column scrambling with the help of chaotic map. [2] In this paper, compares lossless Encryption then Compression (ETC) technique which uses image encryption (i.e., RSA algorithm) used to encrypt the image by ensuring privacy in transmission without any malicious attacks and image compression. [3] In this paper, it introduce a scheme for digital image scrambling based on the principle of information entropy. [4] In this paper, proposed the Encryption-then-Compression Systems to securely transmit Images through an untrusted channel provider. It uses 8/8 blocks for block scrambling. [5] In this research paper Fast Encryption Algorithm is modified to make it work on text and binary data. In the modification of logic gates are modified to make key generation more secure. Also in this research FEAL is able to encrypt any type text of data where as previously it can-not work on text type of data, it was implemented only on gray scale images. Despite this, the FEAL can now be used for the encryption of colour images [6]. In this paper, the image encryption has been achieved via prediction error. A compression algorithm for encrypting images has been realized by using three different wavelet transform techniques such as HAAR, BIOR and DAUBECHIES individually. After the experiment results shows the HAAR wavelet gives the reasonably high security level. The MSE, PSNR values and compression ratio for resultant images are better than the previous one. Better results of peak signal to noise ratio indicates that the reconstructed image is of higher quality.. [7] This paper talks more about the algorithms related to the binary and gray code in terms of the digital image. Where the text file is attached and converted into the gray code and hide it in the digital image and then decrypt it. This entire work is done by the use of MATLAB Software, so there is no need of network communication system. The differences between the original and the Stego images are distinguished with the help of PSNR and MSE values [8]. This paper implements secured and effectual medical image encryption algorithm based on RC4 and utilize the medical image storage and transmission. [9] the encryption of an image is accomplished via pixel prediction and secret key. Extreme compression of the encrypted image is done by using two techniques, Arithmetic and Huffman coding. [10].

## III. PROBLEM STATEMENT

There are some encryption techniques, the image are divided into 8x8 blocks and at the output end the image will be not secure and also the image get blurred. Data also get lost in the existing work.

In Existing System there is limitation on block size to prevent JPEG distortion due to recompression forced by social media. Proposed scheme solve this limitation.

## IV. PROPOSED METHOD

We have worked to facilitate the information security in getting secure transmission of data/image over social media which maintain the information hiding inside texture image i.e., cover image. Hence this system is suitable for

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maintaining high level security for information transmission or image preservation in the network. In proposed work, a block scrambling technique is used to hide the image in RGB color to gray scale color image and also attach the cover image to the gray scale image for more security to the image. After the encryption of the image (gray scale image) compressed with lossless image compression to decrease the redundancy of the image thereby increasing the capacity of storage and efficient transmission. The proposed algorithms are applicable to digital and printed media. The possible ways which is used to hide the generated share are also discussed. The proposed a block scrambling encryption scheme not only has a high level of user friendliness and manageability, but also reduces transmission risk and enhances the security of participants and shares.

The proposed system consists of three components:

1. **Encryption:** Image Encryption is the process of converting an image into unreadable format so that it can be transmitted over the network safely. Its reverse process is image decryption, which is used to convert the unreadable format of an image to the original image and for this the receiver have to use the key for the encrypted data.
2. **Compression:** Image compression is defined as a process of reducing the image size in accordance to some loss of information. JPEG and JPEG 2000 are the two most widely used image compression techniques.
3. **Decryption:** Image Decryption process is image decryption, which is used to convert the unreadable format of an image to the original image and for this the receiver have to use the key for the encrypted data.

## V. ARCHITECTURE

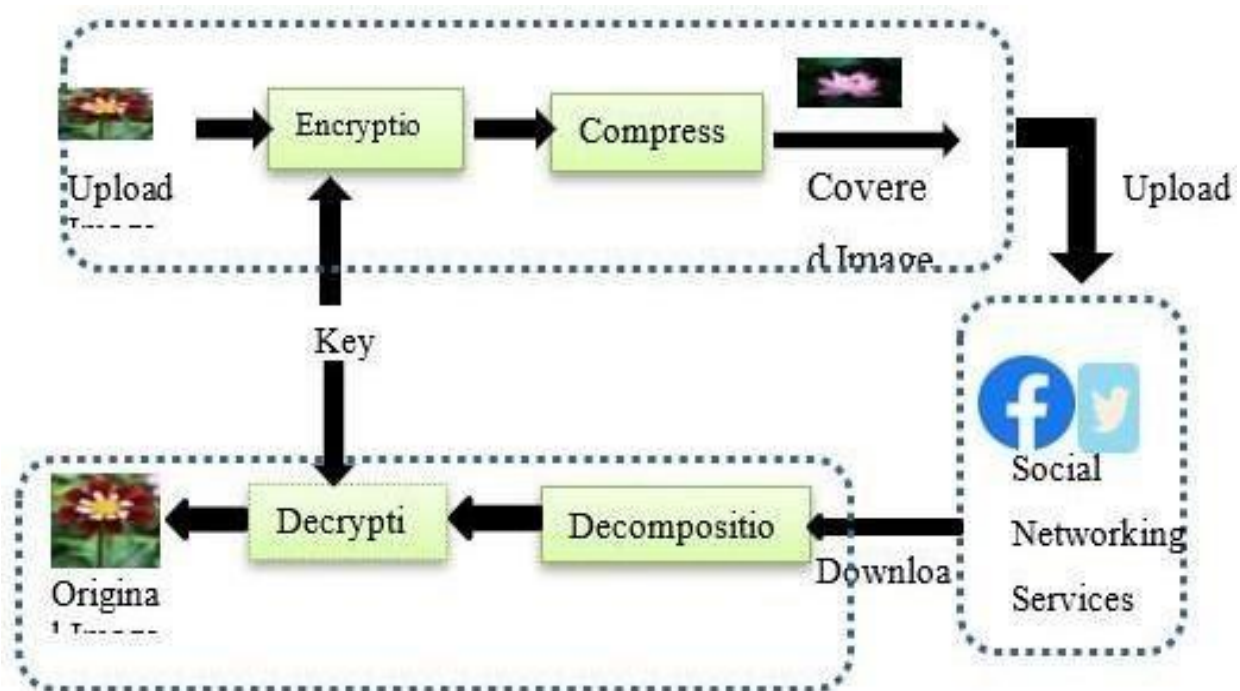


Fig 1. System Architecture



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## VI. CONCLUSION

We proposed a novel block-scrambling image encryption scheme that enhances the security of systems for JPEG images and that image will be secured. The proposed scheme allows the use of a smaller block size and a larger number of blocks than the color-based image encryption scheme. An Images encryption using the proposed scheme are include less color of information due to the use of gray scale based images even when the original image has three color channels.

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