

Chapter 9

Analysis of Color Image Encryption Using Multidimensional Bogdanov Map

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ABSTRACT

Image encryption is a main concern in digital transmission of data over communication network. As encryption and decryption of image has got considerable attention in the past decades, its effectiveness and compatibility need to be taken care of. The work reported in this chapter is mainly concerned with enhancement of dimension in image encryption technique. The work mainly deals with pixels shuffling of an image using Bogdanov chaotic map for both gray and color image, where encryption and decryption process are associated with the key. In color image, the image is divided into all three planes (RGB) individually. Scrambling is done with all three planes individually. All the three planes are summed up into a single plane which gives us the final result. In Bogdanov map, old pixel position is replaced with new pixel position. Further, the authors analyzed security of image encryption techniques with two parameters called NPCR and UACI. The efficacy of the encryption process can be seen in experimental results.

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INTRODUCTION

This is a technological era where most of the work is done digitally. Computer is a revolution in itself and so as computer networks. Now one person can send and receive information with the help of computer. In modern era, travelling of data or information is more convenient than ever. Information can be audio, video and images etc. Where computer network offers many advantages but also it sets up illegal use of information. To secure information, it needs to be hidden from unauthorized people. Nowadays, not only textual but also multimedia data is transferred over networks. To prevent unauthorized user, lots of methods can be used such as Image encryption technique, Cryptographic system, Watermarking techniques etc. The image encryption methods can prevent from illegal access. To deal with illegal access of digital data there are diversity of techniques used such as Arnold's cat map, baker map, henon map, cross chaotic map, logistic map, duffing map, bogdanov map, tent map etc.

IMAGE ENCRYPTION

Image encryption is the process to convert a message in such way that only authorized person can access it. In an encryption process, the intended information or message, referred to as plaintext, is encrypted using an encryption algorithm and generating cipher text that can be read only if decrypted with authorized person. An encryption process generally uses a pseudo- random encryption key generated by an algorithm. An authorized receiver can easily decrypt the message with the key provided by the sender to receiver but not to unauthorized users.

Image encryption usually consist two parts:-

1. Encryption
2. Decryption

In encryption process, image can be encrypted through keys such as pseudo random number from original image into encrypted image. In Decryption process, encrypted image can be decrypted into original image through keys and only authorized person can decrypt the image. Figure 1 and Figure 2 shows block diagram of image encryption and decryption process.

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