

Chapter 63

Analysis of Color Image Encryption Using Multidimensional Bogdanov Map

R. N. Ramakant Parida

Kalinga Institute of Industrial Technology, India

Swapnil Singh

Kalinga Institute of Industrial Technology, India

Chittaranjan Pradhan

Kalinga Institute of Industrial Technology, India

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.

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

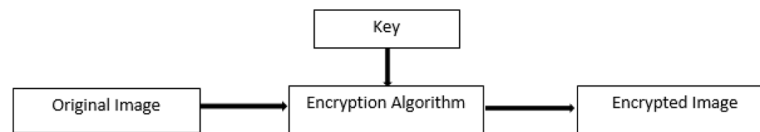
Image encryption is the process to convert a message in such way that only authorized person can access it. In an encryption process, the intended information or message, referred to as plaintext, is encrypted using an encryption algorithm and generating cipher text that can be read only if decrypted 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.

Figure 1. Process of image encryption



19 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/analysis-of-color-image-encryption-using-multidimensional-bogdanov-map/270654

Related Content

Deep Learning-based Framework for Smart Sustainable Cities: A Case-study in Protection from Air Pollution

Nagarathna Ravi, Vimala Rani P, Rajesh Alias Harinarayan R, Mercy Shalinie S, Karthick Seshadriand Pariventhan P (2019). *International Journal of Intelligent Information Technologies* (pp. 76-107).

www.irma-international.org/article/deep-learning-based-framework-for-smart-sustainable-cities/237967

Smart Healthcare System, Digital Health and Telemedicine, Management and Emergencies: Patient Emergency Application (PES) E-Governance Applications

A. Merlin Mancy, A. V. Senthil Kumar, Rohaya Latip, G. Jagadamba, Prasun Chakrabarti, Priyanka Sharma, Ismail Bin Musirin, Meenakshi Sharmaand B. G. Kanchan (2024). *Sustainable Development in AI, Blockchain, and E-Governance Applications* (pp. 124-151).

www.irma-international.org/chapter/smart-healthcare-system-digital-health-and-telemedicine-management-and-emergencies/338957

Interval-Fuzzy Fixed Charge Transportation Problems

Sudha G.and Ganesan K. (2022). *International Journal of Fuzzy System Applications* (pp. 1-14).

www.irma-international.org/article/interval-fuzzy-fixed-charge-transportation-problems/306281

Intelligent MAS in System Engineering and Robotics

G. Nicolás Marichaland Evelio J. González (2009). *Encyclopedia of Artificial Intelligence* (pp. 917-923).

www.irma-international.org/chapter/intelligent-mas-system-engineering-robotics/10352

A Reinforcement Learning Integrating Distributed Caches for Contextual Road Navigation

Jean-Michel Ilié, Ahmed-Chawki Chaoucheand François Pêcheux (2022). *International Journal of Ambient Computing and Intelligence* (pp. 1-19).

www.irma-international.org/article/a-reinforcement-learning-integrating-distributed-caches-for-contextual-road-navigation/300792