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Medical Images Protection Using Genetic Algorithm

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Abstract

In this paper presented a new approach to protect the digital images using the genetic algorithm by image encryption technique. In genetics Algorithms the crossing operation assembles the existing genes and the mutation operation produces new genes. Here for each pixel pair the binary value of a cross-image and the mutation is applied to encrypt the image. Different test analysis like correlation, entropy and histogram analysis is done to check the performance of the algorithm for the protection or encryption of the digital medical image.

Keyword: Genetic algorithms, Medical image protection, Encryption Secret key, Gray scale image security.

Introduction

The image is the most used communication mode in the different fields, such as the medical zone, the research zone, the commercial zone, the military zone, etc. The important image transfer will be done via an unsecured Internet network. Therefore, adequate security is required for the image to prevent the unauthorized person from accessing important information. The advantage of the image is that it covers more multimedia data and needs protection. Cryptography is a type of image security method. It offers the secure method of transmission and storage for image via the Internet. Security is the main concern of any system to maintain the integrity, confidentiality and authenticity of the image. The cryptography is the effective method but if the number of gray scale are more than it problem to providing the security.

Data encryption is a product of the field of mathematical information theory, an area that addresses various ways of managing and manipulating information. Cryptography contains two basic processes: a process consists of transforming recognizable data, called simple data, into an unrecognizable form, called encryption data. Transforming data in this way is called to encrypt data or encryption. The second process is when the encryption data is retransformed into the original data, so-called decryption or decryption of the data. To determine if a user has permission to access information, a key is often used. Once a key has been used to encrypt information, only a person who knows the correct key can decrypt the encrypted data. The key is the basis of most current data encryption algorithms. A good encryption algorithm should be safe even if the algorithm is known.

Encryption is the process of transforming information to ensure its security. With the strong growth of computer networks and the latest advances in digital technologies, a vast amount of digital data is being exchanged across different types of networks. It is often true that much of this information is confidential or private. As a result, different security techniques have been used to provide the required protection [6].

Data privacy has become unacceptable for data access and increased demand for digital signal transmission, the data monitoring program has become a critical issue. Different cryptographic schemes are required to protect information from unauthorized access or illegal reproduction and modification. Cryptography is used with the help of an unreadable format

to change the original data. The greater complexity involved in the central generation process makes it difficult for the glass attack to break the key.

Proposed Medical Image Protection Technique

In the recent technology, the security of digital images in medical has attracted much attention, especially when the communication networks are used to send these images. An image encryption is the one of the best technique tries to convert an image to another image that is hard to understand. In this type of communication, we propose an encryption technique in which gray scale medical images based on the features of genetic algorithms. The Performance analysis of the proposed scheme show it has good statistical character, key sensitivity and can resist brute-force attack, plaintext attack, differential attack and entropy attack efficiently.

All the process which is shown in the figure 1 is used to protect a digital medical image by using the genetic algorithm. These all the process is used to secure a digital image or encrypted a digital medical image. It is one of the best methods to encrypt the medical image to secure or protect the digital medical image.

Simulation And Result Discuss Of The Proposed Method

The Image is transfer after the encryption of the medical image, at the time of communicating or transfer the medical image we transfer the encrypted image for the protection of the original medical image because from this process only that person will be get the original in which we want to transfer it. Only that person gets the original image after decryption process of the encrypted medical image.

The figure 1 shown an original medical image and the figure 2 shown its encrypted image. From the encrypted image no one can get the original image before decrypted it properly. The figure 3 had shown the Histograms of medical images.

Figure 1: Original Medical Image

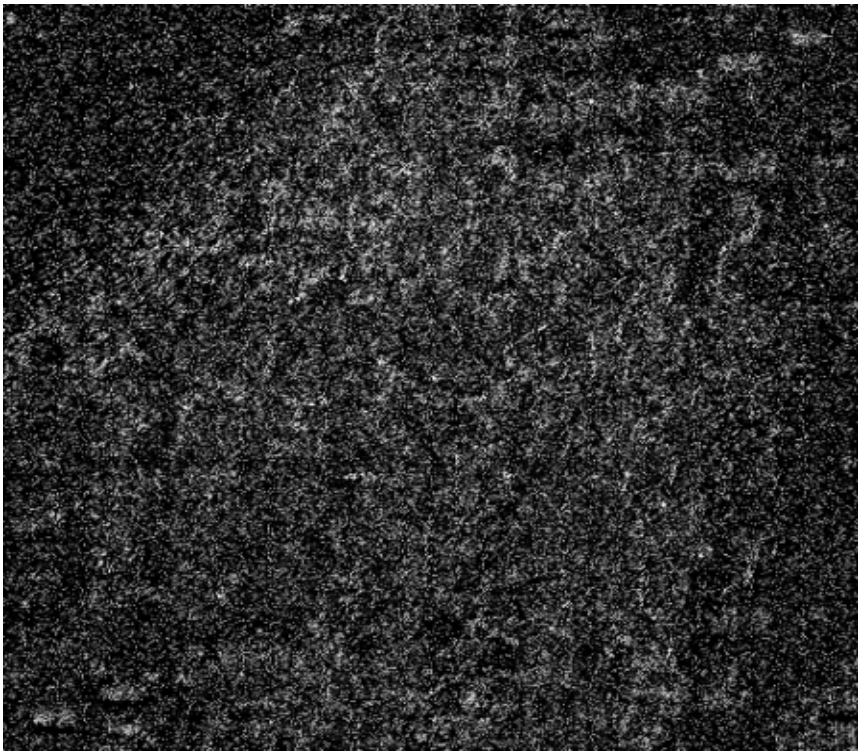

Figure 1 : Encrypted Medical Image

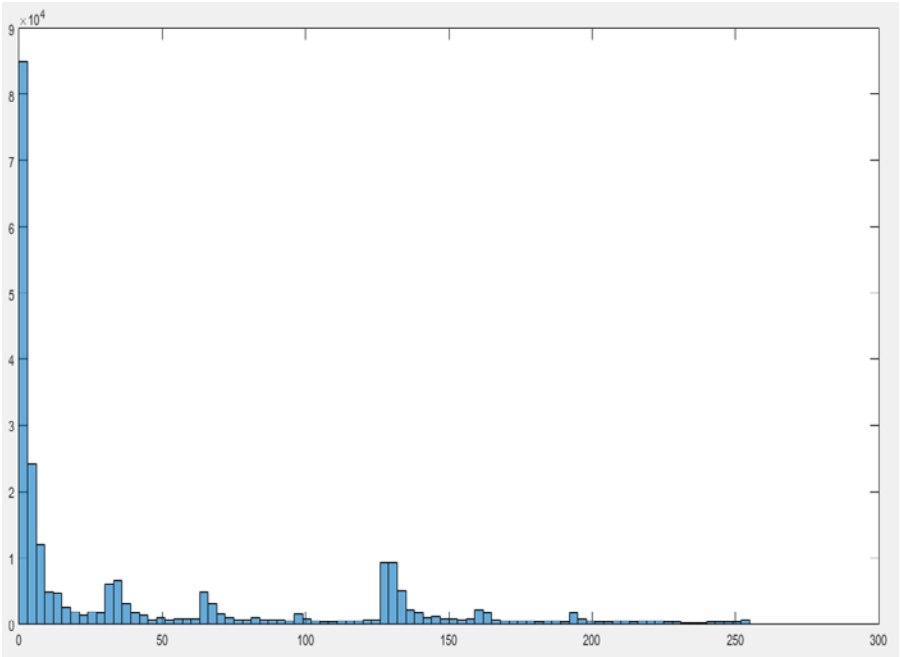

Figure 3: Histograms of Medical Images

Conclusion

The major advantage of genetic algorithms is their flexibility and robustness as a global search method. They are "weak methods" which do not use gradient information and make relatively few assumptions about the problem being solved. They can deal with highly nonlinear problems and non-differentiable functions as well as functions with multiple local optima and readily amenable to implementation, which renders them usable in real-time. This approach is based primarily

on using MATLAB in implementing the genetic operators. Genetic algorithms also be extremely useful if applied in conjunction with neural networks. One of the best algorithm is the Genetic algorithm. In this paper presented the digital medical image protection technique or encryption technique using the genetic algorithm in detailed.

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