

## **Compression The Medical Images Using Length Coding Method**

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**Abstract :** *The dimensional values. It reduced image data size by using a length coding and without loss of data values . The results of the samples used after comparing the importance of using and distinguish the images In this research, the artificial neural network was used for the purpose of distinguishing the medical images used and increasing the efficiency of the network and comparing them with the compression method for images without using the network. In order to comprehension of the integrated ideas and concepts related to research designed educational program relative to the design model (Hannfa ) as one of the educational models in instructional design*

**Keywords :** *Algorithm , length coding , fractal, neural network, compression*

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### **I. Introduction**

The digital image processing can be divided into the four basic operations

A- the restoration of the digital image:

And it is a process that error handling is where the data entered and re-digitized image of a body that is supposed to be them if the imaging process was not accompanied by deformation or sources of errors. And it's called the mistakes corrected at this stage of engineering mistakes and errors of radiation and noise in the data or the data entered [1].

B-Improving digital photo (image enhancement):

And the processing performed on the digital image data is the improvement of data and Replace it with new data where the picture becomes clearer, making it easier transaction Interpretation of the contents and identify targets more accurately covered by the image. This process includes techniques designed to increase the visual differences between the landmarks in the picture. And from these optimization techniques radiological image techniques to extend and improve the image contrast by using spatial filtering and spectral optimization of the image by using the digital image data transfer techniques [2].

C - Classification of digital photo (image classification):

Or extract information from digital image is a process in which the digital image data analysis is automatic and that the state's rules and the amount of systems based on multi-spectral radiation values are designed for computer to make the decision to identify the objectives covered by the digital photo after classified into groups representing targets of a radiological values identical [3]. The integration of the data set: (data merging) And is the process of software put where to make the integration of multiple sets of data in the same location, such as capturing digital images of the same area at different dates for the changes that occur over time, and can be integrated into digital image data with other data such as digital models of the earth's surface and data land cover for use in geographic information systems[4]. This division of the digital image data processing does not mean that these sections is interlinked with each other, so that the restoration of the digital image process to remove noise which is one of the improvements (lead identical role to the process of improving the image) and the improvements will facilitate the classification process and raise the accuracy [5].

### **II. Image compression**

This process is also known as primary treatment, because it precedes the processing of digital image that is the improvement of the image and the development of information, including operations. The difference between the compression and reduce the image data transfer is the process of removing some image information to bring down the group's elements to one point are downsizing this compression process [6] Image compression and reduce the size of image data while retaining the data necessary to Vail's no shrinking the size, file called a compressed file that is used to retrieve the image we must know the type ,size and data for that image show the compression process. The compression process includes two stages

1.Image compression stage

2. Phase decoding the image

The signal to noise ratio of the most commonly used methods to recover the original image[7]

$$SNR = \sqrt{\frac{\sum_{r=0}^{n-1} \sum_{c=0}^{n-1} [\bar{I}(r,c)]^2}{\sum_{r=0}^{n-1} \sum_{c=0}^{n-1} [I(r,c) - \bar{I}(r,c)]^2}} \dots(1)$$

Compression ratio = uncompressed file size / compressed file size  
 =size u/size c .....(2)

One of the important ways the is to use a method of length coding steps described in Figure(1)

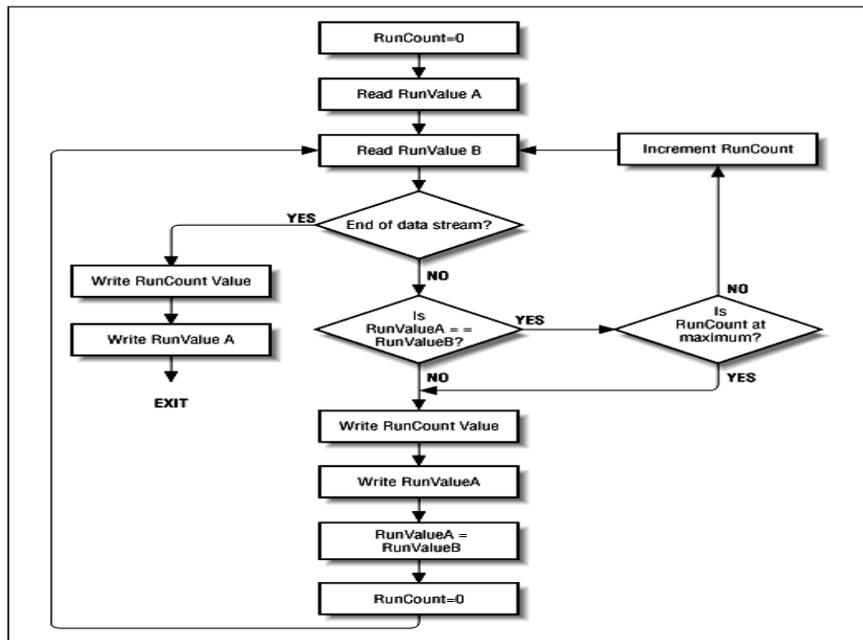


Figure 1. Flowchart of the length coding[8]

### III. Artificial Neural Network (ANN)

Scientists for many years to the goal of access to a method more like a way INSAT in Pattern Recognition stand this method is the use of parallel processing of data at one time this treatment are in units or terminals connected to each other through links with weights and seized during the network and shape[9] the process of training shown in figure (2) illustrates this process

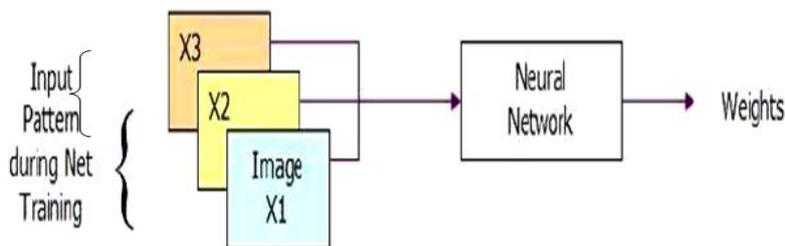


Figure 2.network and shape the process of train [10]

### IV. Iteration Algorithm V. Reaserach proceducer

The network consists input stages of,hidden layer ,and output layer. It is used to recognize medical images iltluation in Figure (3) Multistage neural network The input layer experiment will use a 32-bit region of interest. They state that they achieved better results with five hidden units in the hidden larger. We calculate the variances features in equation (3). These features are both calculated from the region of interest extracted from images

$$v = \sqrt{\frac{1}{n^2} \sum_{i=0}^n \sum_{j=0}^n xi, j - \mu^2} \quad \dots(3)$$

This feature contains the same information as the standard deviation used in the section, average is defined as:

$$\mu = \sqrt{\frac{1}{n^2} \sum_{i=0}^n \sum_{j=0}^n xi, j} \quad \dots(4)$$

Using Matlab programming language to teach multiple network layers shown in figure(3). the best of fractal dimension value by apply the (INSAT) as shown in figure (2)and compare with length coding the method described in the form (1),also designing and constructing an instructional computer program be using instustional model to introduce the basic concepts for the fractal and neural according to is shown in figure(5).

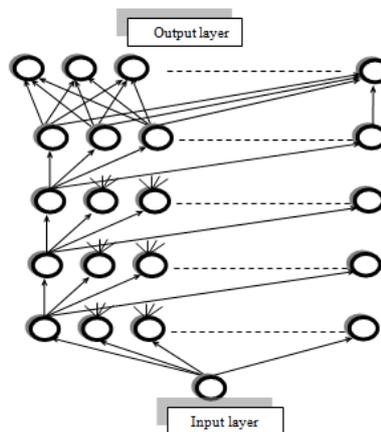


Figure 3. Multistage neural network for classifying images

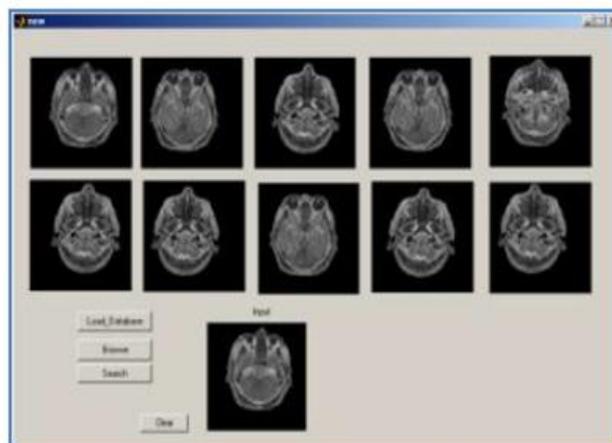
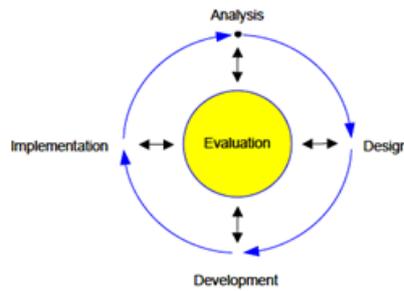


Figure (4) shows the sample of images

### VI. Experimental Results

We computed 40 features from each image. These features are:. For each of these features, the calculated mean value, extreme value, and standard error, property Table (1) shown Results of Statistics engineering and medical images used



figure(5) institutional model

Table (1) shows the value of Execution time.

Compression ratio	$\mu$	$\epsilon$	v	p
1	0.01	0.01	0.1	0.1
2	0.02	0.01	0.2	0.1
3	0.03	0.01	0.3	0.1
4	0.04	0.01	0.4	0.1
5	0.05	0.02	0.5	0.1
6	0.06	0.03	0.6	0.1
7	0.07	0.03	0.7	0.1
8	0.08	0.03	0.8	0.1
9	0.08	0.04	0.1	0.1
10	0.1	0.04	0.2	0.1

also experimental results show that:

- 1- The network has been identified by 95% percent of the medical images used and the network can be used and developed to increase the ratio compared to the percentage if the network is not used . network always classify the inputs, figure (6) shows the value of Execution time

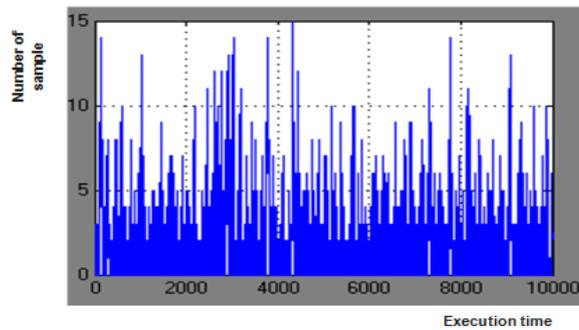


Figure (6) shows the value of Execution time.

- 1- When comparing the pre-way function described with refined along the way encryption to impose compression and Retrieval
- 2- Image compression in this type ratio was 0.5 to 10, while the first method (LCM)was based on the accounts of the values as shown in Figure (7)

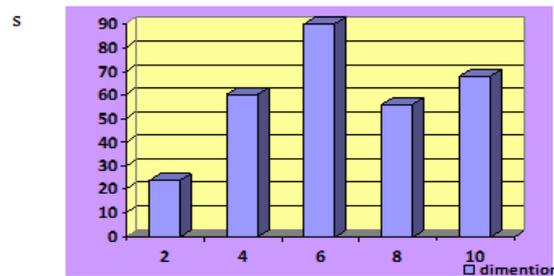


Figure (7) show the value of fractal dimension in (LCM)

3-The designed instructional program helps in saving time and efforts of the learner when studying the subject of fractal geometry and neural network application in medical images.

## **VII. Conclusion**

It has been communicating through a search on a set of conclusions:

- 1 - Create a model that simulates reality and facilitates the process of artificial neural network based on the study of the experimental method compiled using Matlab programming language to teach multiple network layers.
- 2-by using length coding compression is used in the reduction of the size of the memory required to store the image and thus suppress the display of scale needed to send the image .
- 3-Instructional program tend to achieve the principals of teaching and learning through translating them into reality, so that by these principles, it build up the skill of knowledge through providing experience to learn the fractal and neural network application.

## **Reference**

- [1] A. D. Zane, "A Neural Network Approach to Discrete Hartler and Fourier Transforms",IEEE Transactions on Circuit and Systems, Vol. 36, No. 5, pp. 695-702, 2012.
- [2] H. J. Reitboeck and J. Altman, "A Model for Size- and Rotation-Invariant Pattern Processing in the Visual System", Biological Cybernetics, Vol. 51, pp. 113-121,1998.
- [3] B. B. Mandelbrot, "The fractal geometry of nature", Freeman, San Francisco , (1993).
- [4] B. B. Mandelbrot, "Fractional Brownian motions, fractional noises and applications", SIAM Review 10(40) , 1998.
- [5] D. Comis, "Fractals Abridge to the future for soil science", Agricultural Research Magazine 46(4), pp. 10-13, 2009.
- [6] K. J. Falconer, Chapter 2: " Hausdorff measure and dimension, In Fractal Geometry Mathematical Foundations And Applications", Thomson Press Ltd. , 2000.
- [7] S. Davies and P. Hall, "Fractal analysis of surface roughness by using spatial data", Journal of The Royal Statistical Society Series, B Statistical Methodology 61(1), pp.3-29, 2006.
- [8] W. N. Street, "A neural network model for prognostic prediction", Proceedings of the Fifteenth International Conference on Machine Learning, Madison, Wisconsin, Morgan Kaufmann, 2005.
- [9] M. L. Rossen, " Representational Issues in a Neural Network Model of Syllable Recognition ion", <http://www.ivsl.org/pdf/2014>.
- [10] ymada,K."Handwritten Numeral Recognition by Multi-layered Neural Network with Improved learning Algorithm",<http://www.ivsl.org/pdf/2012>.