



CONTENT BASED IMAGE RETRIEVAL USING NEURAL NETWORK – AN OVERVIEW

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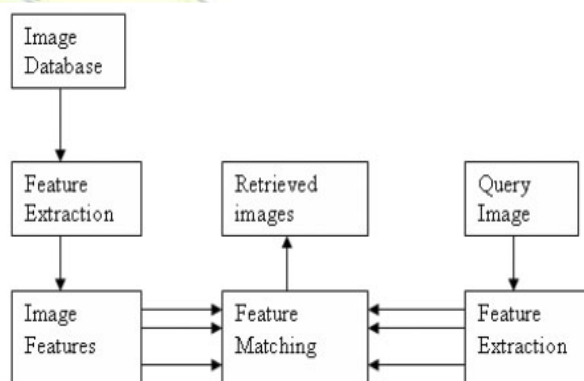
Abstract

CBIR is the most useful research area in the field of computer Science and Digital Image Processing. It is very popular from the past 15 years. In this paper a comprehensive review on CBIR using Neural Network has been initiated. Content Based Image Retrieval is a system where more number of images is retrieved from a large database collection. To improve better Content Based Image Retrieval system, It is necessary to find comparatively a better technique for image retrieval. This paper deals with a review on how Neural Network takes an important place in Content Based Image Retrieval Techniques.

Keywords:Digital Image Processing, Content Based Image Retrieval and Neural Network.

I.Introduction

Various image databases like Art Collections , Medical Image Databases, Scientific Databases are used to give thorough information on human beings. As the rapid development of technology throughout the society, digital images are exponentially increased in various fields. Manual image annotation is very difficult when the size of image database is large. To reduce this drawback, now CBIR is introduced and image is retrieved by using various methods. The basic fundamental of content based image retrieval is feature extraction [12].



Process involved in Content – based Image Retrieval

Considering a search with Google Scholar, a voluminous literature has been listed on topic of image processing with Neural Network. In information technology, a neural network is a system of programs and data structures that approximates the operation of the human brain. A neural network usually involves a large number of processors operating in parallel, each with its own small sphere of knowledge and access to data in its local memory. The main task associated with a neuron is to receive the activation values from its neighbors (the output of other neurons), compute an output based on its weighted input parameters and send that output to its neighbours. Neural Networks are computational systems made up of simple processing units called neurons which are usually organized into layers with fully or partially connections.

Other advantages include:

1. Adaptive learning:



2.. Self-Organisation:

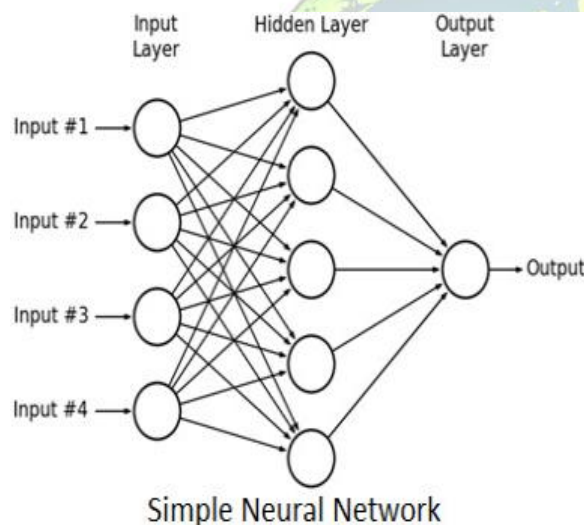
- Creating its own organization.

3.Real Time Operation

- Computations are carried out in parallel and Special hardware is designed

4.FaultTolerance :

- Partial destruction of a network leads to the corresponding degradation of performance. However, some network capabilities may be retained even with major network damage.



Applications of neural networks

Character Recognition - The idea of character recognition has become very important as handheld devices like the Palm Pilot are becoming increasingly popular. Neural networks can be used to recognize handwritten characters.

Image Compression - Neural networks can receive and process vast amounts of information at once, making them useful in image compression. With the Internet explosion and more sites using more images on their sites, using neural networks for image compression is worth a look.

Stock Market Prediction - The day-to-day business of the stock market is extremely complicated. Many factors

weigh in whether a given stock will go up or down on any given day. Since neural networks can examine a lot of information quickly and sort it all out, they can be used to predict stock prices.

Traveling Saleman's Problem - Interestingly enough, neural networks can solve the traveling salesman problem, but only to a certain degree of approximation.

Medicine, Electronic Nose, Security, and Loan Applications - These are some applications that are in their proof-of-concept stage, with the acceptance of a neural network that will decide whether or not to grant a loan, something that has already been used more

successfully than many humans.

Miscellaneous Applications - These are some very interesting (albeit at times a little absurd) applications of neural networks

II.Literature Review

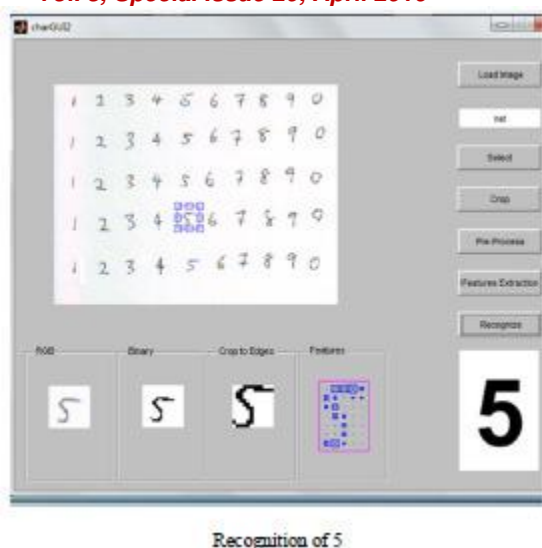
According to Zhenghao Shi, and Lifeng He[1], Neural Network is used for medical image reprocessing, medical image segmentation, and medical image object detection and recognition . In their analysis,Hopfield Neural Network is used for image reconstruction ,The feed forward neural network [2]-[3] and the self-organizing Kohonen neural network [4]-[5] , are used for image reconstruction, The feed forward neural network is the most used neural network for medical image segmentation and the back propagation neural network takes an important role in medical image detection and recognition.

Neural Network takes a very important role to retrieve images and also takes a key role in predicting learning disability [6].

AnkitSharma,Dipti R Chaudhary[7] used feed forwardback propagation method in Neural Network to classify Character Recognition. Many hand written texts are taken into the consideration. The following is the example for character recognition which states the proposed work of Ankit and Chaudhary.

Dadvandipour[8] utilized Neural Networks in the research field of Image Processing System (IPS) with feed forward structure to detect, and recognize small component parts like (machine tools) on a moving belt conveyor.

ArvindNagathan, ,Manimozhiand JitendranathMungara[9] stated in their paper that the use ofneural network has considerably improved the recall



rate and also retrieval time, due to its highly efficient and accurate classification capability. They used a three layer neural network as classifier which is set up and configured with parameters that are best suitable for image retrieval task. Their results showed a considerable improvement in terms of precision and recall of image retrieval.

Vrushali Yashwantrao Badadapure [10] utilized Neural Network based as CBIR. In their works, Features of images stored in database are extracted and compared to the features of the query image. Features extracted and measured similarity. DML (Distance Metric Learning) and ANN algorithms are used to measure similarity between images. ANN (Artificial Neural Network) is more effective and more efficient than alternative algorithm.

Darsana and Jagajothi [11] used the neural network classification method in their paper for effective retrieval of images. In their paper they justify that the neural network classification method achieves the goals of clustering relevant images using meta-heuristics and dynamically modifies the feature space by feeding automatic relevance feedback without any human interaction. The motivation behind this paper is a study on the works done by early researchers in the field of content based image retrieval based on color and texture features and the neural network classification for efficient image retrieval.

Santhosh, Tina Esther Trueman [12] used the neural network technique for clustering to increase the accurateness of image. Histogram feature, texture

features and shape feature are compared and explored for CBIR. CBIR created by using color, shape and texture fused features by means of constructing feature vectors weights and clustered using Self-Organizing Map to display similar images. They produced best result in Neural Network rather than the results from Self-Organizing Map (SOM).

Preetika D'Silva and P. Bhuvaneswari [13] applied neural network for image retrieval using Euclidean distance. In their work, Medical database is created with the pre-processed medical images and shape and texture features are extracted and the features of the query image are extracted and are used by the neural network. Euclidean distance between the query features and the database features are computed. Then the feed forward back propagation neural network is utilized finally to retrieve the similar medical images from the medical database.

Swathi Rao G, Manipriya Singh and Ramnath Panwar Singh [14] utilized neural network for image retrieval with the help of Gabor filter. In their proposed work, Thousand images are taken for the implementation purpose. Mean and standard deviation of the images are computed using Gabor filter. Using the neural network classifier for image retrieval system is trained and tested and classifies the images from a large database relevant to the requirement.

III. Conclusion

Numerous methods are available for feature extraction in CBIR. Also we have reviewed various papers related to different classification methods for the improvement of image retrieval in CBIR. By the above review, Neural Network takes an important place in image retrieval. It can be very useful in comparisons studies. Network classification has considerably improved the recall rate and also retrieval time, due to its highly efficient and accurate classification capability.

The foregoing review of neural network application in CBIR unambiguously demonstrates the advantages of retrieval of images from cluster. Therefore the principles of neural network particularly in medical image processing are much more appreciable in the process of selection of image from pooled image data. Much more



clear studies are needed to ascertain this hypothesis in future. The present review may help to achieve this.

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