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[Patel* *et al.*, 6(7): July, 2017]
IC™ Value: 3.00

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

IJESRT

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY

A REVIEW WAVELET TRANSFORM AND FUZZY K-MEANS BASED IMAGE DE-NOISING METHOD

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DOI: 10.5281/zenodo.822974

ABSTRACT

The research area of image processing technique using fuzzy k-means and wavelet transform. The enormous amount of data necessary for images is a main reason for the growth of many areas within the research field of computer imaging such as image processing and compression. In order to get this in requisites of the concerned research work, wavelet transforms and k-means clustering is applied. This can be done in order to discover more possible combinations that may lead to the finest de-noising technique. In this review paper we have tried to review the maximum aspects regarding to image de-noising.

KEYWORDS: Image De-noising, Wavelet Transform and Wavelet Thresholding, Fuzzy K-means, etc.

I. INTRODUCTION

The image processing is a field that continues to grow, with new applications being developed at an ever increasing rapidity. The attractive and exciting area to be involved in today with application areas ranging from the entertainment industry to the space program. One of the most interesting aspects of this information revolution is the ability to send and receive complex data that transcends ordinary written text.

Image information, transmitted in the form of digital images, has become a main method of communication for the 21 century. Image processing is one form of signal processing for which the input is an image, these photographs or frames of video and the output of image processing can be either an image or a set of characteristics or parameters related to the image processing [1]. The majority of image processing techniques involve treating the image as a two-dimensional signal and applying standard signal processing techniques to it. Imperfect instruments, problems with data acquisition process, and interfering natural phenomena can all corrupt the data of interest. Various types of noise present in image are Gaussian noise, Salt &Pepper noise and Speckle noise. Image de-noising techniques are used to prevent these types of noises while retaining the important signal features. Spatial filters like mean and median filter are used to remove the noise from image. But the disadvantage of spatial filters is that these filters not only smooth the data to reduce noise but also blur edges in image. Therefore, Wavelet Transform is used to preserve the edges of image. It is a powerful tool of signal or image processing for its multi-resolution possibilities.

This paper reviews wavelet based approach, where the additive noise form is present in an image, Gaussian noise is most commonly known as additive white Gaussian noise which is evenly distributed over the signal. Each pixel in the noisy image is the sum of the true pixel value and random Gaussian distributed noise value. Simple de-noising algorithms that use the wavelet transform consist of three steps. Proposed the following wavelet de-noising scheme:

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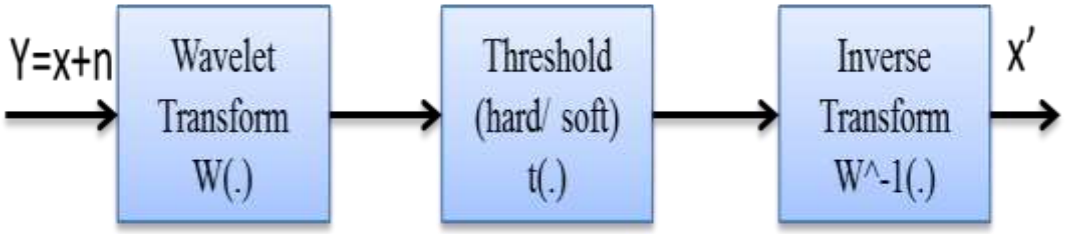

Fig. 1 The Wavelet based image de-noising

II. RELATED WORK

The many researchers have been done in field of image de-noising problem some of the work is described in this paper.

Utkarsh Agrawal [1], proposed method for the k means clustering for adaptive wavelet transform based image de-noising, the clustering used for systematic retrieval of data by organizing them into several clusters system. Clustering is used to organize data for efficient retrieval. Investigation de-noising of images corrupted with variable Gaussian noise spread across the images. The applying IWT PSNR of the de-noised image is calculated. PSNR of the de-noised image varies between 50 to 65 dB, which is a comprehensible indication of the working of our proposed method.

Sanjiv K. Bhatia [2], develop an adaptive technique that produce the clusters without refer to initial representation of cluster section. This technique first identify K clusters in an input data set by combining existing clusters and by creating new ones with keeping the number of clusters constant. The technique has splendid speedup of a search process when other efficient search techniques do not perform well.

A. Khare [3], proposed method for the de-noising of medical image using the wavelet coefficient embedded with noise and applying soft thresholding on it. It has shown that threshold gives better result when it is applied at multiple levels. The main originate of propose threshold is the main choice of wavelet coefficient parameters. If the mean value of wavelet coefficients is high then it implies that most of wavelet coefficients have high value, i.e. the image has a large amount of variability. Similarly for the smaller value, that is, if the mean value of wavelet coefficients is low then it implies that most of wavelet coefficients have smaller value, i.e. the image is smooth. For the calculation of threshold value we have to consider the ratio of standard deviation and mean value.

Mohsen had [4], worked for de-noising the image polluted with Additive Gaussian Noise using clustering techniques. It applies more intelligent training for the de-noising such that firstly it selects important data for training then it clusters in such a way that all training block lie in low rank subspace, so that we can design a dictionary applicable for image de-noising and obtain results near the state of the art local methods.

PriyamChatterjee [5], had worked for de-noising the image cluster based on geometric structure which works by learning a geometric descriptor using local kernels of image. This approach defines a class between the methods for categorizing the kernel regression. Proposed fine by clustering the image using important features that are able to capture the underlying geometry in the presence of noise.

III. CONCLUSION

The various papers and literature has been studied for image de-noising technique. The wavelet transform and k-means algorithm perform better in the recognition but required higher computation time. In feature, the wavelet transform and c-means algorithm with various other \parameters may be useful. The parallel processing may also the option to use the multi-core processer to reduce the time of computation.

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CITE AN ARTICLE

Patel, N., & Soni, P. K., Ass. Prof. (2017). A REVIEW WAVELET TRANSFORM AND FUZZY K-MEANS BASED IMAGE DE-NOISING METHOD . *INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY*, *6*(7), 61-71. doi:10.5281/zenodo.822974