Image Enhancement Using PCNN

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Abstract: *Image enhancement is an important task in image processing, use of wavelet transform improves the quality of an image and reduces distortion level. Image enhancement is an important step for any complicated algorithms, in computer vision and image processing. Denoising is necessary and the initial step to be taken prior to the image data is analyzed. It is essential to apply an efficient enhancement technique, to compensate such data corruption. The effort of image enhancement is to improve an image that is cleaner than its distortion observation. Therefore, a substantial technology in image analysis is noise reduction and the initial step to be taken prior to images is analyzed*

Keywords: *processing, distortion, Denoising,data corruption,technology.*

I. Introduction

Image degradation is inevitable during the transmission and alteration of images [1]. For example, the quality of an image shot by a camera is sometimes low due to the distortion of camera's optics scheme, the relative motion of the photographed object and the camera, the ecological change and the arbitrary disturbance. The image enhancement is an important technique that can improve the quality of the degraded image and offer some interesting image features selectively [2][3]. Image enhancement is improving the interpretability or perception of information in images for human viewers and providing better input to other automated image processing techniques. Objective of image enhancement is to modify attributes of an image to make it more suitable for a given task and a specific spectator [7].

II. Related Work

In the review of enhancement seen that enhancement technique loss the contrasts and brightness of image [4]. Brightness preserving in image enhance is critical phase [5]. Here they discuss different method of image enhancements with brightness preserving and contrasts.
1. Content-aware dark image enhancement through channel division
2. The fuzzy nonlinear enhancement algorithm of infrared image based on curvelet transform
3. Image enhancement by wavelet-based thresholding neural network with adaptive learning rate
4. Stationary image resolution enhancement on the basis of contourlet and wavelet transforms by means of the artificial neural network [6]

III. Proposed System

Image enhancement play an important role in the field of medical diagnose and remote sensing. The process generation of medical image is grayscale and black and white. These image contain some unwanted and distorted signal value and produces noise and darkness in image. In the processing of image denoising technique some noise value as well as some actual data are lost. Now in most of cases image enhancement process are used for increasing quality of grayscale image.in current research trend some method are used such as transform based function and neural network based image enhancement technique. In this dissertation proposed hybrid image enhancement technique, these technique based on pulse coupled neural network model and genetic algorithm. In this dissertation genetic algorithm act as threshold function and PCNN network work as filter.

IV. Processing of Proposed Algorithm

Step1. Initially input image passes through DWT function and decomposed into two layers different value.
Step2. The layers value different higher and lower part.
Step3. The collection of lower intensity value used genetic algorithm
step4.Genetic algorithm collects the local noise value after that combined with high intensity value.
Step5. After collecting total noise value convert into feature vector image data passes through PCNN network
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Step6. In phase of feature mapping in feature space of PCNN network create a fixed cluster according to threshold of details of image part.

Step7. Here show steps of processing of PCNN network

1) Initialize each node's weights.
2) Choose a random vector from training data and present it to the PCNN.
3) Every node is examined to find the Best Matching Unit.
4) The radius of the neighborhood around the BMU is calculated. The size of the neighborhood decreases with each iteration.
5) Each node in the BMU's neighborhood has its weights adjusted to become more like the BMU. Nodes closest to the BMU are altered more than the nodes furthest away in the neighborhood.
6) Repeat from step 2 for enough iteration for convergence.
7) Calculating the BMU is done according to the Euclidean distance among the node's weights (W1, W2, ... , W) and the input vector's values (V1, V2,…, Vn).This gives a good measurement of how similar the two sets of data are to each other.
8) The new weight for a node is the old weight, plus a fraction (L) of the difference between the old weight and the input vecto adjusted (theta) based on distance from the BMU.
9) The learning rate, L, is also an exponential *decay* function.This ensures that the PCNN will converge.
10) The lambda represents a time constant, and t is the time step

Steps 8. After processing of PCNN network out data of image is also passes through PCNN two stage network

Step 9.Finally gets enhanced image and calculate the value of PSNR and AMBR value
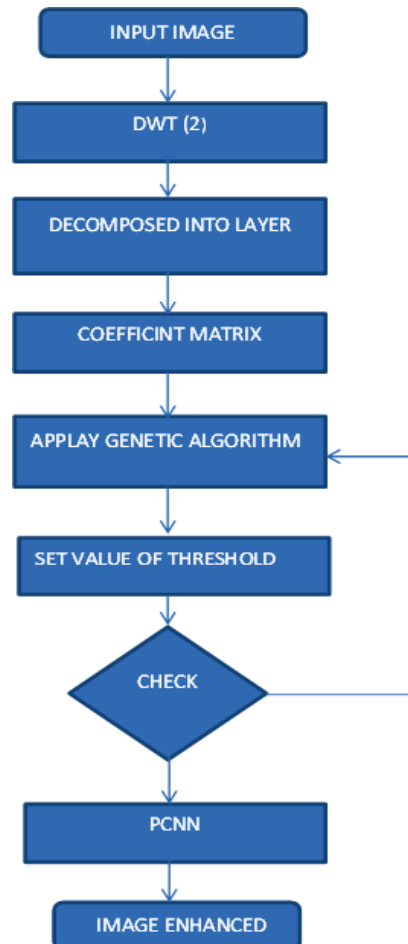
Fig.1: Proposed model system

V. Conclusion

In this a hybrid PCNN-GA method based on Wavelet transforms function and a neural network is proposed. PCNN were used to find correlation between noised and original WT coefficients and approximation. The experimental results show the mean with the traditional enhancement methods, the proposed threshold-based enhancement digital image enhancement algorithm for mixed digital image enhancement is relatively

clear, especially in the more noise, more complex cases", can show its good performance.

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