

Research Paper**EDGE PRESERVING IMAGE DENOSING TECHNIQUE BASED ON
SOM NEURAL NETWORK MODEL**ANJALI KHARE¹, SHAHAB AHMED², L K VISHWAMITRA³

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ABSTRACT

In this paper proposed a hybrid method for medical image denosing for improvement of CT and MRI image for brain stroke and brain tumor. The process of CT and MRI image gets the high component value of noise in environment. For the reduction of these noise used wavelet transform domain method. The wavelet transform method is well recognized method for noise reduction. In wavelet transform method the local noise component value are not considered. Then after the denosing process noise are still remain in CT and MRI image. For these low components value collection used multiple sequences. And finally used self-organized map network. The proposed method implanted in MATLAB 7.8.0 software. MATLAB is high end computational language for image processing. For the experiment process used five CT and MRI image with 512×512 resolution.

KEYWORDS

Medical Image, Denosing, Wavelet, SOM Network

INTRODUCTION

Image clamor lessening without structure corruption is per-haps the most imperative errand in low-level picture handling. In this investigation, the proposed calculation is assessed and contrasted and numerous other existing strategies, including quick respective filter (FBF), guided picture filter (GIF) and SURE-LET technique. The parameters of every technique have been set by ideal execution created in the trial. Really, as the commotion change σ^2 can be assessed from the deliberate information utilizing the middle of outright deviation, their LLSURE strategy is totally programmed amid denosing process on the off chance that they set the window sweep fixed ($r = 2$ in this investigation), as opposed to the FBF and GIF which need to tune physically the parameters to get fantastic filtered comes about. This solid correlation was just conceivable on account of the generosity of the different creators who have given their individual Matlab codes on their own sites[8].

The tried pictures are adulterated by reenacted added substance Gaussian background noise five diverse power levels $\sigma \in [5, 10, 14]$. What's more, the denoising procedure has been per-framed more than ten diverse clamor acknowledge for every standard deviation and the subsequent PSNRs and calculation times arrived at the midpoint of over these ten runs[8].

At last, they might want to stress that as opposed to FBF and GIF, their LLSURE technique is totally programmed amid denosing process since the commotion difference σ^2 can be evaluated from the deliberate information. Additionally, the evaluated difference can be deciphered as a scale parameter in LLSURE technique, that is, they can develop a multi-scale space representation of the underlying picture with various change, though in Luisier et al. Beyond any doubt LET strategy, the evaluated change is just a pivotal limit which decides the denosing quality. This is shown in Figure. As they can watch that few bit by bit simplified (smoothed) variants of the underlying picture is acquired by utilizing their strategy with expanding difference, accordingly one can utilize this scale-space representation for removing semantically essential data[8].The pinnacle picking decreases the full information set to powers at considered m/z -values. At that point the edge-safeguarding denosing is separately connected to every m/z -picture supplanting it with its denoised form. The final venture of their division system is to bunch all lessened and handled spectra with a grouping calculation. they don't endeavor to assess the quantity of groups from the information (utilizing, for instance, the Akaike strategy), but instead indicate it from the earlier. This is more sensible in a general study on the grounds that, first, in a cutting edge MALDI-imaging study one is keen on a little quantities of groups (up to 10), so division maps for all quantities of bunches can be figured very quick,

and second, visual perception of a division delineate a histologist gives a universally handy method for assessment and choice of the best number of bunches [3]. The attractive reverberation (MR) information are obtained as mind boggling esteemed information made out of flag and clamor in the K-space. In the development of a picture, the circulation of MR information is changed from Gaussian to Rician in light of the fact that these information are changed over into an extent picture by taking the square foundation of the total of the squares of the genuine and the nonexistent part of the intricate information in a pixel-wise way. These greatness pictures have different antiquities because of tangled MRI picture development, for example, framework delay, edge in homogeneity, non-focused examining windows, stage varieties, whirlpool current, beat timing mistake, loop impedance changes, and so forth., that influence the picture arrangement utilizing the mind boggling MR information. Thus, the mistake between the first picture and the prepared picture initiates the Rician clamor in greatness MR picture. The rest of paper discuss as in section 2 discuss the Graphical Processor Unit. In section 3 discuss the Problem Formulation. In section 4 discuss proposed Work. In section 5 discuss the experimental result and analysis. Finally discuss conclusion & future work in section 5.

GRAPHICAL PROCESSOR UNIT

Many picture preparing applications include complex calculations which use parallel figuring stage like graphical processor unit (GPU) because of its high memory data transfer capacity and fast registering ability in actualizing the different calculating picture handling operations. For executing the calculations in the GPU, a few devoted programming devices are accessible, which require an intensive comprehension of the GPU equipment subtle elements and application program ideas notwithstanding great programming aptitudes. Be that as it may, MATLAB is an adaptable stage for actualizing a few complex operations effortlessly utilizing the worked as a part of flag and picture handling tool-boxes. In this work, they executed quick inclination projection calculation for the expulsion of Rician commotion exhibit in attractive reverberation (MR) pictures. A large portion of the constant picture preparing strategies require high complex handling calculations that can be actualized utilizing parallel figuring procedures as a part of GPU stage, since GPU is a solitary processor with inherent multi-processor hinders that can be utilized successfully as a part of a parallel mold to execute various assignments continuously than the other processor equipment stages [2]. GPU is an equipment outfitted with gigantic computational pull and high memory data transfer capacity, which can acquire huge enhancements pixel handling, illustrations outline applications

and picture operations as far as speed and calculating operations. It is likewise called Visual Processing Unit (VPU) of a Graphics Card or Graphics Accelerator. To handle autonomous design pieces and to exchange a segment of center memory to the video memory, the GPUs are utilized as a part of the early PC equipment and additionally video show units. Be that as it may, the current GPU gives quick and proficient figuring of 3D PC illustrations utilizing transistors and backings programmable shaders, over-inspecting and high exactness shading designs. Then again, the General Purpose GPUs (GPGPUs) are the new era of GPUs that are going for taking care of more broad, complex, and concentrated preparing. With the progressions in GPU, a few general and particular applications with high information parallelism can be executed effectively, since GPGPU underpins parallel information handling utilizing vast number of preparing units coordinated inside the GPU. Encourage, it bolsters single-guideline numerous data (SIMD) or single-program various information (SPMD) access and math, stacking and insertions units for information pre-handling notwithstanding the assessment units for essential capacities. The possibility of GPUs is all around archived and is inspected here. A multi-disciplinary gather talked about the different issues in parallel registering and its gadget level applications like GPGPU. The possibility of GPU in broadened applications like straightforward picture handling reenactments and morphological

edge recognition were exhibited as far as adaptability and time productivity [2].

PROPOSED ALGORITHM

This segment, we talk about picture denoising philosophy in view of SOM neural system show. The picture elements are separated from the picture utilizing wavelet change work. SOM goes about as a grouping component that tasks N-dimensional elements from the WT work into a M-dimensional element space. The subsequent vectors are bolstered into a SOM that sorts them onto one of the relearned clamor classes. The proposed plan is work alongside MS. The MS procedure is the accumulation assignment of neighborhood power of medicinal picture information. The gathered clamor esteem consolidated with high force picture esteem and creates vector esteem for the procedure. They mapped highlights from every edge of the word onto the SOM yield to shape a direction of champ hubs for a given word. The SOM takes in this direction for each denoising imperatives esteem is contained a progressive association of SOM and SOM. SOM gets contributions from the WT work bank and maps onto a M-dimensional space where M is the dimensionality of the SOM yield hub appropriation. The changed element vectors are encouraged into the SOM, which arranges them. We call the element space produced from the WT work yield as essential element space and M-dimensional component space from SOM yield as optional element space. The vectors from the

auxiliary element space are called optional component vectors.

Processing of proposed Algorithm

Step1. Initially input image passes through WT 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 MS (multiple sequences)

step4. MS 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 self organized map network

Step6. In phase of feature mapping in feature space of SOM network create a fixed cluster according to threshold of details of image part.

Step7. Here show steps of processing of SOM network

Initialize each node's weights.

Choose a random vector from training data and present it to the SOM.

Every node is examined to find the Best Matching Unit (BMU).

The radius of the neighborhood around the BMU is calculated. The size of the neighborhood decreases with each iteration.

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.

Repeat from step 2 for enough iteration for convergence.

Calculating the BMU is done according to the Euclidean distance among the node's weights (W_1, W_2, \dots, W_n) and the input vector's values (V_1, V_2, \dots, V_n).

This gives a good measurement of how similar the two sets of data are to each other.

The new weight for a node is the old weight, plus a fraction (L) of the difference between the old weight and the input vector... adjusted (θ) based on distance from the BMU.

The learning rate, L , is also an exponential decay function.

This ensures that the SOM will converge.

The λ represents a time constant, and t is the time step

Steps8. After processing of SOM network out data of image

Step9. Finally gets denoised image and calculate the value of RMSD value.

EXPERIMENTAL RESULT ANALYSIS

To investigate the effectiveness of the proposed method for image fusion based on wavelet transform function and particle of swarm optimization. We used MATLAB software 7.14.0 and some reputed image used for experimental task such as the name given Barbara, Lena and image-1. For the performance evaluation of GCD(greatest common divisor), GCD-N and Proposed Method for given Barbara, Lena and

image-1. This all image is gray scale image size is 512 * 512. The performance measuring parameter is RMSD and Elapsed Time. Here we are using various types of GCD (greatest common divisor), GCD-N and Proposed Method.

[1] [2] METHOD	[3] [4] RMSD	[5] [6] ELAPSED TIME
[7] [8] GCD	[9] [10] 12.6239	[11] [12] 3.376760
[13] [14] GCD-N	[15] [16] 24.2383	[17] [18] 5.218639
[19] [20] PROPOSED	[21] [22] 29.2392	[23] [24] 5.017088

Table 1: The comparative result analysis for input noise value is 0.09 and Barbara image using GCD, GCD-N and Proposed method. Find the output value of RMSD and Elapsed Time in seconds.

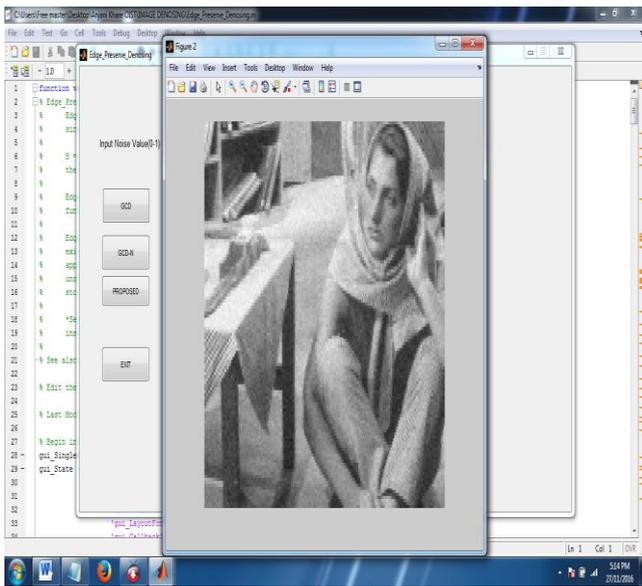


Figure 1: show the output window of implementation with input noise value is 0.09 using GCD-N Method for Barbara Image.

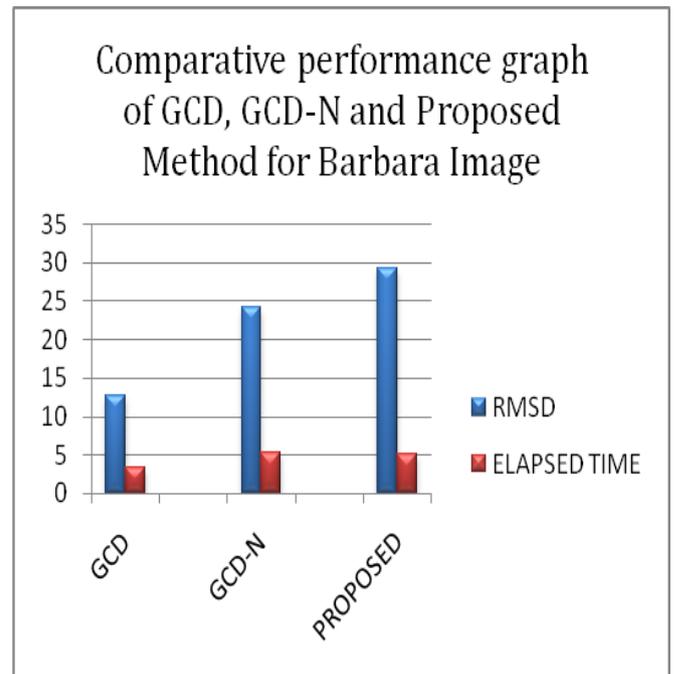


Figure 3: The comparative result analysis for input noise value is 0.09 and Barbara image using GCD, GCD-N and Proposed method for the output value of RMSD and Elapsed Time in seconds.

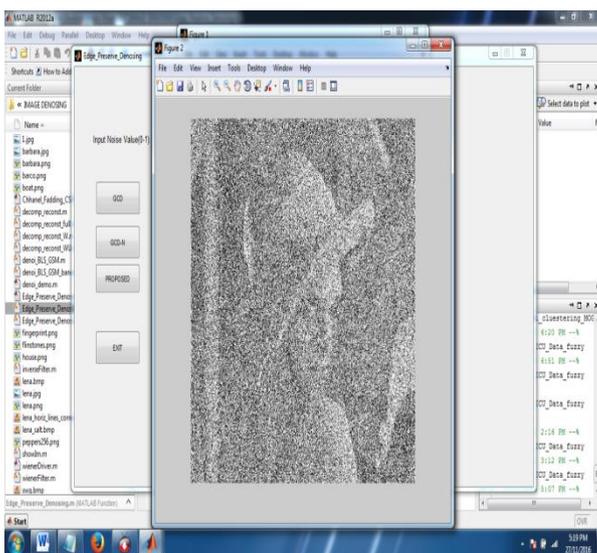


Figure 2: show the output window of implementation with input noise value is 0.25 using GCD Method for Lena Image.

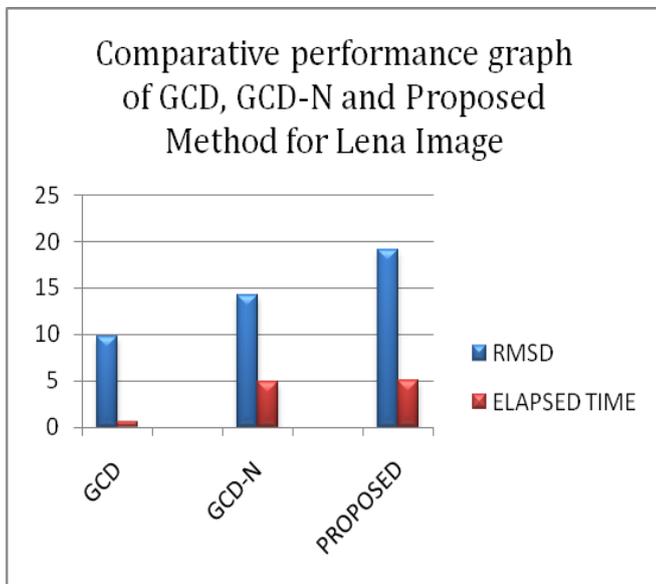


Figure 4: The comparative result analysis for input noise value is 0.25 and Lena image using GCD, GCD-N and Proposed method for the output value of RMSD and Elapsed Time in seconds.

CONCLUSION AND FUTURE WORK

In this exposition, a half breed of SOM-MS technique in light of wavelet change work and neural systems is proposed. SOM were utilized to discover connection amongst noised and unique DWT coefficients and estimate. Test comes about demonstrated ability of proposed technique to evacuate commotion as far as PSNR and visual quality. Diverse models and distinctive initiation capacities is considered. The exploratory outcomes demonstrate the mean with the customary denoising techniques, the proposed edge based denoising computerized picture denoising calculation for blended advanced picture denoising is generally clear, particularly in the more commotion, more mind-boggling cases", can demonstrate its great execution. In the denoising procedure with a specific end goal to accomplish better denoising impact, the

framework sets aside more opportunity to pay; the other for shading computerized picture handling has not been a decent outcome.

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