ISSN: 2278 – 909X
International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE)
Volume 7. Issue 12. December 2018

ENHANCED NCF IN COLOR IMAGES

REVATHY ROY

Abstract—Salt and pepper noise is a form of impulse noise typically seen on images. It represents itself as randomly occurring white and black pixels.Here fast filtering approach which uses Enhanced Neighborhood Correlation is discussed to filter salt & pepper noises in color images. This kind of filtering has much higher edge preserving ability. This algorithm is able to synchronously reflect image quality via amount, location and density statistics of salt & pepper noise spots and make good sense to guide parameter selection for imaging systems.By utilizing a 4×4 pixel template, the algorithm can discriminate and filter various patterns of salt& pepper noise spots or blocks within 2×2 pixel size range. The color images are denoised by extracting the R, G and B planes from the noisy image, denoised separately and are merged together to form the color image, rather than converting to gray for denoising and then reconstructing from the denoised gray image.

This algorithm denoises only noisy pixels restore image quality and preserves edge information in color images by enhancing the exissting NCF.

Index: Terms-impulse noise, neighborhood correlation , psnrratio, salt and pepper noise

I. INTRODUCTION

Image noise is random variation of brightness or color information in images, and is usually an aspect of electronic noise. Noises are added in the images during acquisition by camera sensors and transmission in the channel. It can be produced by the sensor and circuitry of a scanner or digital camera.

Two applications are of great importance in the area of image processing.Noise filtering and image enhancement.The aim of noise filtering is to eliminate noise and its effects on the original image.Keeps the distortion as little as possible

There are many kinds of noises in images. Two of the most common types of noises in image processing are Gaussian noise and Impulse noise .The impulse noise also called “Salt and Pepper Noise”, the black point and white point sprinkled all over image, typically looks like salt and pepper.

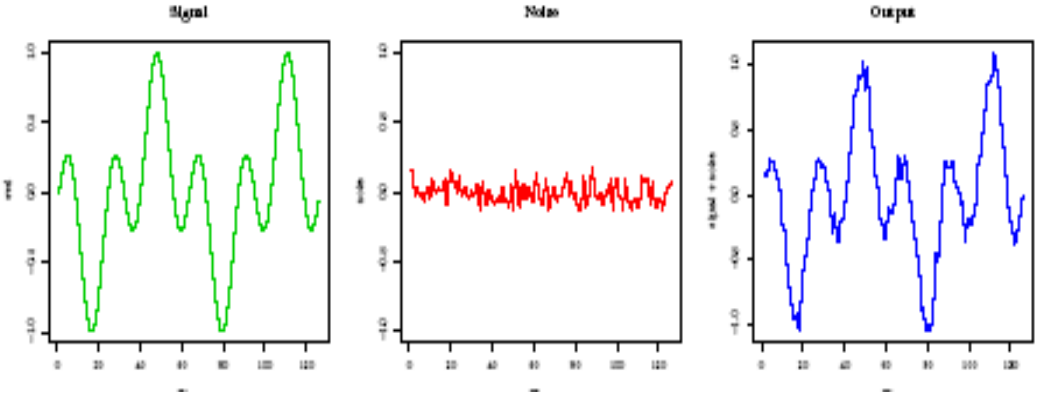


Fig1 (a)Signal (b)Noise (c)Output

ISSN: 2278 – 909X
International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE)
Volume 7, Issue 12, December 2018

Impulse noise pixels can take the maximum and minimum values in the dynamic range (0, 255).

Salt and pepper noise-dark pixels in white region and white pixels in dark region.

It can corrupt the images where the corrupted pixel takes either maximum or minimum gray level.

The characteristic of this noise is that only some of the pixels are affected by the salt and pepper noise.

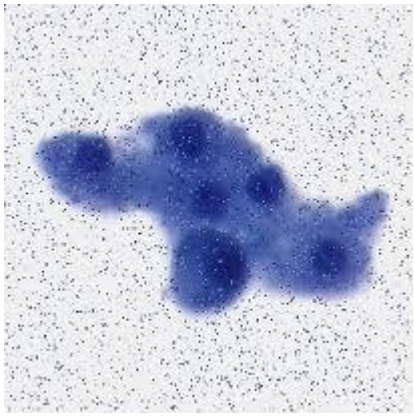


Fig2 ..noisy image

IINEIGHBORHOOD CORRELATION

Neighborhood correlation is the basic operation that will perform to extract information from image.

It performs same operation at every point in the image and it replaces every pixel with a linear combination of its neighbors. This is done because the neighboring pixels have more similarity to the pixel to be detected than the end ones.

III PROPOSED METHOD

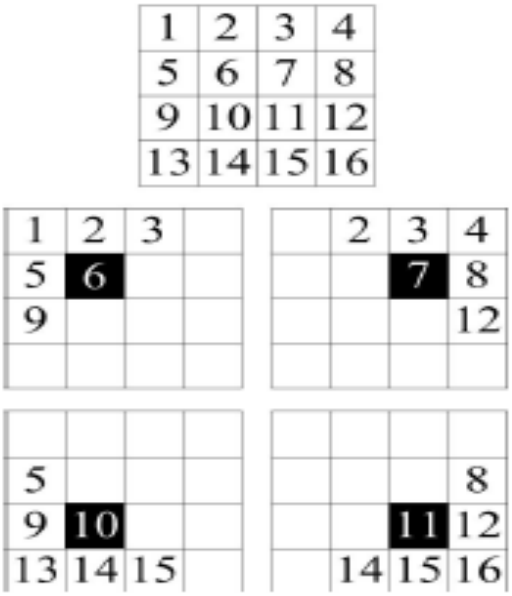
The color images are denoised by implementing the basic algorithm .

A salt & pepper noise fast filtering algorithm based on neighborhood correlation detection is utilized.

A small variation in the basic algorithm is done in color images.

In this process an increase in the psnr value is obtained as compared to the basic algorithm.Therefore the originality of the color images are maintained as the noise block gets higher.A comparative study is done in an effective manner.

IV ALGORITHM PRINCIPLE



l The 4×4 pixel template and 5/8 neighborhood pixels corresponding to each central pixel

Fig3.algorithm principle NCF

PRINCIPLE OF ALGORITHM

The algorithm works in specified steps so that it takes a 4 x 4 matrix and calculates for each 2x2 pixel.

The pixel evaluated is denoted by i. fi is the gray scale of central-pixel named i.

Threshold lies between 0.6rms and 0.9 rmsvalues.fi^N is the aggregation of pixel grey-scale in its 5/8 neighbor .Condition A is that fi – fi^N median > Threshold.

If condition A is met by all 4 central pixels then move from temp to permanent register

and don't go for condition B. If all doesn't meet A then simply move without checking B and moving from temp.

Condition B is to check the grey scale aggregation of those that met condition A(fi1) and those that didn't(fi2) fi1max - fi1min <0.3TH &fi1min - fi2max > 0.6^{Th}

If B is met move temp to permanent else it is and edge of object so clear temp.

Repeat steps till entire image is completed. Finally replace permanent register values of central pixel with the median of 5/8 Neighbor. Repeat the procedure with conditions

A->fi^N median - fi >ThresholdB->fi1max - fi1min <0.3TH & fi2min – fi1max > 0.6TH

V.NCF IN COLOR IMAGES

Basic algorithm effect could be extended to the case of color images.Same effect of filtering could be obtained as such.One plane effect is extended to three planes-R,G and B.The algorithm works in specified steps so that it takes a 4 x 4 matrix and calculates for each 2x2 pixel.

The pixel evaluated is denoted by i. fi is the gray scale of central-pixel named i.

Threshold lies between 0.6rms and 0.9 rmsvalues.fi^N is the aggregation of pixel grey-scale in its 5/8 neighbor .Condition A is that fi – fi^N mean> Threshold.

If condition A is met by all 4 central pixels then move from temp to permanent register and don't go for condition B. If all doesn't meet A then simply move without checking B and moving from temp.

Condition B is to check the grey scale aggregation of those that met condition A(fi1) and those that didn't(fi2) fi1max - fi1min <0.3TH &fi1min - fi2max > 0.6^{Th}

If B is met move temp to permanent else it is and edge of object so clear temp.

Repeat steps till entire image is completed. Finally replace permanent register values of central pixel with the median of 5/8 Neighbor. Repeat the procedure with conditions

A->fi^N median - fi >ThresholdB->fi1max - fi1min <0.3TH & fi2min – fi1max > 0.6TH

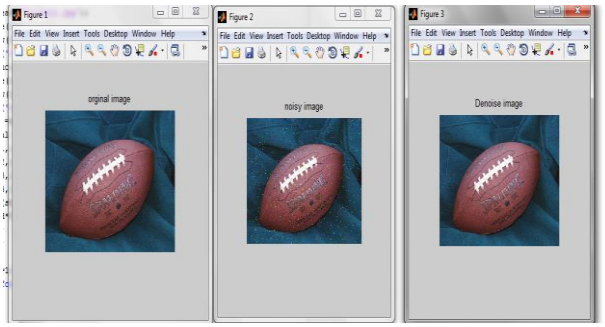


Fig4: The result of NCF method in color images is shown in the figure.

VI ENHANCED NCF IN COLOR IMAGES

In enhanced method Median value comparison is added in the condition checking.

Median value calculation gives the central value as compared to the average value obtained from the mean value.It will give more clear result as the noise density gets higher.that is

Condition A is that fi – fi^N median > Threshold. Instead of that fi – fi^N mean> Threshold.

So here the central value is obtained.The more psnr value is obtained.so the noise level is low in Enhanced NCF.so comparing the median with the mean it gives more precise value nd the removal of noise wil be done more accurately as compared to the mean value comparison.

TABLE OF COMPARISON

Image	Noise density	Ncf	Encf
football	0.05	28.412	30.255
	0.1	22.9808	25.92
	0.15	18.99	22.94

VIIEXPERIMENTAL RESULTS –ANALYSIS

Experimental results show that enhanced NCF algorithm also has high ability in restraining salt and pepper noise in color images.As compared to the NCF ,ENCF results with higher psnrvalue.Aspsnr is bigger,it is considered noise level is lower

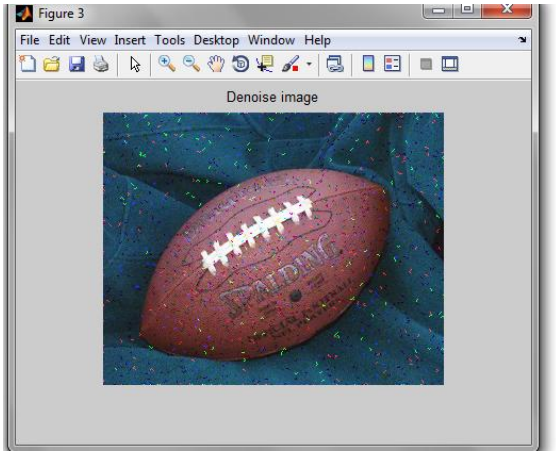


Fig5.noisy image

ENHANCED NCF

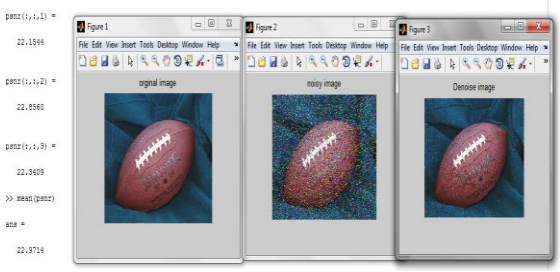


Fig6.Enhanced NCF

GRAPH OF COMPARISON

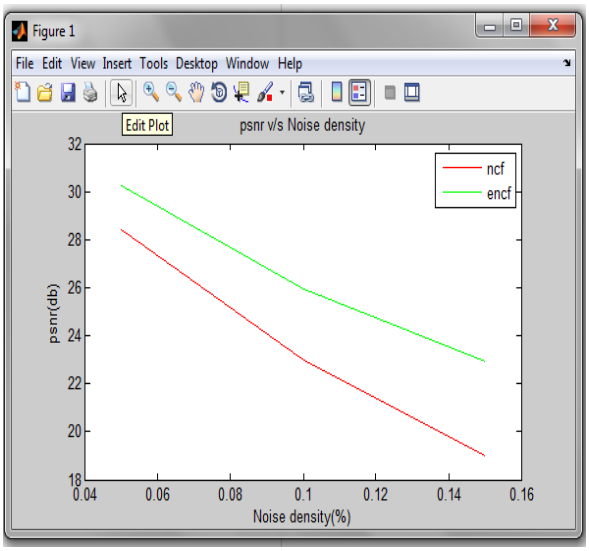


Fig7.comparison of NCF and Enhanced NCF

VIII CONCLUSION

The enhancedneighborhood correlation filtering algorithm proposed in this paper has high ability in restraining lower medium density salt & pepper noise while preserving details for common grayscale images. Its performance excels traditional NCF and median filtering and some isolated noise spot filtering algorithms. So by converting gray scale to color image same efficiency could be achieved. Owing

to its simple process, high processing speed, and wide applicability for several kinds of noise, the algorithm can be used as an image pre-processing method.

ACKNOWLEDGEMENT

I would like to express my gratitude to all who give me support for the completeness of this paper

REFERENCES

[1] KrisanaChinasam,YuttapongRangsanseri and PunyaThitimajshima," Removal of salt and pepper noise in text/graphics" IEEE ComputerSociety Press, 1998.

[2] Hasan S. M. Al-Khaffaf1, Abdullah Z. Talib, Rosalina Abdul Salam
School of Computer Sciences, UniversitiSains Malaysia, 11800 USM Penang, Malaysia
*hasan, azht, rosalina@cs.usm.my"*Removing Salt-and-Pepper Noise from Binary Images of EngineeringDrawings"IEEE 2008

[3] NUCHAREE PREMCHAISWADI, SUKANYA YIMNGAM, WICHIAN PREMCHAISWADI
Faculty of Information Technology, Dhurakijpundit University
110/1-4 Prachachuen Road Laski, Bangkok 10210, ThailandKasetsart University, Bangkok, Thailand Graduate School of Information Technology, Siam University-" A Scheme for Salt and Pepper Noise Reduction on Gray level and Color Images" Proceedings of the 9th WSEAS International Conference on signal processing,computational geometry and artificial vision issn: 1790-2008

[4] K. S. Srinivasan and D. Ebenezer "A new fast and efficient decision-based algorithm for removal of high-density impulse noises" IEEE SIGNAL PROCESSING LETTERS, VOL. 14, NO. 3, MARCH 2007

[5] V.R.Vijaykumar, P.T.Vanathi, P.Kanagasabapathy and D.Ebenezer"Robust statistics based algorithm to remove salt and pepper noise in images" International Journal of Information and Communication Engineering 5:3 2009

[6] Qing Xu, Rui Zhang, MateuSbert"A new approach to salt and pepper noise removal of color images" 2009 Fifth International Joint Conference on INC, IMS and IDC

[7] Venkatasubramanian Adhinarayanan*1*, S.P.Sheebha*2*, L. Sriraman*3*, T. N. Prabakar*4*, G. Seetharaman*5*,*Research Scholar1,, Sathyabama University, Chennai, Department of Electronics &CommunicationEngineering,Oxford Engineering College, Trichy, Tamilnadu"*Modified algorithm for the removal of salt and pepper noise in color images" 2012 Third International Conference on Intelligent Systems Modelling and Simulation.

[8] K.RatnaBabu, 2L.Arun Rahul, 3P.Vineet Souri, 4A.Suneetha ,Sir C R Reddy College of Engineering, Eluru, W.G, AP, India"Image denoising in the presense of high level salt and pepper noise using modified median filter"IJCST Vol. 2, SP 1, December 2011

MRS.RevathyRoy completed her Mtech from Fisat,Angamaly.Currently she is working as assistant professor in College of Engineering punnapra,,alapuzha.This work is a part of her research program.