A measured Analysis of Biomedical Images for various noises

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ABSTRACT

In today's world, the noise reduction in images is still a serious concern for image researchers. When the image processing starts the first thing which is essential in it is the application of noise reduction algorithm on image that ids under process. A plenty of methods are there for noise reduction along with its own ideas merits and demerits. They all provide very good results but still there are some inaccuracy in these all results. The paper imitate the refining of Biomedical images from various noises. This paper consist of parametric results of test inputs for various noises.

Key words: Filtering, Predefined filter, Poisson noise, Noise.

INTRODUCTION

In today's digital imaging system the highly demanded approach is noise reduction. There are variety of noises such as localvar, poisson, speckle noise, Gaussian noise and impulse noise, which acts a s obstacle at the time of acquisition, transmission and processing of images. For image restoration many state of the art filters consist of two main processes, classification (detection) and reconstruction (filtering). Image processing is the technique which includes Classification, feature extraction and pattern recognition. There are many techniques which are used in digital image processing that are Pixelization, Linear filtering, Hidden markov model, wavelets and self organizing maps etc

REFINEMENT OF IMAGE

For the smooth visualization of an image the main process is image filtering. For this purpose two strategies are used i.e., linear filtering and non linear filtering. The filters used for this purpose are classified into two categories, linear filters and non linear filters. Output of linear filter is the linear function of an input. Whereas the output of non linear filters are always non linear [1 2].

The various filters used for filtering [5,6]:

- **Unsharp Filter:** this filter crisping the edges of an images. With the help of this filter the details of images becomes more clear.
- **Average Filter:** The role of this filter is to diminish the intensity variations of pixels.
- **Wiener Filter:** In this filter the comparison of noiseless signal with noisy signal strategy is followed. The resultant error signal helps to make the image results more fine.
- **Median Filter:** Its function is almost equal to mean filter. But its performance is superior than average (mean) filter. This filter comes under the category of edge preserving filters.

RESEARCH MEHODOLOGY

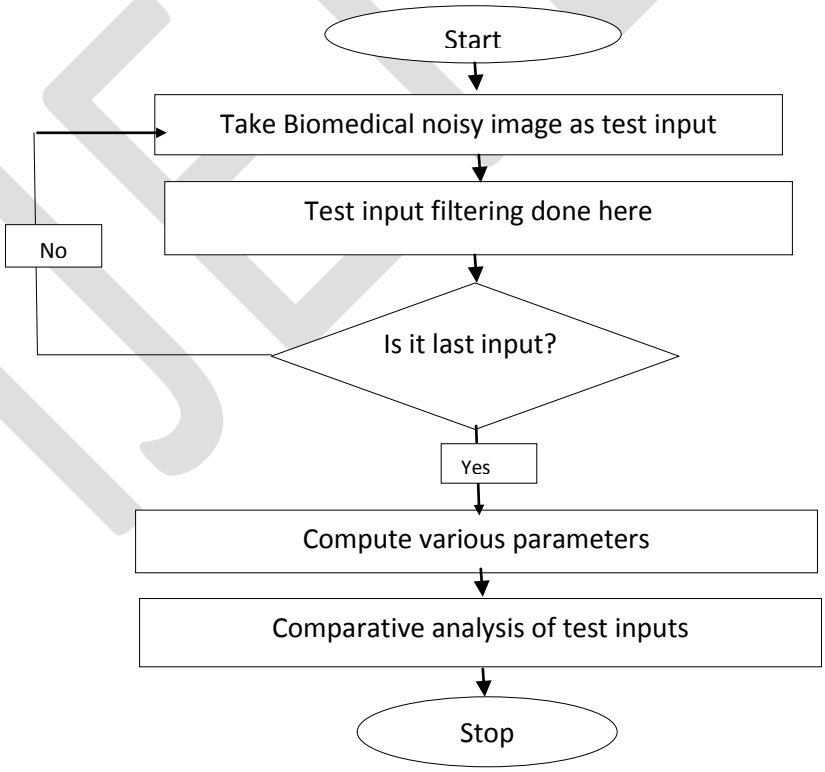
Methodology of Proposed filter

Step1: Give test inputs one by one

Step2: impurity addition in test inputs

Step3: Process Test input

Step4: Filter test input and then calculate various indices.



RESULTS AND DISCUSSION

This work depicts the parameter comparison of test inputs for various noises filtering.

Conditional Analysis

The different test inputs are considered in this work. The result of work done is shown below.

Test inputs

The noisy test inputs which have been taken as input in this work are shown below:

(a) **(b)** **(c)**

Figure 2: Test noisy Inputs

Test input filtering

Above three test inputs are used for as inputs to predefined and proposed filters for filtering purpose. The results after filtering are shown below:

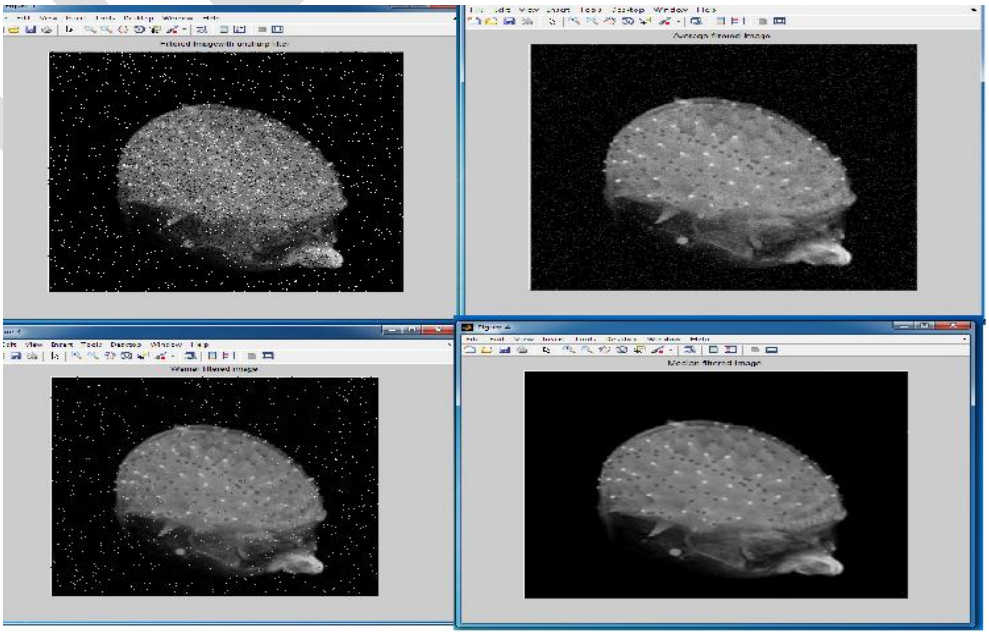


Figure 3: First test input filtering results

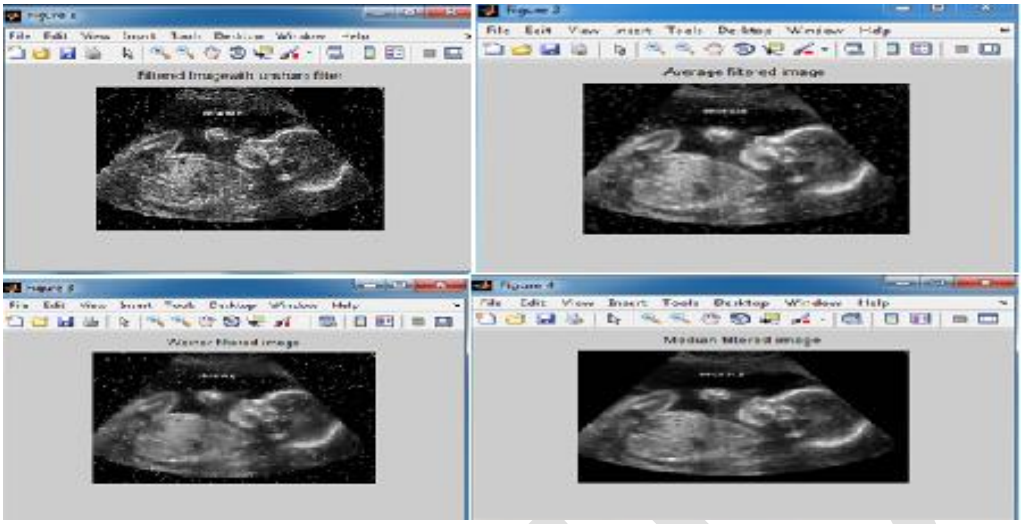


Figure 4: Second test input filtering results

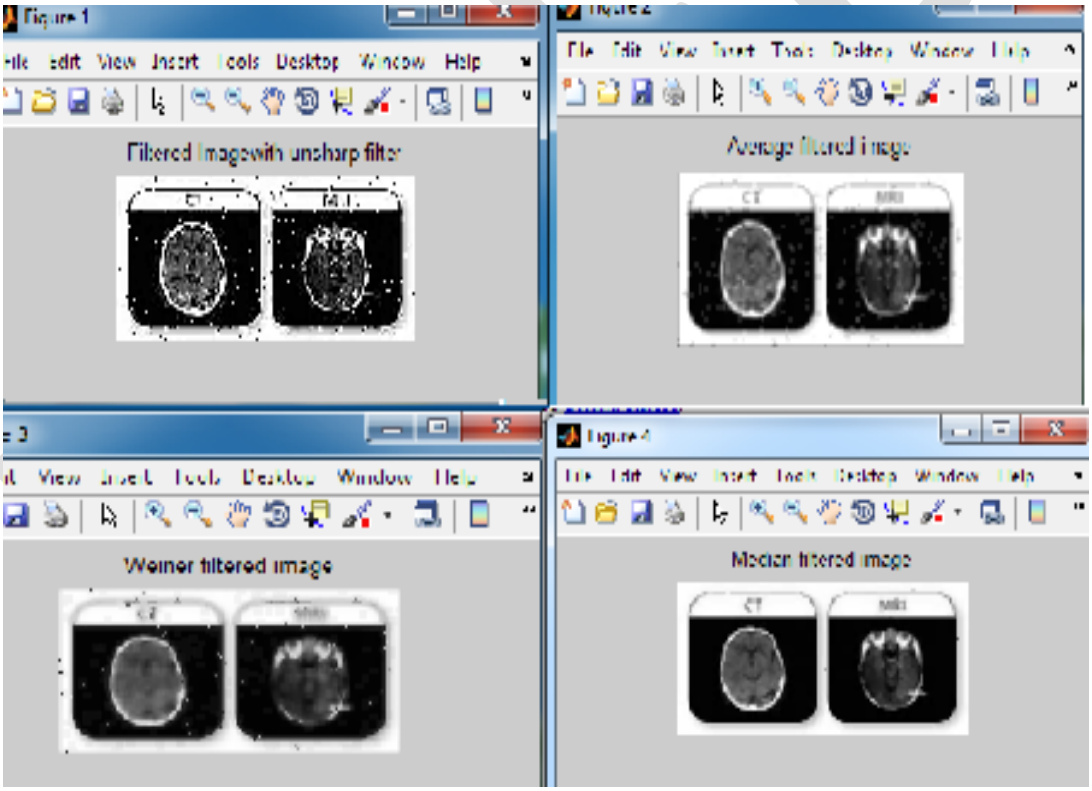


Figure 5: Third test input filtering results

From above results we can visualize that after filtering the test inputs become more fine and clear.

The following pictorial results is the representation of proposed filter results for test inputs. These results are more clear as compared to predefined filters.

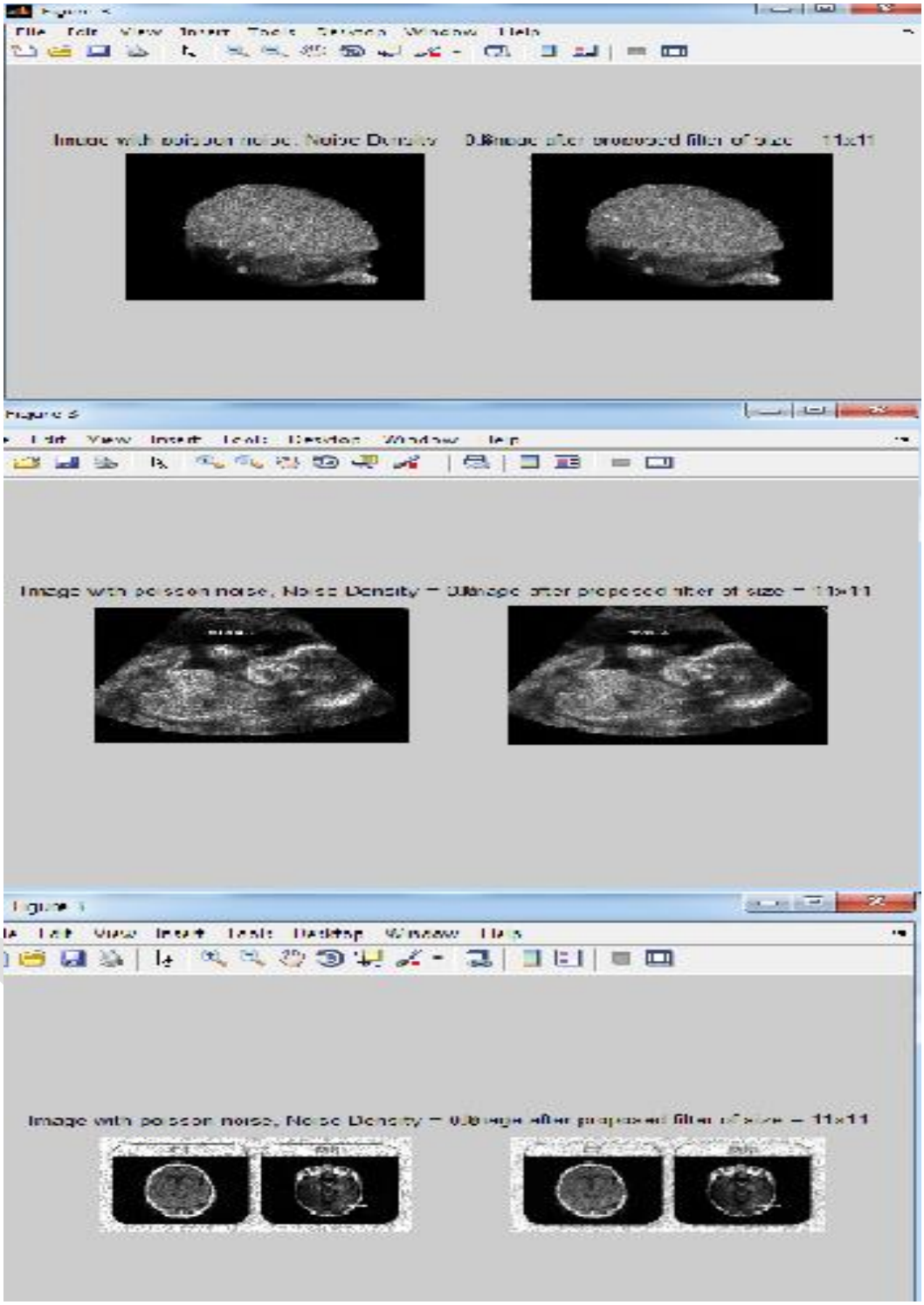


Figure 6: Proposed filter results for test inputs

Parametric performance Comparison of test inputs

Table 1: Image parameter results for noisy test inputs

	For test input image 1				For test input image 2				For test input image 3			
Filter type	MSE	PSNR	SNR	SSIM	MSE	PSNR	SNR	SSIM	MSE	PSNR	SNR	SSIM
Wiener filtered	157.52	38.23	15.07	0.98	247.24	36.27	13.61	0.78	794.26	31.21	14.95	0.62
Unsharp Filter	266.99	35.94	12.79	0.84	797.94	31.19	8.49	0.79	690.35	31.81	15.56	0.88
Median filtered	834.48	30.99	7.83	0.48	833.77	30.99	8.31	0.49	1.0219e+003	30.11	13.84	0.65
Average filter	5.0289e+003	23.19	0.03	0.12	5.6542e+003	22.68	0.03	0.12	2.4580e+004	16.30	0.035	0.067

Table 1 results depicted that Weiner generates outstanding results for all the three inputs. It means out of all predefined filters, wiener performance is superior.

Table 2: Image parameter results of proposed Filter

	Impulse noise filtering				Gaussian noise filtering				Poisson noise filtering			
Test Inputs	MSE	SNR	PSNR	SSIM	MSE	SNR	PSNR	SSIM	MSE	SNR	PSNR	SSIM
Test input1	0.0187	67.45	65.41	0.9996	0.0418	64.1997	61.9235	0.9989	0.0012	77.6008	77.4290	0.9997
Test input 2	0.0199	55.1143	65.1386	0.0095	0.0209	55.7945	64.9331	0.9996	0.0021	63.9139	74.9090	0.9993
Test input3	0.0175	59.0689	65.6951	0.0096	0.0219	58.3984	64.7232	0.9995	0.0049	64.3804	71.2261	0.0098

Above parametric comparison shows that the proposed filter generates better results for all image parameters as compared to predefined filters.

CONCLUSION

The abridge description of above work is that out of all predefined filters, Weiner have the better performance and an average filter yields very poor performance results. But our proposed filter is best for all kind of noises reduction.

FUTURE SCOPE

Many algorithmic models, strategies has been developed for image noise reduction. But still they all are having some demerits and not be able to get exact structural results. For this purpose the best way is to use Teacher learning based algorithm. This will help to choose the adequate values of all parameters for image.

REFRENCES

[1] K. Sethi and B. Chatterjee, "Machine recognition of constrained hand printed Devanagari", *Pattern Recognition,* Vol. 9, pp. 69-75(1977).

[2] G. L. Cash and M. Hatamian, "Optical Character Recognition by the method of moments", Computer Vision, Graphics, and Image Processing, 39, 1987, pp. 291-310.

[3] Usha Rani, Er. Balwinder Singh, Er. Ravinder Singh, "Machine Printed Punjabi Character Recognition Using Morphological Operators on Binary Images", International Journal of Engineering Research & Technology, Patiala , Vol. 1 Issue 3, May 2012.

[4] Kanika Bansal and Rajiv Kumar, "K-Algorithm: A modified Technique for Noise Removal In Handwritten Documents" 2013

[5] B. Al-Badr and S.A. Mahmoud, "Survey and bibliography of Arabic optical text Recognition", *Signal Processing,* Vol. 41, pp. 49-77(1995).

[6] Y. S. Huang and C.Y. Suen, "A method of combining multiple experts for the recognition of unconstrained handwritten numerals", IEEE Trans. Pattern Analysis Mach. Intelligence, Vol 17, No.1, 1995, pp. 90-93.