www.ijprems.com
editor@ijprems.com

INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)

Vol. 02, Issue 05, May 2022, pp : 370-372

e-ISSN : 2583-1062

Impact Factor : 2.205

TWO LEVEL NOISE FILTERING APPROACH FOR IMAGE SMOOTHENING IN DIGITAL IMAGE PROCESSING

Reethika .B[*1], Shruthi .G[*2]

[*1,2]Student, M.sc Computer Science, Fatima College (Autonomous) MK University, Madurai, Tamil Nadu, India.

ABSTRACT

The process of extracting useful information from the digitally acquired images through a digital computer is known as Digital Image Processing (DIP). Those processing need some algorithms to acquire information in it. Researchers faced a lot of uncertainties during information extraction from an image. Those uncertainties are collectively called as noise which leads to high complexity during information extraction. In this work, we perform noise filtering in which the clutters, blurriness, in the image are removed using adaptive median filter and spatial smoothing filters. These filters enhance the image quality by smoothing the image. The results show that the proposed work outperforms better than the existing works.

Keywords: Digital Image Processing, Noise Filtering, Image Smoothening and Filters.

1. INTRODUCTION

The application of image processing had been started in early 19th century. The first image processing application was used in the newspaper industry in which the images are transmitted through Underground water cables. Later, the image transmission was developed to digital images leads to growth of digital image processing. However lot of issues faced in real time as the digitally images may filled with noise. The noises degrade the image quality thereby reducing the extraction accuracy.

To overcome the issues due to noises, lot of techniques were introduced such as filtering techniques. However, the existing filtering techniques are lacks with less accuracy as they consider only static filter which are not much suitable for real time noise filtering.

2. METHODOLOGY

This section deals with the proposed methodology. The aim of the proposed method is to smoothened the digital using two filters which improves the image quality thereby improving image information extraction quality. The explanation of the proposed methodology is provided below,

2.1 Adaptive Median Filter

Based on the image statistical characteristics, these filters adaptively explore the each image region which results in effective noise removal. The steps involved in adaptive Median Filtering technique are,

1. Initially, the median values of every pixel in the images are calculated
2. Set the threshold point for the pixels based on thresholding techniques.
3. Based on the calculated median pixel values and pre-determined threshold point, comparison on each pixel is done.
4. From the comparison result, find the pixel region with below or above threshold.
5. Finally, refine the affected pixel region.

2.2 Sharpening Spatial Smoothing Filters

This filter is also known as the derivative filter. The main motive of this derivative filter is to highlights the image edge with removes the image blurring effects thereby improving the image quality. Those filter is work based on first and second order derivative,

(i) First order derivative:

$$f' = f(x+1) - f(x)$$

(ii) Second order derivative:

$$f'' = f(x+1) + f(x-1) - 2f(x)$$

www.ijprems.com
editor@ijprems.com

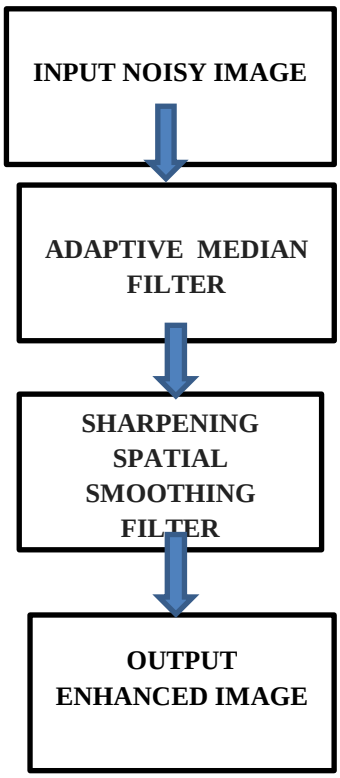
INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)

Vol. 02, Issue 05, May 2022, pp : 370-372

e-ISSN : 2583-1062

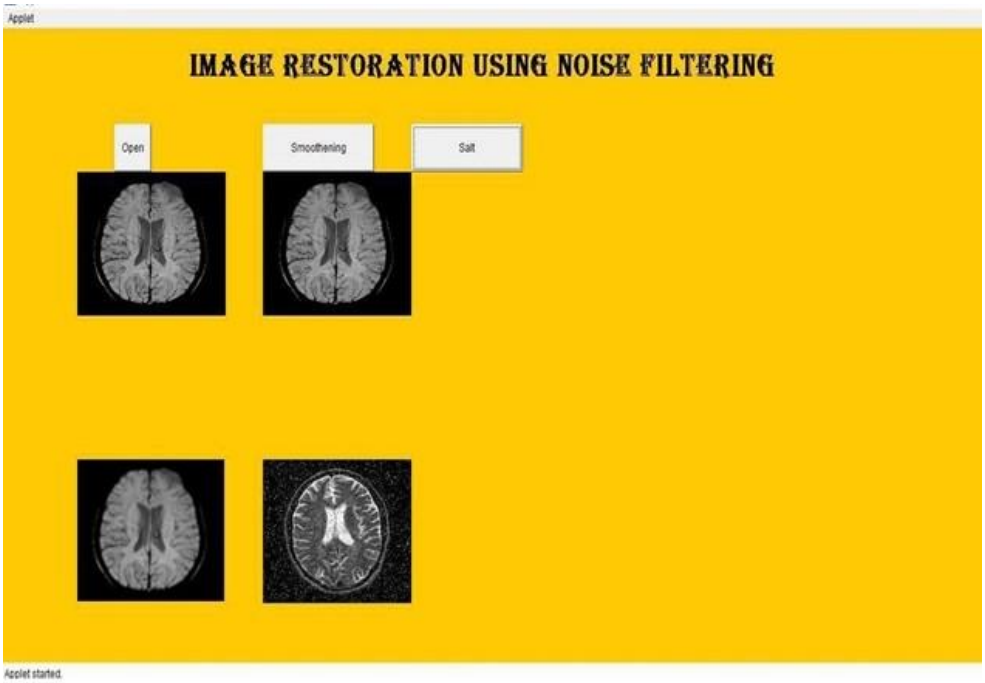
Impact Factor : 2.205

3. MODELING AND ANALYSIS



From the above figure, initially the images with noise are provided to adaptive median filter. The filter can effectively explore all the pixels and remove salt and pepper noises. Then the image is fed to sharpening smoothing spatial filter where two sub levels are employed which are called first and second derivative. Both derivate are used to remove the image blurriness and performs image Smoothening.

4. RESULT



5. CONCLUSION

The existing issues in the digital image processing in terms of image complexity and less accuracy is removed in this work. The two level noise filtering is done in which adaptive Median filter and sharpening Spatial Smoothening filter

is employed which reduces the image clutters, blurriness etc...and improves the image quality. The experimental results shows that the proposed results acquire highly effective in noise filtering.

6. REFERENCE

[1] Gonzalez, "Digital Image Processing", PEARSON, 2005.

[2] H. M. Lin and A. N. Wilson, "Median filters with adaptive length", IEEE Trans. Circuits Syst., vol. 35, no. 6, June 1988.

[3] Luo, Wenbin. "Efficient removal of impulse noise from digital images." IEEE Transactions on Consumer Electronics 52.2 (2006): 523-527.

[4] Hwang, Humor, and Richard A. Haddad. "Adaptive median filters: new algorithms and results." IEEE Transactions on Image Processing 4.4 (1995): 499-502.

[5] R. C. Gonzalez and R. E. Woods, "Digital Image Processing", Pearson Prentice Hall Publication, (2008).

[6] R. Kimmel A. Spira and N. Sochen, "A short time beltrami kernel for smoothing images and manifolds," IEEE Trans. Image Processing, vol. 16, no. 6, pp. 1628–1636, 2007.

[7] Singh, L. Shyam Sundar, et al. "A Review on Image Enhancement Methods on Different Domains."