International Journal of Innovative Studies in Sciences and Engineering Technology (IJISSET)

ISSN 2455-4863 (Online) www.ijisset.org *Volume: 3 Issue: 4 | April 2017*

Image De-Noising Using Various Filters

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Abstract: *Image processing is basically a use of computer algorithm to perform image processing on digital images. Image de-noising is nothi*ng but removal of noise from noisy image. *Image de-noising can be considered as a component of processing or as a process itself. Image de-noising has remained a fundamental problem in the field of image processing. Image de-noising is an important pre-processing task before further processing of image like segmentation, feature extraction, texture etc. The purpose of de-noising is to remove the unwanted noise present in the image while retaining the edges and other detailed features as much as possible. Image filtering is applied in numerous applications. Although most images after processing are subject to visualization and analysis by humans. Image processing allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the build up of noise and signal distortion during processing of images .Wavelet transforms have become a very powerful tool for de-noising an image. One of the most popular methods is wiener filter. In this work two types of noise guassian noise, salt and paper noise is used an image denoising performed for different noise by mean filter, median filter, adaptive median filter, gaussain filter and wavelet filter. MSE and PSNR metrics that do not adequately characterize image visual quality are still basically used in filter design and performance comparisons. Noise is one of main obstacles degrading quality of original image of different nature: optic, infrared radar, ultrasound once .*

Keywords: *Image de-noising, noises, Matlab, Filters, MSE, PSNR, Comparisons*

1. IMAGE NOISES

Image noise is a random variation of brightness or colour information in images produced by sensor and circuitary of a scanner or digital camera. Image noise can also originate in film grain and in unavoidable shot noise of an ideal photon detector.Image noise is generally regarded as an undesirable by-product of image capture. Although these unwanted fluctuations became known an ''noise" by analogy with unwanted sound they are inaudiable and such as dithering.The types of noises are salt-and-pepper noise and Gaussian noise.

1.1 Salt and pepper noise.

An image containing salt and pepper noise will have dark pixels in bright pixels and bright pixels in dark regions. This type of noise can be caused be dead pixels, analog-to-digital converter errors, bit errors in transmission etc. This can be elimated in large part be part dark frame substraction and by interpolating around dark/bright pixels.

2. FILTERS

Filter play a major role in the image restoration process. The basic concept behind image restoration is digital convolution using linear filtters and moving window principle.

2.1

MEAN FILTER- We can use linear filtering to remove certain type of noises . such as averaging or Gaussian filter,are appropriate for this purpose .

2.2

MEDIAN FILTER- The median filter is anonlinear digital filtering technique , often used to remove noise . such noise reduction is atypical pre processing step to improve results of later processing.

2.3

WIENER FILTER-

The main aim of wiener filter is to filter out the image that has been corrupted by noise.Wiener filter is based on astatidtical approach. Desired frequency response can be aqquired using this filter .

2.4

ADAPTIVE MEDIAN FILTER-

The Adaptive median filter performs spatial processing determine which pixels in an image has been affected by impulse noise . the adaptive median filter classifies pixels as noise by compairing each pixel in the image to its surrounding neighbor pixels

2.5

GAUSSIAN FILTER-

Gaussian filter is used to blurr images and remove noise and details . the Gaussian filtering scheme is based on the peak detection . The peak detection is based on the fact that peaks are to be impulses . The key point is that this filter corrects not only the spectral coefficient of interest but also the amplitude spectrum coefficients within the filter window.

2.6

WAVELET FILTER-

In digital image processing , wavelet transform is very important tool for analyzing the image characteristics. For better analyzing purpose we transform the image from other domain to wavelet domain. Wavelet allows filters to be constructed for stationary as well as non stationary signals So wavelet transform is being prefferd comparing to other transform.

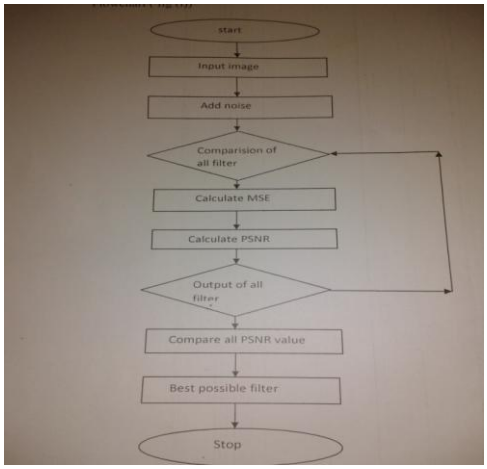

Fig 1: *Flow chart*

In this project we are going to add a noise(salt and pepper) to a plane image. And this image is allow to pass through the different filters. The output of this filter is used to find the MSE(Mean Square Error) value. PSNR(Peak Signal To Noise Ratio) value is calculated from the MSE value.The maximum PSNR value is considered as the best filter among the six filters.

RESULTS

Fig 2: *Fruit*

TABLE:

Filters	MSE	PSNR
Mean	0.139248	8.5621225
Median	0.000047	43.298912
Adaptive median	24167.613076	4.298466
Gaussian	0.002838	25.469923
Wiener	0.138925	8.572210
Wavelet	74.3314	29.42

3. CONCLUSIONS

We used fruit image in “tif” format adding noise(salt and pepper noise) in original image. De-noised all noisy images by all the filters and conclude from the results that:

The performance of median filter after de-noising for all salt and pepper noise is better than mean and wiener filter.

ACKNOWLEDGEMENT

Thanks to our teacher, friends and many more for their support to carry out this research. Thanks. for always supporting us during the work.

REFERENCES

[1] Gabriela Ghimpe, Teanu, Thomas Batard, Marcelo Bertalmio, and Stacey Levine “A Decomposition Framework for Image De-noising Algorithms,” *IEEE Transactions on Image Processing, VOL. 25, NO. 1, January 2.*

[2] Keyur Patel and Hardik N. Mewada “A Review on Different Image De-noising Methods”

International Journal on Recent and Innovation Trends in computing and communication. *ISSN: 2321-8169 VOL: 2 ISSUE: 1 150-159.*

[3] Nikolay Ponomarenko(*), Vladimir Lukin(*), Karen E giazarian(**) *"HVS- METRIC BASED PERFORMANCE ANALYSIS OF IMAGE DE-NOISING ALGORITHMS"*

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