Advanced Technology for remove salt and pepper Noise from Images

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Abstract

During the transmission some unwanted signals are added so that image pixels are distorted these distorted pixel values are known as noisy pixels there are many noise are present in the atmosphere like salt and pepper noise, impulse noise, Gaussian Noise etc. These Noisy pixels are remove noise in different type of algorithm like median filter, adaptive median filter, weighted median filter for remove the pepper and salt noise .These filters are using for recover pixels without destroy the image quality. Non linear digital filter is a best solution for remove the salt and pepper noise from the image. The use of median filter is that for remove noisy signal and unwanted signal without damaging any corner of the image .Median filter is working for low densities because at higher the image will be blurred and damage. Corrupted filters will be accepted and Median filter are suitable for low noise margin but it's not suitable for higher Noise Margin. Median filter is using for conditioner scheme for alert the intensity removal the noisy signal from image then the result between the corrupted and uncorrupted pixels will be prior for applying nonlinear filtering at highly desirables in image. The process of adaptive median filter is to identify the noisy pixels replace by using the median filters where remaining should be unchanged. In adaptive median filter using only for removal of pixels at low level. Adaptive median filter is providing the large window size at high level noise it is not to fit the pixels . you can also say decision based and switching system . A (WMF)weighted median filter is best for high noise level.

Introduction

The adaptive median will be work at rectangular region S_{xy} . Size of SXY during the filtering changes of the adaptive median filter during the filtering operation .Single value of output for th filter replaced the current pixel values a (x,y)th point at which Sxy is centerd .

The following notation is adapted from the book and is reintroduced here:

Zmax = Maximum gray level value in Sxy

Smax = Maximum allowed size of Sxy

Zmin = Minimum gray level value in Sxy.

Zxy = gray level at coordinates (x, y)

Zmed = Median of gray levels in Sxy

The adaptive median filter works with two level Label A and Label B as follow :-

Level B: B1 = Zxy – Zmin

Level A: A1= Zmed - Zmin

A2= Zmed - Zmax

If A1 > 0 AND A2 < 0, Go to level B

Else increase the window size

If window size <= Smax repeat level A

Else output Zxy.

B2 = Zxy – Zmin

If B1 > 0 And B2 < 0 output Zxy

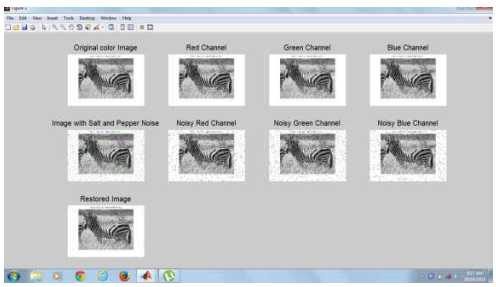
Else output Zmed.

The algorithm has three main purposes:

(a) For remove 'Salt and Pepper' noise.

(b) For smoothen any non impulsive noise.

(c) For reduce excessive distortions which have too much thinning or thickening of object boundaries.



Standard median Filter algorithm

The idea for Media filter will be work for signal entry to entry . In this we will replace the entry to the median of entries of neighboring .Pattern for neighbors is called as the window which will be slide entry per entry over the complete signal. For 1D signal first few preceding and following entries most obvious window while in 2D signals such as images for more complex window patterns are possible .but if the widow have odd number entry then the median is very simple to define . It will be just the middle value after all entries in the window store numerically.

For an even number of entries more then one possible median . We are using the size of window three with one entry immediately preceding and following each entry , a median filter can be applied at given simple id

x = [2 80 6 3]

then the median filtered output signal y will be:

y[4] = Median[3 3 6] = Median[6 3 3] = 3

y[3] = Median[3 6 80] = Median[80 6 3] = 6

y[2] = Median[2 6 80] = Median[2 80 6] = 6

y[1] = 2 = Median[2 2 80]

i.e. y = [2 6 6 3].

The Latest version of the algorithm is working in MATLAB for C code generation. The algorithm take input image, ‘salt.jpg’, as input, operates on the data in double precision, and returns the remove from noised image, ‘A’, as output.

Weighted Median Filter Algorithm

The algorithm is as per below:

1. Create an 5*5 window

2. Take four direction (diagonal right ,vertical, horizontal, diagonal left) from the center pixel (which have 5 pixels in each direction)

3. Firstly Calculate the weighted difference between them then take the minimum value

4. Now The Minimum value will be compared to a threshold value:

if value > threshold:

it is noise pixel image

else: it is not noise pixel image

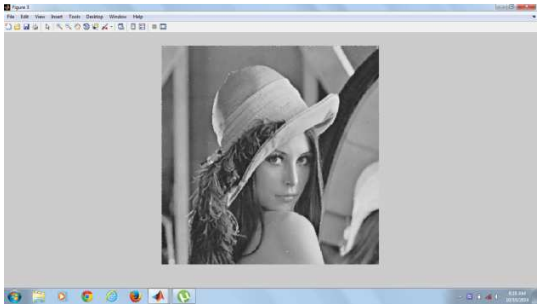
5. Calculate standard deviation of the five pixels in each and every direction

6. We are Giving extra weight to the direction at which the standard deviation is smallest, the weighted median is computed.

7. The noisy pixel will replaced with this median value.

8. Move window throughout the image.

9. Iterate steps 8 to 10 times.



Results

We are removing pepper and salt noise by weighted median filter. We are improving the results from the previous work . In previous paper we found the value of PSNR for weighted median filter is 43.3618 and MSE for weighted median filter is 3.01575. Our PSNR value for weighted median filter is 62.2044 and MSE value is 0.0391.

Conclusion

In this proposed method Weighted median filter are used for removing gray and color image noise. So that it give best PSNR comparison to SMF,AMF and other noise removal algorithm. We can also say these filter as capability to remove salt and pepper noise in image and preserve for the shape .For the detection of noise the process between corrupted pixels and the uncorrupted pixels prior to applying the non linear filter is highly desirable to protect the signal .

The Working of weighted median filter algorithm has been tested at low , medium and high noise densities on both gray scale of images . but when we work at weighted median filter it gives netter results at high noise density based level . The weighted median filter algorithem is useful for impulse noise removal in images at high noise densities .

In this Project, we have present a new efficient threshold switching filter , decision based filter for restore the image . The mechanism will help us to find accurately that where is paper and salt noise is remaining. The noise corrupted pixels replaced with central noise free mean value .

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