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Different Approaches for the Removal of Different Valued Salt and Pepper Noise in Images using Spartan 3

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Abstract*:* To remove high density salt and pepper noise from images an efficient algorithm is proposed. Images are corrupted by salt and pepper noise when they are transmitted over channels because of faulty communication. Impulse noise is nothing but the Salt and Pepper noise. The main objective is to recovered the fully noise free images by removing the impulse noise with minimum signal distortion. There are number of existing noise removing techniques are available with which impulse noise can be removed from images. We are going to work on the images corrupted by salt-and-pepper noise. To remove noise Field Programmable Gate Array is used. The noisy pixels which are present in corrupted images can take only the maximum or minimum values i.e. Minimum is 0 and Maximum is 255 for 8-bit gray scale images.

Keywords: Noise, Filtering techniques, FPGA.

I. INTRODUCTION

To carry out the impulse noise suppression different image denoising techniques are proposed. The standard median filter or its modifications are implemented for denoising process, it may result into blurriness of image because both noisy and noise free pixels are changed. To avoid blurriness of images after changing the values of noisy and noise free pixels different steps has been proposed. Generally there are two steps to perform median filtering: 1) detection of impulse and 2) Filtering of noise. It identifies the pixels which are noisy by using an impulse detector, and after that those pixels are filtered rather than all the remaining pixels of an image to prevent the damage of the pixels which are not noisy. Generally, to remove noise from images different denoising techniques are used which are classified into two categories as: lower-complexity techniques and higher-complexity techniques. The local window with fixed-size is used and also a buffers of line are required. its computational complexity is low and which can be compared with conventional median filter or its modification. The pleasing images are retrieved with adaptively by enlarging size of local window or by performing iterations. This paper, mainly focuses onto the lower-complexity of noise removing techniques due to simplicity and also its implementation is easy with the VLSI circuit.

II. PROPOSED SCHEME

"Decision-based" filter is Adaptive Median Filtering which first identifies the all possible pixels which are noisy and after identification it replaces them with median filter or its variant pixel value by keeping all other pixels unchanged. A high noise level is also get detected by this filter therefore its good filter. Salt and pepper causes noise in images therefore images are get corrupted by impulse noise in the transmission of images. This paper presents an efficient implementation of VLSI to remove salt and pepper i.e. impulse noise. To remove salt and pepper noise without damaging edges Median filters are used. To remove impulse noise as well as preserve the edges Median filters are used for their capability. The new algorithm has lower computation time when compared to other standard algorithms. A result of the algorithm is compared with various existing algorithms. In this paper, an efficient VLSI implementation for removing impulse noise is presented

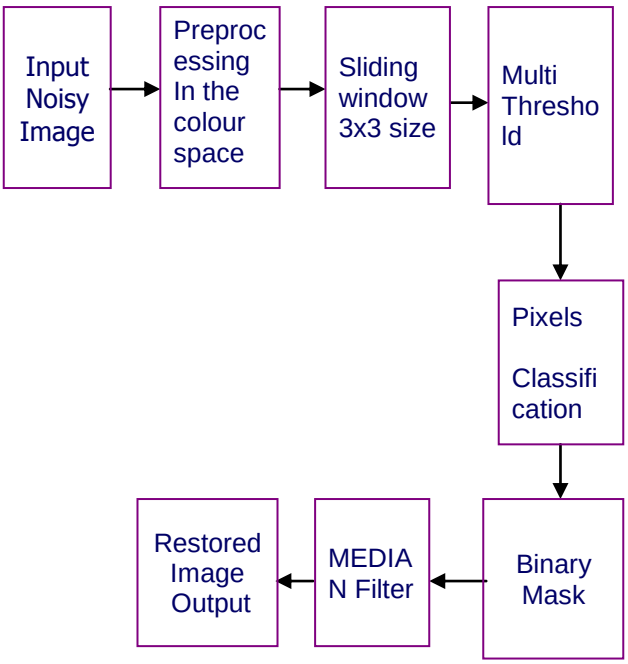

Fig 1. Block diagram of system

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In this project we going to use input image has noisy image which is affected by salt and pepper noise. Those input pixels are under gone into pre-processing in which we going to convert the image RGB bands in to gray image and then we are creating a text file which is containing pixel values of the noisy image. Now, we are considering 3*3 mask in which the center pixel value is going to observe and compare using some threshold value. Depending upon the threshold value we are classifying the image pixels. Then by using median filter that of size 3*3 mask is going to apply on the image. The pixels which are affected by noise are replaced by the median value of the neighbor pixel values. This process is applied for all the noisy affected pixels to eliminate the noise. The noise free image we can get at the output end.

Algorithm

1)Read an image.
2) Resize image
3) Convert to gray scale
4) Copy this image into new one.
5) Filter the border of image
6) Take pixel as center pixel and form 3x3 window
7) Load all values of 3x3 window into array except center pixel
8) Sort in ascending manner all array
9) If pixel value is 0 or 255 then only perform
10) Calculate median by adding n/2 value and its next value if even value n
11) Calculate median by adding n/2 value if odd value
12) Replace median value with center pixel value .
13) Display new pixel valued image

2.1 Existing Method

To remove impulse noise without damaging the edges Median filters are used for their capability. Median filters are used to remove impulse noise as well as preserve the edges. The main drawback of a standard median filter (SMF) is that it is effective only for low noise densities. SMFs many times leads to blurriness of images for large sizes of window when the images are corrupted with high noise density. An effort has been made to device an algorithm for highly corrupted images. Modified Weighted Based(MWB) filter is proposed, and it is based on the differences of the current pixel weightage and the pixels which are aligned in four other directions [1]. A modified decision based algorithm is proposed for the reconstruction of corrupted images which are highly corrupted by impulse noise and this algorithm is based on unsymmetrical trimmed median filter [2].For removing Impulse noise from corrupted images filtering technique is used which is known as Arithmetic Mean Filtering. And some modification is done to this technique by adding two additional features [3].

III. APPLICATIONS

Removal of Impulse noise, mostly use to digital filters, in the area of digital file transfer Enhancement of bright or dark features in an image. Restoring original image during transmission of image through internet. Printing application Medical imaging scanning techniques. Image segmentation .Face recognition

IV. RESULTS

The testing of proposed algorithm is done with 512X512, 8- bits/pixel. For different noise densities present in corrupted images the performance of the developed algorithm is tested and result is compared with other filters like adaptive median filter (AMF) ,decision based algorithm (DBA) and standard median filter (SMF). Every time of testing the image is corrupted with different levels of impulse noise density and then sorting operation is done once 3 x 3 pixels are selected for finding median of window. Sorting operation on 3x3 pixels is performed with different sorting techniques such as quick sort, merge sort, binary sort, bubble sort etc. Shear sorting method is used in the proposed algorithm which is based on parallel architecture. Next work is going on.

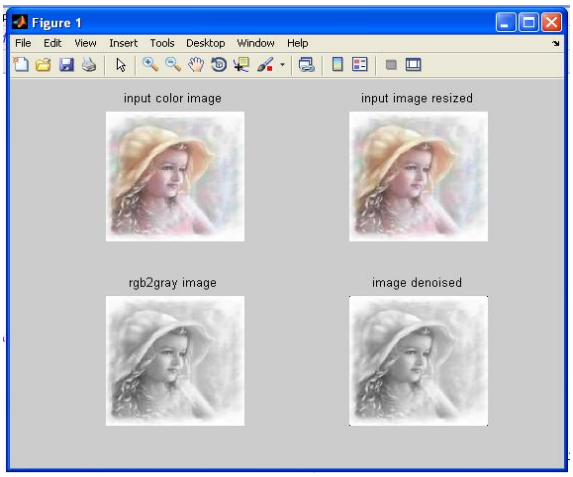

Fig 2.Denoising of Images.

FPGAs are programmable digital logic chips. What that means is that you can program them to do almost any digital function. Xilinx software is used for impulse c coding in which header file is created from matlab software and passed to impulse c coding to remove noise in Xilinx. Output we are going to observe on VB GUI and on Hyper terminal we are going to check Mean square error and psnr values with different sorting algorithms.

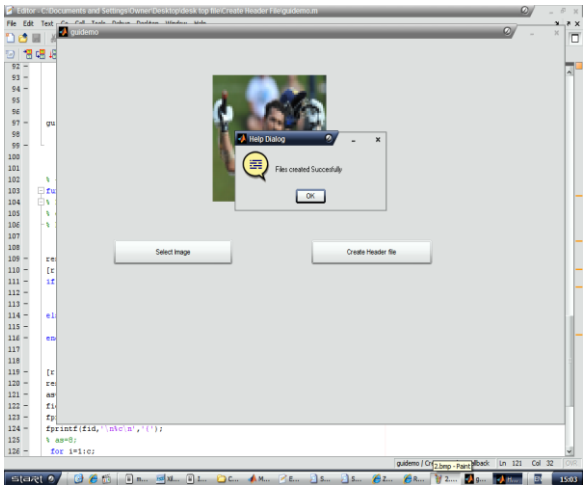

Fig 3.Header file creation.

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V. CONCLUSION

In this paper we proposed FPGA implementation for removal of impulse noise from an image. The FPGA implementation of De-noising technique and Edge Preserved De-noising with median filtering and then sorting technique gives better performance in terms quantitative evaluation and visual quality. Compared to other techniques percentage of impulse noise with lowest hardware cost and lowest complexity will reduced.

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