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DESIGN OF MEDIAN FILTER FOR NOISE REMOVAL

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Abstract: Images are often corrupted by impulse noise in the procedures of image acquisition and transmission. within the process of capturing a picture or transmitting an already captured image, an impulse noise is often added thereto while transmitting. so as to get rid of the noise within the image, filters may be used and here we are visiting use median filter, which could be a non-linear filter which pre-processes the image in step by step for each pixel, and therefore the error within the output images is minimized. during this project, take the clear image with none impulse noise, so add salt and pepper noise to the clear image. Now we get the noisy image so as to get rid of the noise in image we are using the median filter. After the image with noise is generated it's then converted into matrix form with pixel data in rows and columns. Then the info is processed through MATLAB software with various function for the median filter want to remove the induced noise (added salt and pepper noise) and also the original image is restored with none noise within the image. the method of adding a salt and pepper noise is completed due to which we all know the standard and determination of the image before adding noise and after adding noise.

Keywords– Pre-processing, Image processing, Noise filter, Noisy image, MATLAB, Median filter

I. INTRODUCTION

To preserve edges while removing noise introducing a median filter in digital image processing and also having application in signal processing. Median filters are usually used for noise removal and it as a kind of non-linear filter Even though there are many non-linear filters to remove m in the image, only a median filter plays an important role reducing noise effective Because it pre-processes every pixel step by step without affecting the neighbourhood trees and preserves the edges from the edge detection. It gives the accurate result while compare to other nonlinear filters. Here we are adding a noise externally i.e., impulse noise Impulse noise

The filtered image is obtained by placing the median of the values within the input window, at true of the centre of that window, at the output image. The median is that the max um likelihood es of the case within the case of Laplacian noise distribution. For relatively uniform areas, the median filter estimates the Gray-level value, with particular success within the presence of long-tailed noise. As a footing is crossed, one side or the choice dominates the window, and output switches sharply between the values. Thus, the sting isn't blurred. The disadvantage of such filter is that within the presence of small signal-to-noise ratios they have an inclination to interrupt up image edges and produce false noise edges, which they cannot suppress the medium-tailed (Gaussian)noise distributions.

II. LITERATURE SURVEY

Chungcheongnam has proposed a completely unique improved median filter algorithm for the pictures highly corrupted with salt-and-pepper noise. Firstly, all the pixels are separated into signal pixels and noisy pixels by using the Max Min noise detector. The noisy pixels are then classified into three classes, which are moderate-density, high-density, and low-density noises, supported the local statistic information.

Abhishek Tripathi has introduced the bilateral filter to get rid of the fog. during this paper, a completely unique and efficient fog removal algorithm is proposed. Fog is created thanks to attenuation and air light. Attenuation reduces the contrast and air light increases the whiteness within the scene.

III. EXISTING METHOD

- Today's world is globe of internet during which information is critical to be exchanged across this globe, within fraction of second. This information could also be composed of text videos, or images while transmissions over the communication media are get corrupted thanks to addition of noise
- In colour cameras where more amplification is employed within the blue colour channel than within the green or red channel
- A Gaussian noise Additive noise and salt and pepper noise is one amongst the foremost common problems in image processing · Even a high-resolution photo is absolute to have some noise in it. For a high-resolution photo a straightforward box blur is also sufficient, because even a little feature like eyelashes on cloth texture are going to be represented by an outsized group of pixels.

IV. PROPOSED SYSTEM

Median filter and modifications of it belong to wide class of filters based on classification of chosen samples collection.
3-step error filtering process includes:
1. Collection of N values measured variable.
2. Truncation of maximal and minimal values, i.e., anomalous error filtering.
3. Calculation of arithmetic average of rest N-2 values, i.e., filtering of errors.
Median filter is often used in case of rare impulse errors suppression superposed on useful signal. The filter is very often used in applications of video correction.

A. Salt Pepper Noise

Salt-and-Pepper noise is a form of noise sometimes seen on images. It is also known as impulse noise. This noise can be caused by sharp and sudden disturbances in the image signal. It presents itself as sparsely occurring white and black pixels. Salt-and-pepper noise affects the images and reduce the quality as increases the noise on black and white pixel.

B. Merits:

- Images are pre-processed that improves the quality
- This type of non-linear filter provides a high quality of required image.

V. ALGORITHM

- **Step 1:** Initial step of the program is to declare the parameter with the variable.
- **Step 2**: The parameter to be taken as image, generally image in the sense it composed of finite number of elements each of which elements have a particular value at a particular location. The elements are referred to as picture elements, image elements and pixels.
- **Step 3:** Then with the required command initialize the image or any format for the filter process. Where the image should be clear (e.g., forest, moon, flower, etc.,) here the clear image in the sense without affected by any noise.
- **Step 4:** After introducing the clear image, now for the process is required to add salt and pepper noise with some pixel values. Salt and pepper noise is a form of noise, sometimes seen on images. The noise can be caused by sharp and sudden disturbance in the image signal.
- **Step 5:** Initialize the salt and pepper noise. Where salt noise indicates the white pixel and pepper noise indicates the black pixel. The salt noise denotes the minimum value and pepper noise denotes the maximum value.
- **Step 6:** Pixel defined as the small elements, in which small area forms an image. Where pixel contain red, green, blue color. And it ranges from 0-255. The minimum value range as 0 and maximum value range as 255.
- **Step 7:** After inducing the salt and pepper noise, the pixel value gets reduced or increased and then image get affected. The pixel value arranged in matrix form which is rows and columns. E.g.: assume pixel value as 150 and it get reduced as 130 or it may be increased to 180 by inducing noise.
- **Step 8:** Calculate the average value per pixel from the given pixel from the initial stage. Now introduce the filtering technique, which is minimum, maximum, median filter. For this concept, median filter is used to remove noise.
- **Step 9:** While using the minimum filter it selects the lowest pixel value from the ordered matrix and it removes salt type noise.

- **Step 10:** While using the maximum filter it selects the highest pixel value from the matrix and it removes pepper type noise.
- **Step 11**: While using the median filter, it removes the highest and lowest value which is salt and pepper noise.
- **Step 12**: For this process median filter is used to remove the corrupted noise from the image, and it minimize the error step by step. Where the median filter also known as non-linear filter. Here the non-linear filter also functions as same as median filter, which is used to reduce noise.
- **Step 13:** By using the median filter, the corrupted pixel value reaches the original pixel value or nearby given value (eg:130 in case of reduced value or 180 in case of increased value reaches as 148 – 150 in case of reduced and 150 – 152 in case of increased value). Where the noise gets decreased or filtered and get output as clear image.

VI. EXPERIMENTAL RESULTS

If we can add salt and pepper noise to the image. This type of noise consists of random pixels being set to black or white (the extremes of the data range). Notice that median filter does a better job of removing noise, with less blurring of edged of the coins.

Fig. 1 Image without noise

Then salt and pepper noise is added to the clear image with a noise value of 0.05

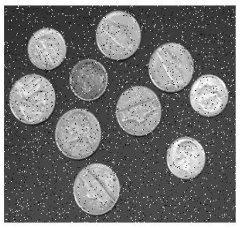

Fig. 2 Image with salt and pepper noise

Then we are finding the average value for the image

Then all the float digits in the average values are converted in to near round integer values

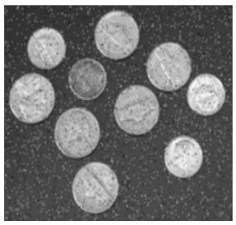

Fig. 3 Image with Noise after average

Then the median filter is applied to the image with salt and pepper noise and the image is displayed

Fig. 4 Image processed by Median Filter

If the image output has any additional noise to be removed then, it is removed by re-processing the same.

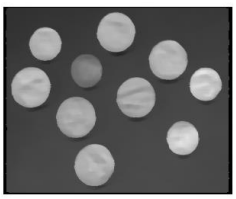

Fig. 5 Image re-processed for errors

VII. CONCLUSION

Digital images are often corrupted by Impulse noise thanks to errors generated in noisy sensor, errors that occur within the process of converting signals from analogy-to-digital and also errors that are generated within the communication channels. so as to get rid of impulse noise, enhance the affected image quality, we've studied the median filter and have developed a way supported an improved median filtering algorithm. The proposed method could be a spatial domain approach and uses the choice of an efficient median per window. Our effective median filter has been applied to photographs corrupted by impulse noise and comparatively small number of distortions (like Gaussian noise and tiny blurring components) in experimental simulations.

VIII. FUTURE ENHANCEMENT

- Rejects the impulses at various level
- Edges are preserved
- Pixels can be improved
- At every preprocessing stage, the quality can be adjusted with variations of noise removal

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