

Implementation of Hybrid Median Filter Using Neural Network and Fuzzy Logic

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Abstract—

An images corrupted by impulse noise are often originated in routine practice. This problem accrue in digital images because of channel decode damages, signals dyeing down during transmission, when transmit in a communication channel, video sensor's noises and other partitions. Before the invention of computers and software such as Photoshop, mostly photo restoration was done by restoration experts such as museum art restorers. These were applied directly to the damaged photo and consisted mainly of air brushing over the damage. A new hybrid filter which is combination of median filter and decision or hybrid filter is proposed for reducing the unwanted noises and provide best quality image. Proposed filter provide best result as compare to other filter.

Keywords— Image Restoring, CLAHE Filter, Hybrid Filter, Gaussian noise and Impulse noise, Median Filter.

I. INTRODUCTION

IMAGE RESTORATION-Image restoration is an important issue in high level image processing which deals with recovering of an original and sharp image using a degradation and restoration model. This is used to estimate the original image from the degraded data. Sometimes referred to as image deblurring or image deconvolution is concerned with the reconstruction or estimation of the uncorrupted image from a blurred and noisy image.

NOISE-Image noise is random (not present in the object imaged) variation of brightness or color information in image. An aspect of electronic noise can be produced by the sensor and circuitry of a scanner. Film grain also sprouted by image noise. Image noise is an undesirable by-product of image capture that adds spurious and extraneous information. "Noise" means that "unwanted signal"; unwanted electrical fluctuations in signal received by AM radios caused audible acoustic noise ("static"). By analogy unwanted electrical fluctuations themselves came to be known as "noise". Image noise is, of course, inaudible.

IMAGE FILTERING TECHNIQUE

- **Median Filtering**- Median filtering play a pivotal role in image restoration and widely used techniques of filtering and best known for its excellent noise reduction ability from the images.
- **Adaptive Filtering**-An adaptive filter that uses the gray and color space for removal impulsive noise in images. All processing is based on the gray and color space. That can provide noise suppression results very best and better preserve thin lines, edges and image details and provide better quality of image as compared to other filters.
- **Linear Filtering**-linear filter we can easily remove the noise from the image with the help in filter function. This filter can be implemented on salt and pepper and Gaussian noise.
- **Weiner Filtering**-Both the degradation function and statistical characteristics of noise into the restoration process incorporates by wiener filter.
- **Histogram Equalization**-Contract intensities that are not well distributed during histogram representation when image produced by this.
- **Contrast Limited-Adaptive Histogram Equalization (CLAHE)**-CLAHE is work on small regions in the image that is called tiles rather than the entire image. Each tile's contrast enhanced so that output image region approximately matches the histogram specified by distributed parameter.
- **Decision Based Filter**-Decision Based Filter addresses the limitations of median filter in which only median values are used for the replacement of the corrupted pixels. Image first detected by it. The corrupted image pixels and uncorrupted image pixels are detected by checking the pixel element value against the maximum and minimum values in the window selected.

II. RELATED WORK

The various approaches and filtering technique used to restore an image are described below:

A. Hybrid Restoration Approach of Defocused Image Using MGAM and Inverse Filtering

A novel hybrid restoration scheme of defocused image uses multivariate generalized additive model (MGAM) which is a nonparametric statistical regression model with no curse of dimensionality and inverse filtering (InvF). Five features of

wavelet domain in defocused digital image, which show a very stable relationship with the point spread function parameter which are extracted by training and fitting a multivariate generalized additive model that is to estimate defocused blurred parameter used by author in algorithm. Parameter is obtained after the spread function, inverse filtering, which is needed to know the point spread function and a non-blind restoration method for completion the restoration for getting defocused image. TO evaluate performances of the presented method simulated and real blurred images are experimentally illustrated. Obtain results show that the proposed defocused image hybrid restoration technique is effective and robust.

B. Implementation and Analysis of Image Restoration Techniques *IMAGE restoration is an important issue in high-level*

During the data acquisition process images are often degraded, sampling, quantization effects, various sources of noise and blurring may involve in the time of degradation and information loss. The purpose of image restoration is to take original image from degraded data. Field of medical imaging, space or astronomical imaging, remote sensing, microscopy imaging field, photography deblurring, and forensic science area, etc are the various field where image restoration apply. The benefits of improving image quality provide the best cost and complexity where the restoration algorithms involved. Comparing various image restoration techniques like Wiener filter, Neural Network approach, on the basis of PSNR is the aim of this paper.

C. A Novel Method of Image Restoration by using Different Types of Filtering Techniques.

Image restoration is an important issue in high level image processing which deals with recovering of an original and sharp image using a degradation and restoration model. It occurs during image acquisition process. Image restoration is used to estimate the original image from the degraded data. To provide a concise overview of most useful restoration models is the aim of this paper .Various types of image restoration techniques like wiener filter, inverse filter, regularized filter, Richardson –Lucy algorithm, neural network approach ,wavelet based approach ,blind de convolution are described and strength and weakness of each approach are identified.

III. PROPOSED WORK

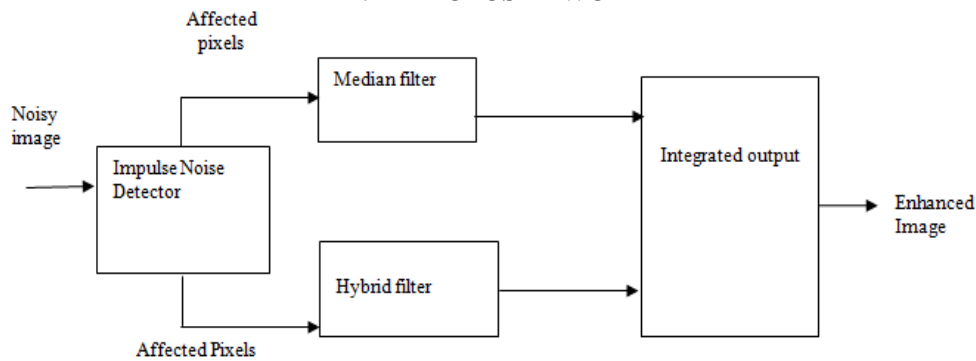


Fig 1.1-Block Diagram of Noise Filter.

Impulse noise detector- Impulse noise detector detect the impulse noises in an image. These can be come through atmospheric disturbance.

Median filter-Median filter is a simple rank selection filter that output the median of the pixels contained in its filtering window.

Hybrid Filter- Hybrid filter overcome the remaining limitation of median filter.

Integrated output- This show integration output of both filters and we got the PSNR value. Based on these result we got enhanced image.

IV. RESULTS

Median Filter



Fig-1.2-Input image

Fig-1.3-Apply median filter

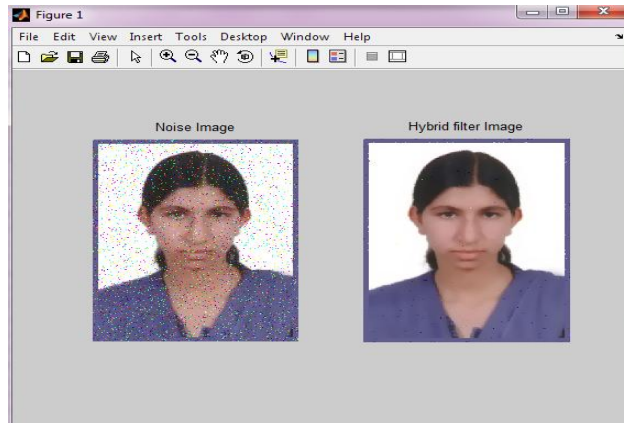


Fig-1.4- Applying hybrid filter

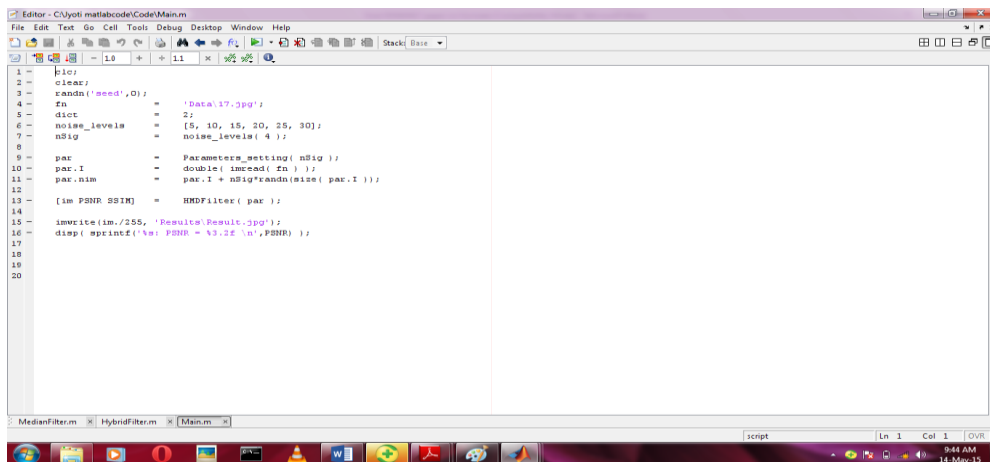


Fig-1.7-Coding of hybrid median filter

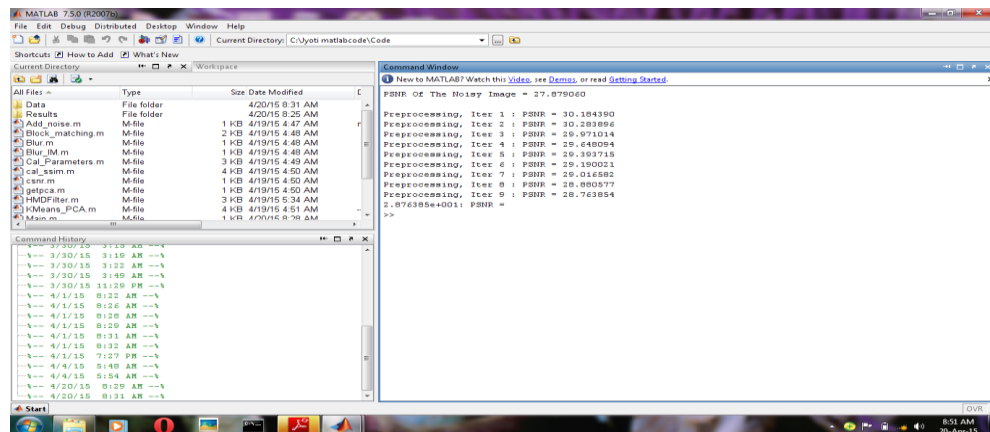


Fig-1.8-Result after applying proposed filter i.e hybrid median filter.

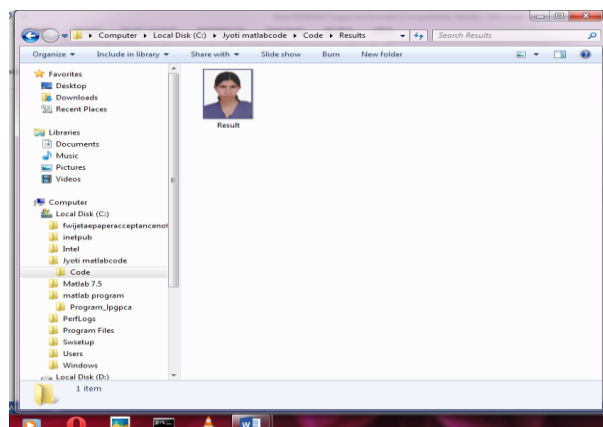


Fig-1.9-Enhanced result image applying HMF

RESULT ON THE BASIC OF PSNR VALUE.

FILTER NAME	PSNR VALUE	RESULT
MEDIAN FILTER	19.94	GOOD
HYBRID FILTER	20.07	BETTER
HYBRID MEDIAN FILTER	35.7872	BEST

VIII. CONCLUSION

A particular unwanted component like noise reduce or remove is the actually meaning of filtering, or to increase or fetch a particular set of function like edges. White Gaussian noise reduced by improved adaptive wiener filter, by ideal low pass filter noise suppressed and reduced, high-frequency information providing a smoothing effect to the image and image sharpening and extraction of high-frequency information such as edges provided by high pass filter. Good result on the basic of PSNR value provided by median filter, Hybrid filter removed all the limitation of median filter and it show better result as compare to median filter. But a proposed filter Hybrid Median filter overcome both limitation of noise and show best result.

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