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Image Blurring & Deblurring With Noise Removal

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Abstract —

The image is dark and noisy and when we zoom an image, zooming factor is increased and image become blurred image with less detail information. This article show how to produce high quality image from noisy and blur image which is simply not possible by denoising the noisy image, or deblurring the blurred image alone. It uses Mean filter, weighted average filter, Gaussian filter etc. One can add noise to the image and remove noise from the image for better view. Produce output image as a black and white image. Mainly it use in image manipulation. *Keywords-: Deblurring, Mean, Sobel, Prewitt*

INTRODUCTION

I.

Image blur is caused either by the camera motion or by the object motion. While taking picture (time of capturing), noise may occur as because of Focus blurring. Blurring due to camera motion when we zoom an image it produce blurred image with loss of information. Because in zooming, we add new pixels to an image that increase the overall number of pixels in an image, whereas in blurring, the number of pixels of a normal image and a blurred image remains the same. As well an image looks sharper and more detailed. Suppose an image of a particular face looks clear when we are able to identify eyes, ears, nose, lips, clearly. This is due to its edges. So in blurring, reduce the edge content and makes the transition from one color to the other very smooth.

II. RELATED RESEARCH

One direct and intuitive solution to deal with image noise is simply to denoise the input image before applying the motion deblurring process. Basic approaches for denoising, such as Gaussian and median filtering, have a tendency to over-smooth edges and remove image detail. Image deblurring and denoising have received a lot of attention in the computer graphics and vision communities. Many single image blind deconvolution methods have been recently proposed. Although they generally work well when the input image is noise-free, their performance degrades rapidly when the noise level increases.

III. PROPOSED WORK

Although there have been many image restoration techniques proposed, without knowing the blur filter. Here we demonstrate various blurring methods such as average, disk, motion, sobel, perwitt. User can add noise to the image. User can remove noise from the image for better view. additive model noise where noise By of H*I+noise. can be Salt and pepper noise, Randomly scattered black and white pixels which also called impulse noise, shot noise or binary noise. Motion filter approximates the linear motion of a camera. Disk Filter do circular averaging of image.

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(A) ORIGINAL



(B) BLURRED

FIGURE 1





FIGURE 2

(A) ORIGINAL



(C) DISK FILTER



(A) ORIGINAL



FIGURE 3: PREWITT OPERATOR

(B) VERTICAL EDGE



(C) HORIZONTAL EDGE

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FIGURE 4: SOBEL OPERATOR

(A) ORIGINAL

(B) VERTICAL EDGE

(C) HORIZONTAL EDGE

Using Prewitt and sobel operator detect horizontal and vertical edge of an image. Horizontal Edge would prominent horizontal edges in the image. As shown in figure 2 all the vertical edges are more visible than the original image using vertical mask. Similarly horizontal mask result all the horizontal edges are visible. So this way we can detect both horizontal and vertical edges from an image. As by comparing both mask sobel operator finds more edges or make edges more visible as compared to Prewitt Operator because in sobel operator has allotted more weight to the pixel intensities around the edges.

Prewitt			Sobel		
-1	0	1	-1	0	1
-1	0	1	-2	0	2
-1	0	1	-1	0	1

Prewitt			Sobel		
1	-1	-1	-1	-2	-1
0	0	0	0	0	0
1	1	1	1	2	1

 TABLE 1: VERTICAL MASK (PREWITT, SOBEL)

TABLE 2: HORIZONTAL MASK (PREWITT, SOBEL)

Mean filter which is box filter and average filter. In which the sum of all the elements should be 1, must be of odd ordered and all the elements should be same. By using mask of 3x3.

1/9 + 1/9 + 1/9 + 1/9 + 1/9 + 1/9 + 1/9 + 1/9 + 1/9 = 9/9 = 1

1/9	1/9	1/9
1/9	1/9	1/9
1/9	1/9	1/9

TABLE 2: MEAN FILTER MASK

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(D) 7X7 MASK

(E) 9X9 MASK

(C) 5X5 MASK (F) 11X11 MASK

FIGURE 5: MEAN FILTER

In weighted average filter, more weight is given to the center value. Due to that the contribution of center becomes more than the rest of the values. So it can control the blurring. Deblurring is an iterative process. As preprocessing step ringing can be avoided by edgetaper function. As well smoothing can be perform by deconvwnr, deconvreg, deconvlucy, deconvblind for smoothing an image.



(A) ORIGINAL

(B) DEBLURRED IMAGE

(C) DEBLURRED IMAGE

FIGURE 6: DEBLURRING

IV. CONCLUSION & FUTURE WORK

We have shown that most state-of-the-art image deblurring techniques are sensitive to image noise. In this paper, we presented a technique that utilizes motion deblurring and image denoising in a synergistic manner for deblurring images with high noise levels.

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