

Gray Image Denoising Using Geometrical Pixel location Encoding and Decoding with improved BM3D Technique

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Abstract— In this paper, a novel BM3D denoising algorithm is developed with geometrical pixel encoding Process.BM3D process implemented with high accuracy. Once the gray image filtered,First gray image is filtered with BM3D method, then image pixel locations are encoded with defined geometric positions, for this encoded technique again filtered with same denoise technique applied earlier. After completion of denoise process image decoded with original geometric locations. The proposed algorithm is tested with standard denoise techniques. The experimental results shows with respected KVSD,MSE factors

Keywords—Image Denoise, Geometric pixel location,Pixel encoder,decoder.

I. INTRODUCTION

Denoising an image is a fundamental task for correcting defects and its reproduction on a display.The problem of removing the noise of an image while preserving its main features (edges, textures, colors, contrast, etc.) has been extensively investigated over the last two decades and several types of approaches have been developed. there is still room for improvement in several directions. For instance, while these methods manage to correctly remove most of the noise, they tend to not properly recover some of the image details.Denoising methods are close to optimal when applied to natural images. applying this denoising method directly on the noisy image. A similar approach for image denoising is the one of Lysaker et al. [21] who first smooth the unit normal field to the image level-lines, then construct a denoised image whose By applying this denoising method directly on the noisy image still room for enhancement in several directions. For instance, while these methods manage to correctly remove most of the noise, then there will better experimental results shows with respected KVSD,MSE factors

II.PROPOSED METHODOLOGY

Many denoising techniques are in literature, the techniques improved in PSNR and SSIM values. For further improvement will possible only carrying filtering technique modification. The proposed methodology improves the noise reduction simply by encoding and decoding of denoised image. In the first step of proposed technique, we applied common denoising technique, then for the denoised image geometric located encode mechanism for each color channel is applied. For each color channel apply same denosing technique which is applied before encoding. After denoising process for each channel geometric decoder is applied to retrieve images with as original color. After that combine all channels to form original image.

III.Geometric Encode and decode method for gray images

Decompose the image into three color components R, G and B.First for each color channel pixel location in diagonal wise are rotated then even rows are moved between nearer columns and even columns are shifted between even columns in forward direction. Similarly, the decoder decodes the encoded image accordingly, Then, for each column encoded image and row encoded the filtered technique is applied. After denoise each block is combined original image size by decoding technique. The proposed denoise for gray scale is clearly explained in following algorithm.

III.1. Proposed Denoised Algorithm for gray images

Input: Image $I(x, y)$, Filter technique F .

Output: Denoise Image.

Initialization: m =number of rows of $I(x, y)$,

n = number of columns of $I(x,y)$. for $x=1$ to m do

For $y=1$ to n do

1. Apply filter F to original image $d(x, y) = F(I(x, y))$

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2. Apply encoder technique using eq.2, eq.3 , eq.4, eq.5
   obtain Dce(x, y) and Dco(x, y)
3. Apply filter F to both the encoded blocks and Dco(x,y)
   and combine If x=even and y=even Dr(x, y) = Dce(x, y)
   Else if x=odd and y=odd Dr(x, y) = Dco(x, y)
   End
4. Decode Dr(x, y) in diagonal rotation to obtain
   denoised image I(x, y)= Dr(y, x)
End for
End for
    
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IV . EXPERIMENTAL RESULTS

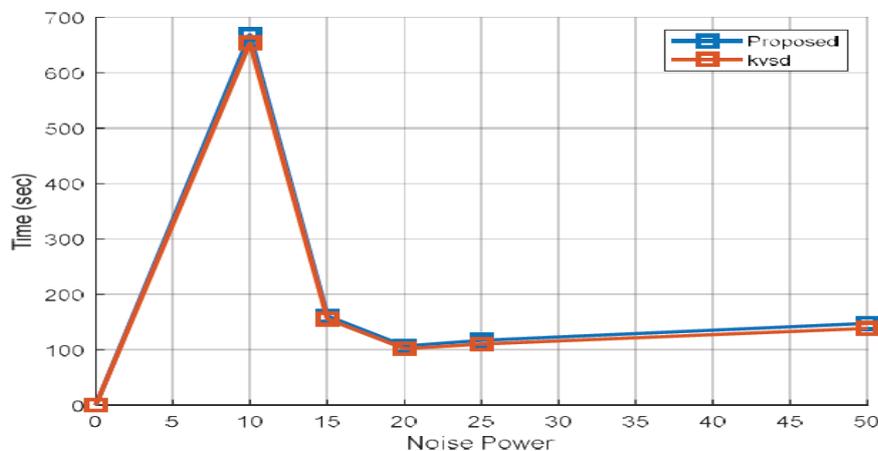


Figure.1.Performance evaluation in time of proposed technique KVSD

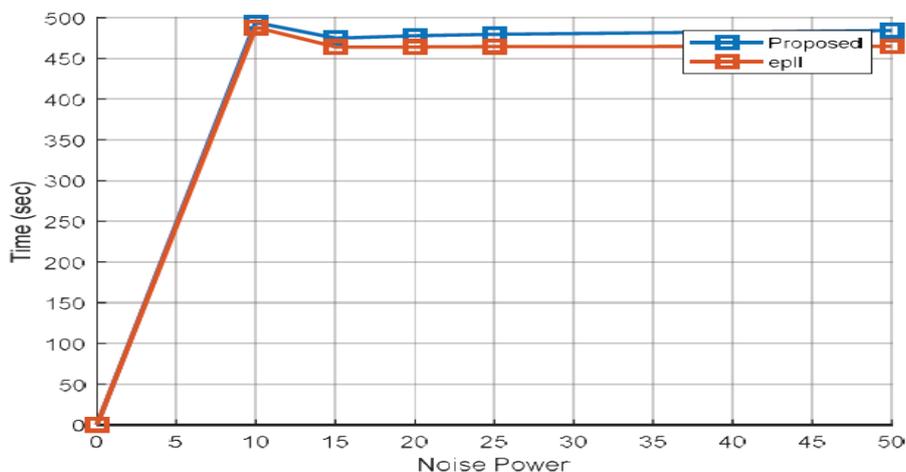


Figure.2.Performance evaluation in time of proposed technique EPLL

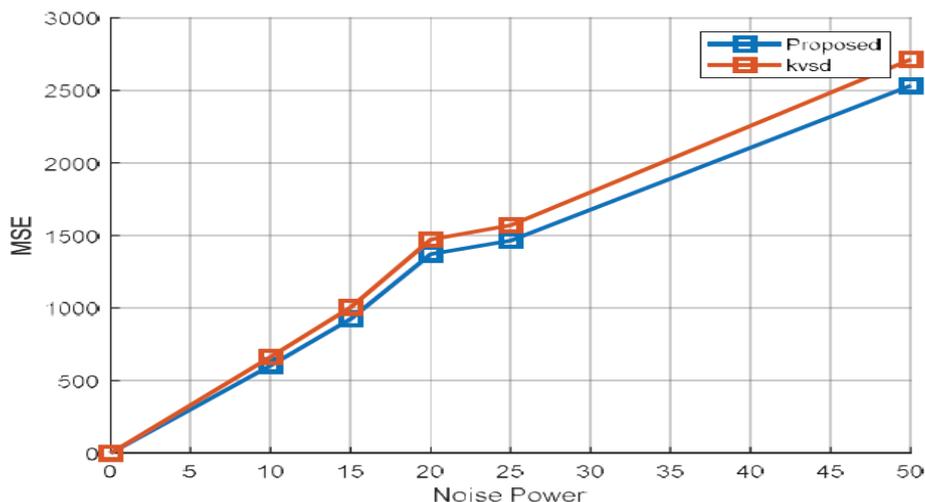


Figure.3. Performance evaluation in MSE of proposed technique for KVSD.

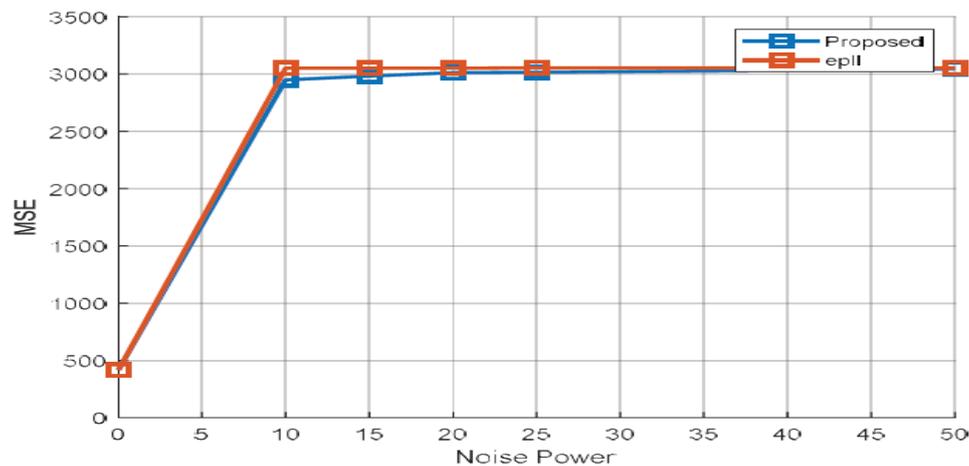


Figure.4.Performance evaluation in MSE of proposed technique for EPLL

V. CONCLUSION

This paper showed a novel image denoising procedure using BM3D filtering method with proposed encoder and decoder system. The proposed methodology improves the noise reduction. In the first step of proposed technique, we applied standard denoising technique, then for the denoised image geometric located encoding technique for each color channel is applied. Decompose the image into three color components R, G and B. For each color channel apply same denoising approach which is applied before encoding. After denoising process for each channel geometric decoder is applied to retrieve original color channels. After that combine all channels to form original image. The proposed technique gives better results appeared differently in relation to existing methodologies. The proposed algorithm is tested with standard denoise techniques. The experimental results shows with respected KVSD, MSE factors.

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