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Comparative Analysis of image Enhancement Techniques on Real Time images

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Abstract: Image enhance methods have to preserve the original reflectance values as possible as they can, where improving the edges and increasing the contrast.We proposed comparative analysis of image enhancement Techniques of DWT and robust guided filtering. To obtain the detailed approximation of the image both visual and quantitative comparisons show that the proposed method has a better preservation capability than the former methods as well as a better contrast improvement along with edge enhancement.

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I INTRODUCTION

There are several techniques which are used frequently for processing the image to improve the visual quality. Some the techniques are Histogram Equalization, Contrast stretching, Adaptive Histogram Equalization etc. The simplest method for enhancement is based on histogram equalization. This method has a good performance for object tracking but the enhanced images are poor in quality because of over saturation and under saturation. There are many histogram based enhancement methods to improve the visual quality of classical histogram equalization method, as bihistogram equalization (BHE),Recursive mean square equalization(RMSHE).In the above methods we started with the dividing histogram of input image into sub histograms and then applied histogram equalization to these sub histograms. It performs well and better than the classical histogram equalization the resulting images of BHE and RMSHE still suffer from oversaturation and under saturation.

In the discrete wavelet transform and singular value decomposition(DWT-SVD)n method first the approximation and wavelet subbands of the images are obtained by DWT.Then inverse SVD followed by inverse DWT is applied to obtain the enhanced image. In the regularized histogram equalization and discrete cosine transform (RHE-DCT) based enhancement method ,first regularized histograme equalization is applied to the image.

II PROPOSED METHOD

In the guided image filtering using non convex potentials have been used for smoothing. De-noising the filtering described have been adopted to multi scale decomposition to obtain the approximation and detail layers of the image. The resulting detail layers have been added to the input image after a weighting process to obtain the final enhanced image. In the guided filtering method uses both static and dynamic guidance for image smoothing.In the guided filtering method uses both static and dynamic guidance for image smoothing.

Static guidance that may be inconsistent with the input and lead to unsatisfactory results, or a dynamic guidance that is automatically updated but sensitive to noises and outliers.

Let f_i be the input image, g_i be the static guidance image and f_i the dynamic guidance (output) image at pixel location i.

Objective function given below should be minimized:

$$\epsilon(u) = \sum_i C_i(u_i - f_i)^2 + \lambda\Omega(u, g)$$

Here, λ is the regularization parameter

A regularizer is proposed :

$$\Omega(u, g) = \sum_{i,j\epsilon N} \emptyset\, \mu(i,j)\psi_v(u_i - u_j)$$

Where

$$\psi_v(x) = \frac{(1 - \phi_v(x))}{v}$$

and

$$\phi \in (x) = e^{-} \in x^2$$

Here, μ *and* v are controlling the smoothness width, while N is the set for 8-neighborhood.

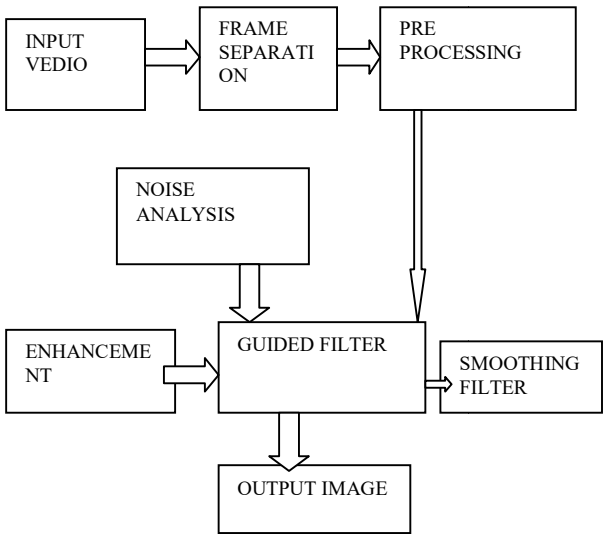


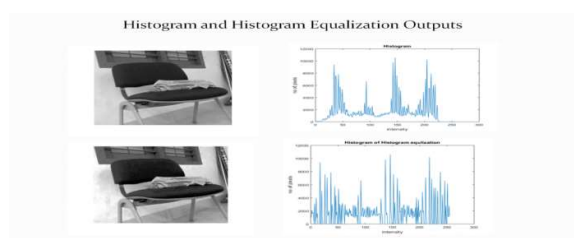
Figure1Block Diagram

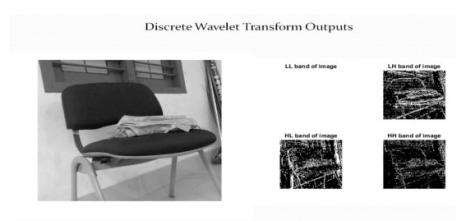
In order to combine the results obtained from the dynamic and static guidance a weighting factor has to be added. Directly optimising the added weights is hard.In order to perform the optimization, a convex upper bound is found iteratively to find a local minimum. Here, to converge to the local minimum majorize -minimization algorithm is used. After Every iteration step the dynamic guidance image is updated, until a fine convergence is achieved.Guided filter has good edge-preserving smoothing properties and does not suffer from the gradient reversal artifacts that are seen when using bilateral filter. It can perform better at the pixels near the edge when compared to bilateral filter.The guided filter is also a more generic concept beyond smoothing.

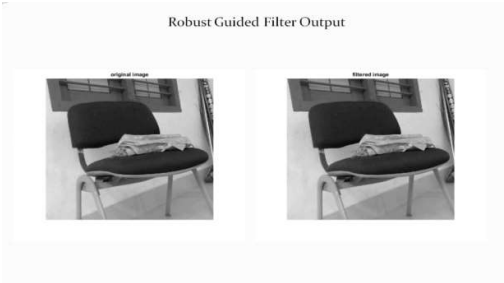
III RESULTS AND DISCUSSION

we use Logitech c920 webcam is a video camera that feeds or streams an image or video in real time to computer to computer network such as the internet. Various lenses are available, the most common in consumer-grade webcams being a plastic lens that can be manually moved in and out to focus the camera.

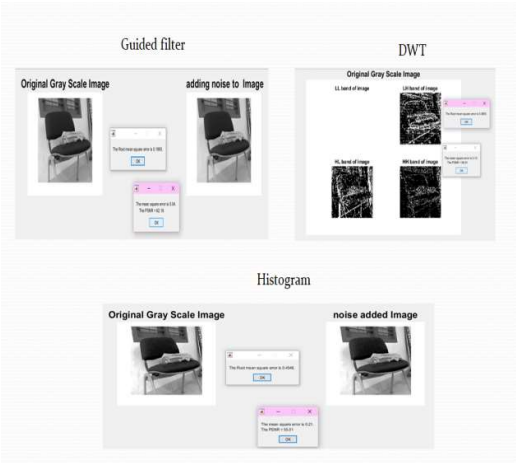
Figure 2 logitech C920







Quantities comparison of different methods with guided filter



Method	PSNR	MSE	RMSE
Histogram	55.85	**0.21**	0.453
DWT	56.94	0.13	0.364
Guided filt	62.18	0.04	0.199

IV CONCLUSION

The proposed methods has been compared with the traditional methods both visually and quantitatively .The comparisons demonstrate that enhancement performance , as well as color preservation is better in the proposed method. And by taking some extra parameters we observe the variations between proposed and traditional methods practically. In order to obtain better results, a local adaptive enhancement method based on static dynamic filtering may be done as future work. We are using a webcam C920 we capture the real time images and we calculate the quantitative metrics.

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