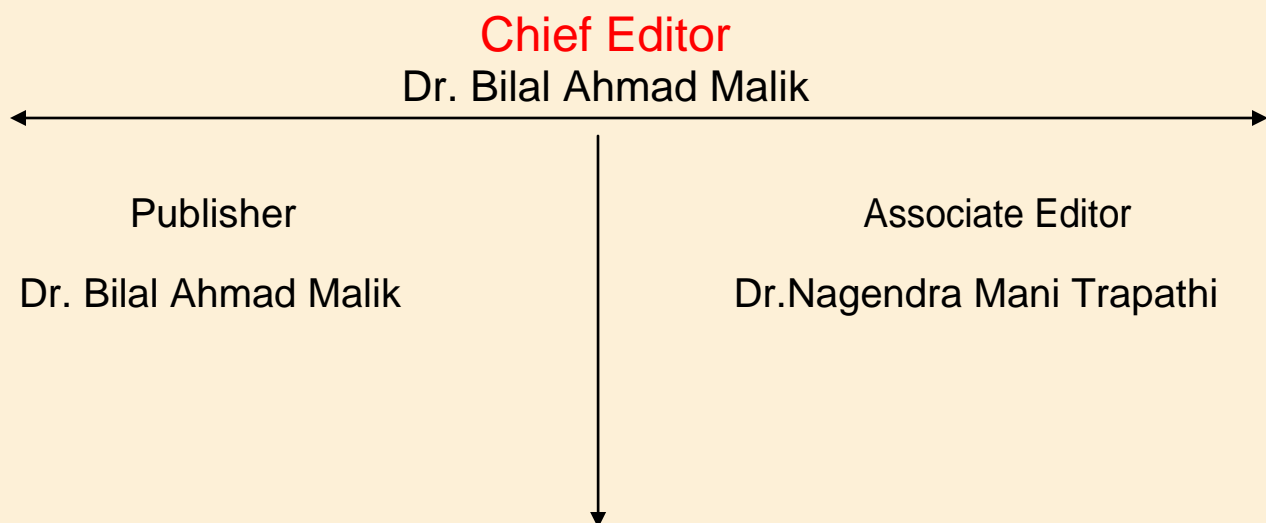# North Asian International Research Journal Consortium

North Asian International Research Journal

Of

Science, Engineering and Information Technology

Chief Editor
Dr. Bilal Ahmad Malik

Publisher

Dr. Bilal Ahmad Malik

Associate Editor

Dr.Nagendra Mani Trapathi

NAIRJC JOURNAL PUBLICATION

North Asian
International
Research Journal Consortium

Welcome to NAIRJC

ISSN NO: 2454 -7514

North Asian International Research Journal of Science, Engineering & Information Technology is a research journal, published monthly in English, Hindi. All research papers submitted to the journal will be double-blind peer reviewed referred by members of the editorial board. Readers will include investigator in Universities, Research Institutes Government and Industry with research interest in the general subjects

Editorial Board

Address: -North Asian International Research Journal Consortium (NAIRJC) 221 Gangoo, Pulwama, Jammu and Kashmir, India - 192301, Cell: 09086405302, 09906662570, Ph. No: 01933-212815, Email: nairjc5@gmail.com, nairjc@nairjc.com, info@nairjc.com Website: www.nairjc.com

A NOVEL ALGORITHM FOR COLORED IMAGE ENHANCEMENT

MANMEET KAUR [1] & ANUDEEP GORAYA [2]

[1] M.Tech in ECE, Rayat Institute of Engineering and Information Technology, Railmajra
[2] Associate Prof. in ECE, Rayat Institute of Engineering and Information Technology, Railmajra

Abstract— Image is a visual perception of some scene or something. Images are set of pixels that have some values and these values appear in the form of colors to view that particular set of pixels as image. An image contains information about whatever is depicted in the picture and hence it can be said as useful source for storing or conveying information. Image noise is most apparent in image region with low signal level, such as shadow region or under expose images. Thus noise can disrupt the actual quality of the image. Image enhancement is a technique which is applied on image in order to obtain the quality oriented image so that it can be used for future purposes or in several applications like face recognition, security purposes etc. This paper presented an idea of using new approach for image enhancement which performs contrast enhancement and deduction of noise from the image. Experiments have been performed to conclude the given idea and results have shown that given technique outperforms in comparison with traditional technique.

Keywords— HSV color model, image enhancement, hybrid filters.

I. INTRODUCTION

Image enhancement is a part of image processing. Digital image processing is used for improving the quality of the digital data by removing the unwanted and noisy contents form it. It is done to increase the quality of the image by increasing the sharpness of the image pixels, increasing the vision clarity of the image. It is also done for extracting the information or meaningful data from the image. Digital image processing is a very vast field and it is quite a complex also due to the usage of mathematical calculations. The digital image processing is done with the help of digital computers only. The process of image processing is initiated by an input image which is further processed by the computer by using some calculations and on the basis of these calculations the modification s are done in the image automatically.

Similarly image enhancement aims to increase the quality of the image. Image enhancement enhances the quality of the image by improving the contrast and brightness of the image. Image enhancement techniques are divided into two categories as

North Asian International Research Journal of Sciences, Engineering & I.T. ISSN: 2454 - 7514   Vol. 2, Issue 10, Oct. 2016

IRJIF IMPACT FACTOR: 3.821

subjective or objective enhancement. Subjective enhancement technique is used for enhancing the image quality from the user's point of view. It is implemented on an image continuously until user ensures the increased quality of the image. Objective enhancement is preferred for removing the known errors and distortion form an image. In this technique the errors are removed randomly from the image. Objective enhancement is one time enhancement technique. It is not applied again and again on an image.

Techniques for image Equalization:

There are following techniques for image equalization or contrast enhancements:

- Histogram Equalization (HE)
- Brightness Preserving Bi-Histogram Equalization
- Global Histogram Equalization (GHE)
- Local Histogram Equalization (LHE) Local Histogram Equalization (LHE)
- Weighted Threshold HE (WTHE)
- Recursive Mean-Separate HE Method (RMSHE)
- Mean brightness preserving histogram equalization (MBPHE)
- Dynamic Histogram Equalization (DHE)

II. PROBLEM STATEMENT

As image enhancement techniques has been used to enhance the color contrast of the image.

Consequently image quality has been increased. There are numerous methods have been used till now in order to enhancing the image's contrast and brightness. Traditional methods provides enhancement of the image but noise can also corrupt the quality of the Image at the time of acquisition. Thus methods used before do not able to enhance the image along with noise removal. As they do not provide any filter to remove the noise from the image. Therefore a new approach should be proposed that must provide enhancement of the image along with reduction in amount of noise.
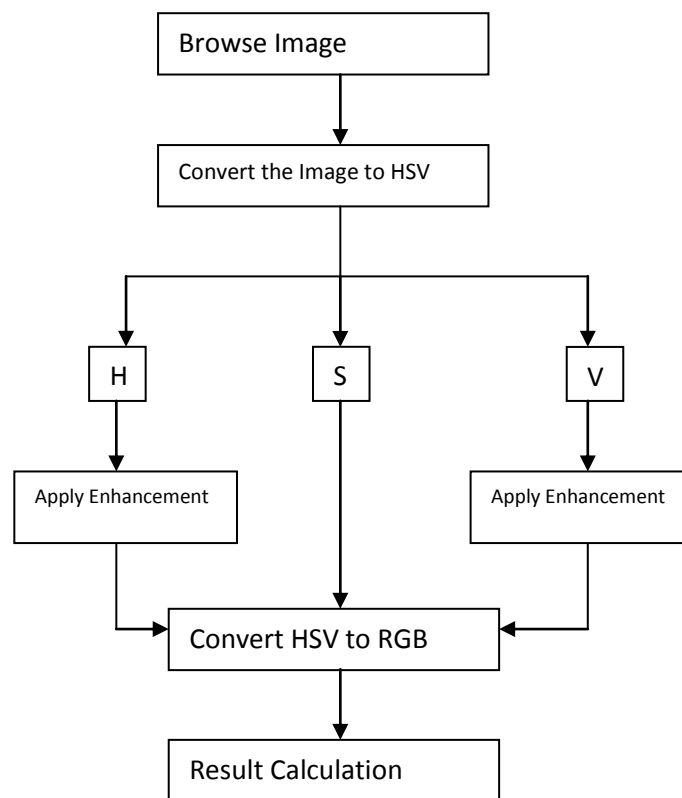

Figure 1. Block diagram of traditional approach

North Asian International Research Journal of Sciences, Engineering & I.T. ISSN: 2454 - 7514   Vol. 2, Issue 10, Oct. 2016

IRJIF IMPACT FACTOR: 3.821

Above figure represents the technique followed by existing techniques where contrast of the image may enhance but there is no way to remove the noise which enters during processing or during enhancement process.

III. PROPOSED WORK

As discussed before those traditional methods are not capable enough in providing enhanced contrast image as well as less noise in the image. Due to which a new method has been proposed which provides enhancement of the contrast and the brightness of the image. Furthermore hybrid filtration technique has been used in order to remove the noise occurs at the time of acquisition or processing. Hybrid filtration consists of histogram equalization and contrast enhancement discussed below.

HE (Histogram Equalization)

It is a technique used for image processing for the purpose of contrast adjustment using histogram of the image. This technique is used for increasing the contrast of an image globally in cases when the image poses the local or close contrast values. This technique is used for increasing the lower local contrast in the image. This technique is used in those images where the image has either dark foreground and background or light foreground and background.
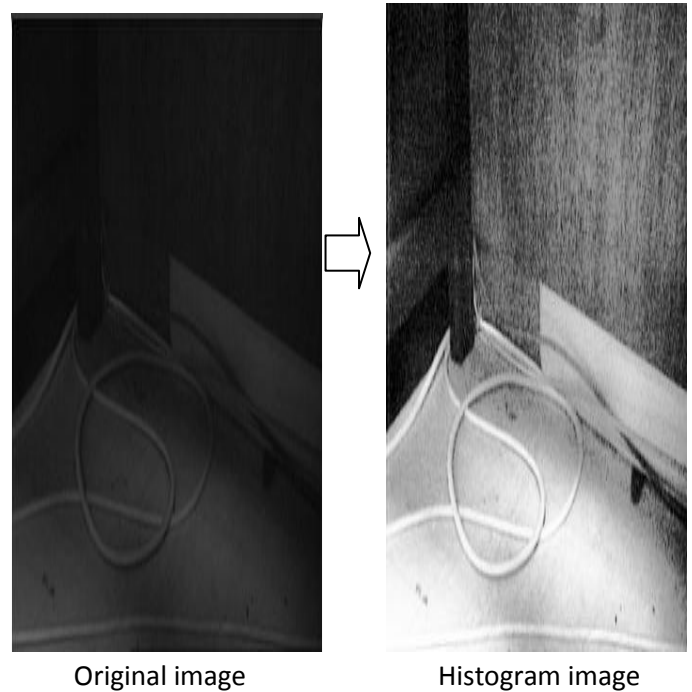

Original image   Histogram image

Figure 2 sample of an image after histogram performed

The main advantage of this technique is that it consists less complex calculations and easy to recover such as if the histogram equalization function is notorious then it would become easy to observe the original histogram. The disadvantage of this technique is that it has an inequality problem that it can lead to the enhancement in the contrast of noise at the time of reducing usable signals.

Contrast Adjustment

In image enhancement, adjustment of contrast by adjusting intensity of an image histogram is identified as contrast adjustment. In such process intensity value of an image maps into a new range so that whole image looks free from noise.
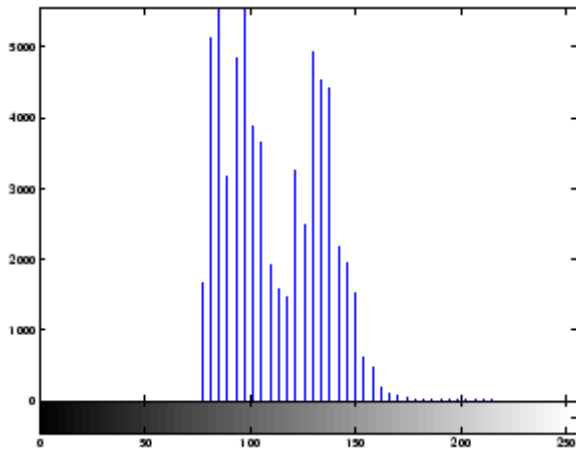
North Asian International Research Journal of Sciences, Engineering & I.T. ISSN: 2454 - 7514   Vol. 2, Issue 10, Oct. 2016

IRJIF IMPACT FACTOR: 3.821

Figure 3 shows histogram of an image.

For instance, in the above figure histogram of a low contrast image is described where all the values gather in the center of the range. Due to this image is not visibly attractive. Thus above histogram remaps and the entire intensity range [0,255] applied. In consequence of contrast of an image enhanced.

IV. METHODOLOGY

In the proposed work, contrast of the image is enhanced using enhancement technique and then apply filter to remove the noise from the image. The methodology of the proposed technique is mentioned below:

1. Initially browse an image to perform enhancement. An image will be loaded into the MATLAB for further processing.
2. Now noise will be added to the image in order to removal of noise at the end of the process.
3. Conversion of an image to HSV color model (Hue, Saturation, and Value) has been performed after addition of noise.

4. Enhancement has been performed on H and V part of the image in order to enhance the brightness and color of the image.
5. Now convert HSV color model to RGB color format to perform noise removal.
6. Apply hybrid filtration technique on the acquired image from previous step for the deduction of noise.
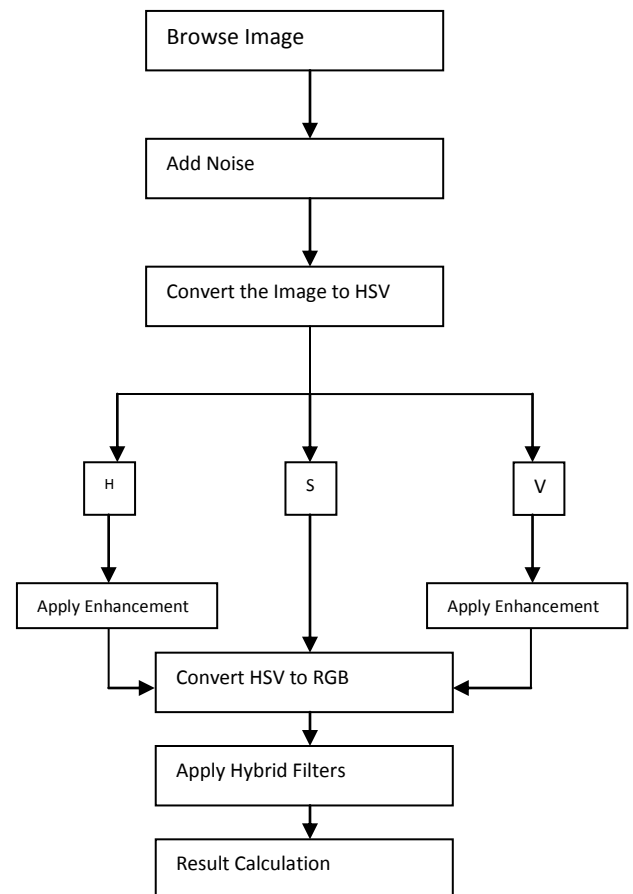7. Lastly evaluates calculation to check the performance of the proposed techniques.

Figure 4   Block diagram of proposed work

North Asian International Research Journal of Sciences, Engineering & I.T. ISSN: 2454 - 7514   Vol. 2, Issue 10, Oct. 2016

IRJIF IMPACT FACTOR: 3.821

V. RESULTS AND DISCUSSION

In this section in order to prove the efficiency of proposed technique over traditional technique, the results are discussed. This section represents the results of various performance parameters. The simulation is performed in MATLAB. The technique is applied on image and compared with traditional technique.

STEP I

In the below figure an image has been loaded into the MATLAB for evaluation purposes. Original image has been taken as a reference image for enhancement purposes.
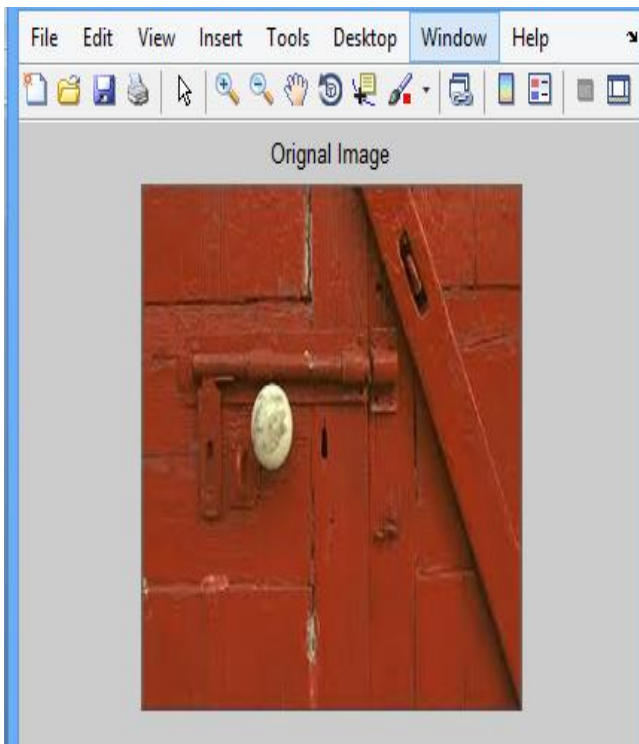

Figure 5 shows original image on which techniques will be applied.
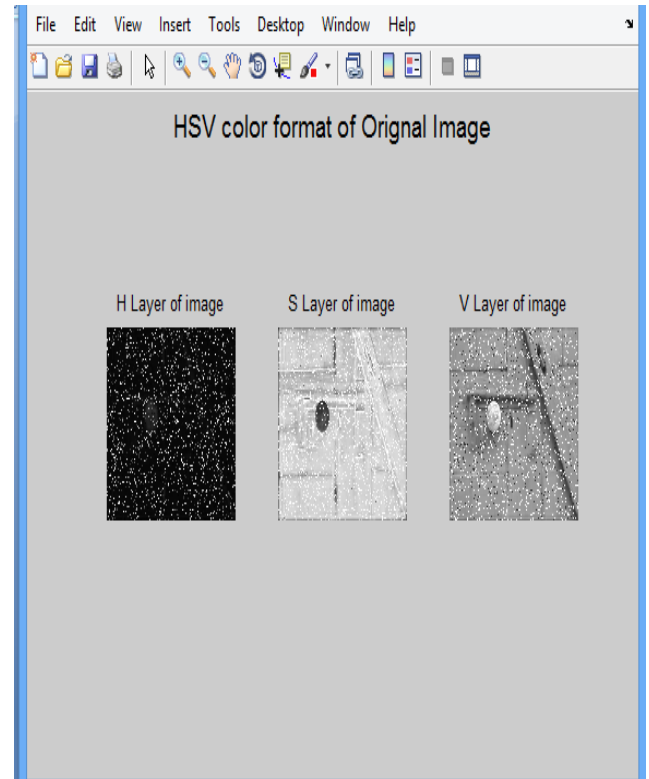
STEP II

Figure 6 Application of HSV on the original image.

In the figure above application of HSV color model has mentioned. Obtained image from the above stage was the noisy image and now in this step original image which was taken in step 1 will be converted into HSV color model so that image can be enhanced on individual layer of the image. Owing to this original image has been converted into three layers i.e. H layer of the image, S layer of the image and V layer of the image. H layer focuses on the color sensation of the light. In other words HUE (H) refers which pure color it resembles. Saturation (S) represents how white color is. And Value (V) represents how dark color is.

North Asian International Research Journal of Sciences, Engineering & I.T. ISSN: 2454 - 7514   Vol. 2, Issue 10, Oct. 2016

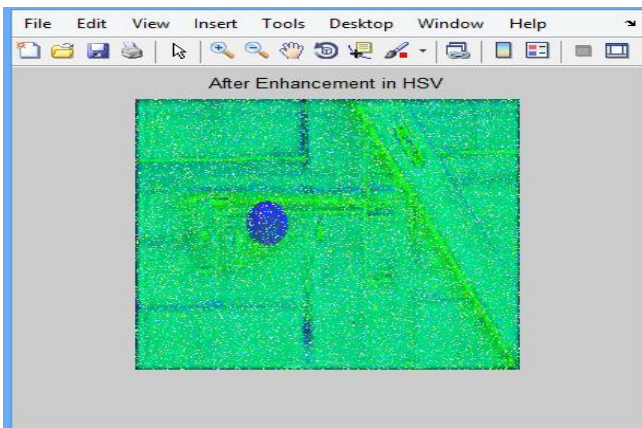IRJIF IMPACT FACTOR: 3.821

STEP III

Figure 7 Enhanced image after applying HSV color model.

Now after applying HSV color model on the image enhancement has been performed and output obtained is mentioned above.

STEP IV

Below obtained image represents enhanced image which has been obtained after applying techniques on the original image. Now the enhanced image may be contained noise due to which it looks destroyed. In the next step denoising will be done.
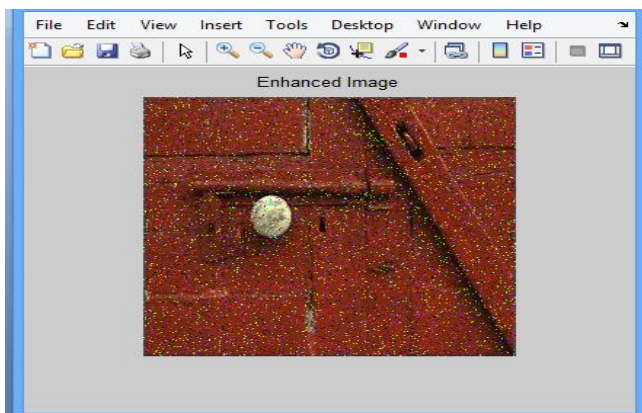
Figure 8 Enhanced image with HSV color model

STEP V

In the figure below filtered image has mentioned which represents the removal of noise using hybrid filters which has not applied on the traditional techniques. In the proposed technique hybrid filters such as contrast adjustment and histogram equalization technique have been used so that noise present in the image at the time of processing can also be removed and obtained image is free from noise. Furthermore enhanced image is obtained shown below:

Figure 9 Filtered image or resultant image

North Asian International Research Journal of Sciences, Engineering & I.T. ISSN: 2454 - 7514   Vol. 2, Issue 10, Oct. 2016

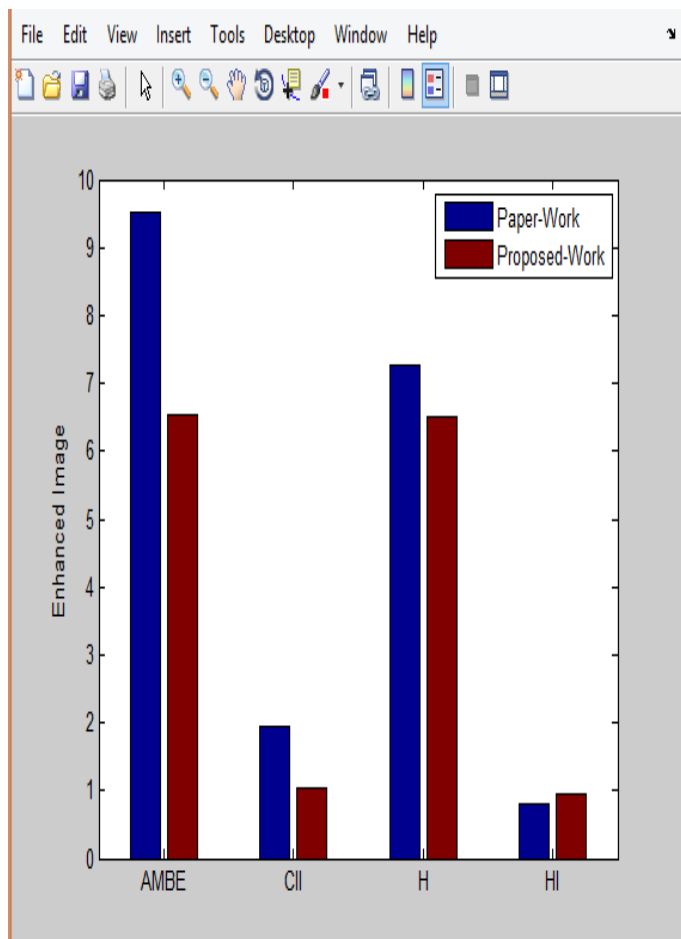IRJIF IMPACT FACTOR: 3.821

STEP VI

Figure 10 Comparison between paper and proposed work

In the above figure, comparison has been performed between the paper and the proposed work. Several parameters have been used in order to compare the results of different images. Parameters describe performance of individual techniques such as existing or proposed. As graph shows that proposed techniques is better in every aspect or in different parameters.

VI. CONCLUSION AND FUTURE SCOPE

Digital image processing is used for improving the quality of the digital data by removing the unwanted and noisy contents form it. It is done to increase the quality of the image by increasing the sharpness of the image pixels, increasing the vision clarity of the image. It is also done for extracting the information or meaningful data from the image. Several techniques have been proposed which have been studied in literature review. Owing to this a new technique has been proposed which can enhance the contrast of the image along with deduction of noise from the image. Firstly enhancement technique was applied and then hybrid filters has applied in order to removal of noise from the image.

In this paper, hybridization technique is applied with the aim of removing noise from the image in which contrast enhancement and histogram equalization technique has been used. Evaluations have been performed that has proven the fact given in the proposed work. Resultant parameters such as AMBE, CII, H and HI show that proposed technique is better in terms of each parameter.

Table1 Below shows comparison of proposed and existing technique in terms of different parameters. And resultant values shows that proposed technique is better than existing approach.

Parameters	Existing	Proposed
AMBE	6.1976	6.5482
CII	1.71	1.087
H	6.5841	6.5008
HI	0.9501	0.9600

Several parameters such as **Absolute Mean Brightness Error**, **Contrast Improvement Index, Discrete Entropy** and **Histogram Intersection** have been defined to check the performance of the proposed technique. These parameters have been used so that brightness and contrast of the image can be measured proficiently.

For future reference number of techniques can be enhanced and on the details of the contrast lot of work can be done. Contrast and brightness of the image can be studied deeply so as to image can be enhanced with less number of complications moreover effectively.

VII. REFERENCES

1. Ji-Hee Han (2011), "A novel 3-d color histogram equalization method with uniform 1-d gray scale histogram "IEEE transactions on image processing, vol. 20, NO. 2, pp 506-512

2. Omprakash Patel (2013), "A comparative study of histogram equalization based image enhancement techniques for brightness preservation and contrast enhancement", Signal & Image Processing : An International Journal (SIPIJ) Vol.4, No.5,

3. P.Shanmugavadivu (2011), "Modified histogram equalization for image contrast enhancement using particle swarm optimization "International Journal of Computer Science, Engineering and Information Technology (IJCSEIT), Vol.1, No.5, December 2011 , pp

4. Chahat Chaudhary, (2013)"Review of image enhancement techniques using histogram equalization " International Journal of Application or Innovation in Engineering & Management (IJAIEM) Volume 2, Issue 5, Volume 2, Issue 5, Page 343 -349

5. Dinesh Sonker (2013), "Comparison of Histogram Equalization Techniques for Image Enhancement of Grayscale images of Dawn and Dusk", International Journal of Modern Engineering Research (IJMER) Vol. 3, Issue. 4, Jul - Aug. pp-2476-2480

6. Turgay Celik (2012) "Automatic Image Equalization and Contrast Enhancement Using Gaussian Mixture Modeling" IEEE TRANSACTIONS ON IMAGE PROCESSING, VOL. 21, NO. 1, pp 145 –156

7. Ravindra Pal Singh, (2015) "Histogram Equalization: A Strong Technique for Image Enhancement "International Journal of Signal Processing, Image Processing and Pattern Recognition Vol.8, No.8

8. Manpreet Kaur (2011), "Survey of Contrast Enhancement Techniques based on Histogram Equalization "IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 2, No. 7, pp 137-141

9. Raju. A ,(2013), "Comparative Analysis of Histogram Equalization based Techniques for Contrast Enhancement and Brightness Preserving " International Journal of Signal Processing, Image Processing and Pattern Recognition Vol.6, No. 5

10. Hyunsup Yoon (2009), "Image Contrast Enhancement based Sub-histogram Equalization Technique without Over-equalization Noise " International Journal of Electrical and Electronics Engineering 3:6, pp 323- 329

11. Mukesh C. Motwani et al (2004), "Survey of Image Denoising Techniques", In Proceedings of GSPX (pp. 27-30).

12. Junyuan Xie et al (2012), "Image Denoising and Inpainting with Deep Neural Networks", Advances in Neural Information Processing Systems, pp. 341-349.

13. S.G. Chang et al (Sep 2000), "Adaptive wavelet thresholding for image denoising and compression", IEEE Transactions on Image Processing, Vol.9, Issue.9, Page(s):1532 – 1546.

14. Jean-Luc Starck et al (Jun 2002), "The curvelet transform for image denoising", IEEE Transactions on Image Processing, Vol. 11, Issue. 6, Page(s):670 – 684.

15. Ioana Firoiu et al (May 2009), "Image Denoising Using a New Implementation of the Hyperanalytic Wavelet Transform", IEEE Transactions on Instrumentation and Measurement, Vol. 58, No. 8, Page(s):2410 – 2416.

16. Qing Guo et al (July 2013), "Image denoising algorithm based on contour let transform for optical coherence tomography heart tube image", IET Image Processing, Vol. 7, Issue. 5, Page(s):442 – 450.

17. Michael Elad et al (Dec 2006), "Image Denoising via Sparse and Redundant Representations over Learned Dictionaries", IEEE Transactions on Image Processing, Vol. 15, Issue.12, Page(s): 3736 – 3745

North Asian International Research Journal of Sciences, Engineering & I.T. ISSN: 2454 - 7514   Vol. 2, Issue 10, Oct. 2016

IRJIF IMPACT FACTOR: 3.821

Publish Research Article

Dear Sir/Mam,

We invite unpublished Research Paper,Summary of Research Project,Theses,Books and Book Review for publication.

Address:- North Asian International Research Journal Consortium (NAIRJC)
221, Gangoo Pulwama - 192301
Jammu & Kashmir, India
Cell: 09086405302, 09906662570,
Ph No: 01933212815
Email:- nairjc5@gmail.com, nairjc@nairjc.com , info@nairjc.com
Website: www.nairjc.com

Confidence and Hard-work is the best medicine to kill the disease called failure. It will make u a successful person