

# COMPARISON OF DIFFERENT TECHNIQUES OF EGDE BASED IMAGE ENHANCEMENT

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**Abstract-** Image enhancement is one of the key issues in high quality pictures such as digital cameras. Since image clarity is very easily affected by lighting, weather, or equipment that has been used to capture the image. The main purpose of image enhancement is to bring out detail that is hidden in an image or to increase contrast from a low contrast image. It gives a large number of choices to enhance the visual quality of images. The existing techniques of image enhancement can be classified into two categories: Spatial Domain and Frequency domain enhancement. The important point of image enhancement is to change attributes of a picture to make it more suitable for a given occupation and a particular observer. Image Enhancement generally utilized as a part of PC Graphics. Capturing pictures is not a troublesome undertaking but rather getting observation from the photo is troublesome because it may experience the ill effects of having slightest picture quality because of capturing gadgets and natural condition like cloud, rain, water and geographical separation and poor lightening condition.

**Keywords-** Image Enhancement, Medical Imaging, Forensic Sciences, Digitized Pictures.

## I. Introduction

Image enhancement is among the least complex and most engaging ranges of digital image processing [1]. Fundamentally, the thought behind enhancement strategies is to bring out detail that is clouded [2]. Enhancement may be utilized to restore a picture that has endured some sort of crumbling because of the optics, gadgets and/or environment or to improve certain components of a picture. The goal of image enhancement is reliant on the application connection, and the criteria for enhancement are frequently subjective or excessively intricate, making it impossible to be effectively changed over to helpful objective measures, image enhancement algorithms have a tendency to be straightforward, qualitative, and ad hoc [3]. Furthermore, in any given application, an image enhancement algorithm that performs well for one class of pictures may not execute too for different classes [4]. Degradation of pictures in a scattering medium is a recognizable issue. Case in point, when imaging the terrain from a forward-looking camera, the atmospheric degradation causes a misfortune in both contrast and colour data. The misfortune interestingly is not uniform

over the picture because of the utilization of a forward-looking camera. Also, the loss of contrast is distinctive for every colour channel because of the wavelength reliance of scrambling. Picture debasement is a disturbance in numerous imaging applications like remote sensing and navigation. Image Enhancement (IE) transforms pictures to give better representation of the subtle details. It is an essential apparatus for scientists in a wide mixed bag of fields including (however not constrained to) therapeutic imaging, art studies, forensics and atmospheric sciences. It is application particular: an IE method suitable for one issue may be deficient for another. For instance forensic images/videos utilize strategies that resolve the issue of low resolution and motion blur while therapeutic imaging advantages more from expanded contrast and sharpness. To cater for such a steadily expanding interest of computerized imaging, software organizations have released commercial software [5] for clients who need to alter and outwardly improve the pictures.

Digitized pictures more often than not experience the ill effects of poor picture quality, especially absence of contrast and vicinity of shading and artifacts, because of the lacks in focusing, lighting, specimen staining and

different components [6,7]. Since a few components are not really perceptible by eye in a picture, we frequently transform pictures before display. Image enhancement is a digital processing system which does its best to enhance picture vision and makes the picture adjust to be prepared by PC. As well, the requirement for contrast enhancement additionally emerges from the way that current softcopy display gadgets, are unequipped for showing the greatest

number of distinctive detectable levels of luminance as can be recorded in a computerized picture [8]. It truly enhances some data inside the picture specifically and limits alternate ones. Thusly, it is anything but difficult to identify and perceive helpful data. It generally yields acceptable results if the best possible procedure is chosen for a given application alongside the correct handling parameters.

Image enhancement procedure comprises of a gathering of strategies that look to enhance the visual appearance of a picture or to change over the picture to a structure more qualified for investigation by a human or machine [9]. The central goal of image enhancement is to alter credits of a picture to make it more suitable for a given undertaking and a particular spectator. Amid this procedure, one or more characteristics of the picture are adjusted. Digital Image enhancement strategies give a large number of decisions to enhancing the visual nature of pictures. Suitable decision of such strategies is incredibly impacted by the imaging methodology, current workload and review conditions [10]. Image enhancement is essentially enhancing the interpretability or perception of data in pictures for human viewers and giving 'better' information for other automated image processing systems. The decision of properties and the way they are adjusted are particular to a given undertaking. Besides, observer-specific factors, for example, the human visual framework and the onlooker's experience, will present a lot of subjectivity into the decision of image enhancement strategies. There exist numerous strategies that can upgrade a computerized picture without ruining it.

## II. Benefits of Image Enhancement

- Improve the visual perception of a processed image
- Increase the amplitude and steepness of image fine details: See what couldn't be seen with the X-ray inspection solution that expands capabilities.
- Improve image quality in poor visibility conditions
- Improve the interpretation and diagnostic imaging capabilities.
- Increase edge steepness and preserve edge details while enhancing contrast in images with varying

illumination. Enhance the edges of an object to facilitate guidance of a robotic gripper

- Development of a solution to a computer imaging problem
- Generate features from selected areas of interest
- For widespread use and adoption low computational cost; suitability for real-time application

## III. Objective

- Our aim is to enhance the quality of the recorded image as to how a human being would have perceived the scene.
- To compare the different parameters like PSNR, MSE, SD on the basis of image enhancement.
- To study the variations in input and derived output image of principle and independent edge components.
- Image fusion on the bases of edge components to compare the parameters of image.

## IV. Proposed Scheme

- Select the target image
- Derive the image into a secondary image using its spatial details into single layer image
- Deduce the edge features details of the image using Principle Edge Filter and Independent Edge Filter
- Do this for each Layer of RGB image
- Using the spatial details and the modified RGB layers perform the convolution to complete enhancement
- The convolution of information exchange takes place in the HSV domain which insures the optimal enhancement of the whole image data

## V. Results and Discussions



Figure 1 shows the original image (left) and original in HSV domain

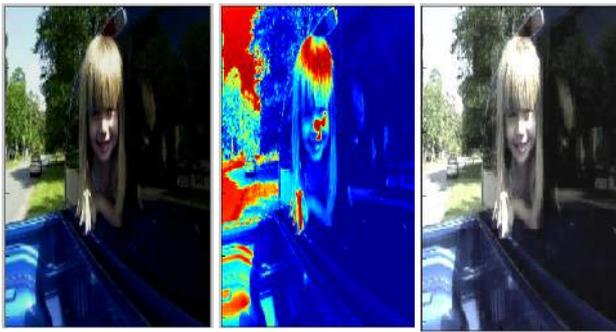


Figure 2 shows the original image (left), original image colour map (middle) and the enhanced image (right)

Table 1 shows comparison of different parameters of image enhancement techniques

Parameters	PSNR	MSE	CC	SSIM
Enhanced Values	31.26	48	0.989	0.989
Histogram	24.33	0	0.960	0.993
Contrast	30.59	20.41	0.947	0.998
Negative	25.51	23.35	1	0.952
AWMF	57.50	0.255	0.7087	0.996
EASF	38.99	1.810	0.166	0.877

## Conclusion

The proposed system of enhancement is based on tracking of high and low order edge details based on the edge region extraction, this new approach works well with the under enhanced of noise affected compressed images and ensures proper balanced enhancement with reduced blocking effect and high saturation.

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