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Comparative Analysis of Underwater Image Enhancement Using Retina Model

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ABSTRACT: This research paper proposes an underwater image enhancement model inspired by the morphology and function of the retina model. So the primary objective of to develop this project of an underwater image enhancement is to recover the quality of a blurriness images that has been degraded due to scatters and amalgamation within the underwater environment.
Objectives are create dataset and implement quality of images with the help of integrated formal methods. Thus to avoid the major problems of underwater image blurriness we need to comparative analysis of underwater image enhancement. There are two strategies are used for underwater image processing i.e. image enhancement and image restoration.
KEYWORDS: Underwater image enhancement, biologically, Adaptive Histogram Equalization (AHE), Color correction (RGB), Dark Channel Prior.

I. INTRODUCTION

In this paper the more important factor is image enhancement because of its usefulness in virtually all image processing applications.Image enhancement tools are often classified into first is Point operations, and second one is spatial operations.In the point operations it includes contrast stretching, noiseclipping, histogram modification,and the pseudocoloring.The point operations are simple nonlinear operations that are well known in the image processing. The spatial operations used in image processing today, other hand typically linear operations. The spatial linear operations are simple and easily implemented it is the best advantage of this operations. Nonlinear image enhancement tools are less susceptible to noise.Noise is always present due to the physical randomness of image acquisition systems,.Ex is under exposure and low light conditions in analog photography conditions lead to images with film grain noise which is together with the image signal itself,are captured during the digitalization.

In the existing research observed that underwater images are the poor quality images because of nature of light. When the light enters the water it got refracted, absorbed and scattered as water is denser medium then air, so the amount of light drops when it enters from air to water and got scattered in different directions. This effects of water on underwater images are only not due to the nature water but also because of the organisms and other material present in the water.

[1]The underwater images often suffer from noise, color distortion and low contrast, because light is attenuated when it propagates through water. Due to these problems increase the difficulty of various tasks such as automatic fish and plankton detection and recognition. Therefore, many methods have been proposed to recover or enhance the degraded underwater images.The noise reduction methods for underwater images could be roughly classified as wavelet-based and filter based, the operation of color correction aims to reduce the strong color cast that typically exists in underwater images.

[2]The main model parameters of each low-level filter adapt according to the global contrast of the input image, the dynamic modulation of the surrounding region to the central part of the receptive field (RF) of a neuron underwater image processing has made a distinct identity in the field of research due to increasing demand for a good quality picture in many applications.

II. LITERATURE SURVEY

Yong-Jie Li el al[1]proposed the underwater image enhancementmodel inspired by the morphology and function of the teleostfish retina. We aim to solve the problems of underwater imagedegradation raised by the blurring and non-uniform colorbiasing. As the first layer of retina,

the photoreceptors can beclassified into the rod and cone types, serving to transmitthe received light signal into the neural response Horizontal cells (HCs) have the biggest RF size in theretina, which makes it possible to integrate the signals fromphotoreceptors over relatively large regions. The visual signal processing in retina is divided into theON and OFF pathways from the layer of bipolar cells. Our algorithm introduce him complementary fusion of luminance informationgiven by the ON and OFF pathways of the retina, which isdifferent from those fusion based methods.

Om Kumari Soni et al[2] has presented the objective of underwater imageenhancement is to recover the quality that has been degradeddue to scatters and amalgamation within the underwater environment. These images suffer from strong absorption, lowcontrast, noise, and poor visibility. Thus to avoidaforementioned problems of the underwater images,enhancement is required. This paper discusses various imageenhancement techniques like Histogram equalization, AdaptiveHistogram Equalization(AHE), CLAHE, Histogram slicing,Contrast stretching, Dark Channel Prior In spite of visible and natural underwater images, sometimes brightness and high contrast for the underwater image also are required for object detection, fish classification, etc.

Kun Xie, Wei Pan et al[3]In this paper they have presented the underwaterrobot navigation and marine science recognition, which is based on the dark channel prior modeland underwater back-scatter model.The model which is used in this paper is more robust.

Donghui Wei et al[4]have proposed the new method to improve the underwater imagevisual quality by using a two-step approach.Firstly, atransmission map based enhancement is applied to increasethe image global contrast, similar to the image defogalgorithm. Secondly, image details are extracted and the localcontrast is improved by applying edge-preserving filter.Experiments demonstrated that the proposed two-stepapproach can significantly improve the visual quality ofunderwater images.

Chong-Yi Li et al[5] Proposes underwater image enhancementmethod which can produce a pair of output versions, it includes underwater dehazing algorithm and the contrast enhancement algorithm. The dehazingalgorithm can minimize the information loss of the enhancedunderwater images based on the minimum information lossprinciple and optical properties of underwater imaging. Thecontrast enhancement algorithm based on histogram distributionprior can effectively increase contrast and brightness.

Shahan C. Nercessian et al[6]In this method they have proposes Many enhancement algorithms have been proposed basedon different sets of criteria. However, a direct multi-scaleimage enhancement algorithm capable of independently and/orsimultaneously providing adequate contrast enhancement, tonaledition, dynamic range compression, and accurate edge preservation in a controlled manner has yet to be produced. In this paper, a multi-scale image enhancement algorithm based on anew parametric contrast measure is presented. The parametriccontrast measure incorporates not only the luminance maskingcharacteristic, but also the contrast masking characteristic of thehuman visual system. The new image enhancement algorithmic capable of adjusting the appropriate brightness level ofthe image directly, and used a non-linearly mapping to contrastcoefficients at each scale.

Hitam et al[7] proposes a new method specifically developed for enhancing the underwater images called mixture “Contrast Limited Adaptive Histogram Equalization (CLAHE).This method operates contrast limited adaptive histogram equalization on RGB and HSV.The combined results show less mean square error and high peak signal to noise ratio(PSNR) then other methods of underwater image enhancing.

Tatsuya Baba et al[8] In this paper they have represent the image enhancement methods for underwater images. It is a challenging task to remove a dominant color while keeping Sharpness or brightness for various image processing tasks, e.g., image recognition. The methods are Luma Contrast Enhancement, Chroma Contrast Enhancement. This paper proposed the colorcorrection and image enhancement method for underwater images.

Yaomin Wang et al[9] In this paper they represent the underwater image enhancement with virtual retina model and image quality assessment. Retinal information processing begins with the sampling of rod and cone photoreceptors. The red (R), green (G), and blue (B) components of the input underwater images are responded respectively by long-, medium-, and short wavelength cone photoreceptors (L, M, and S cones) of retina, while the brightness of the dim regions in the input underwater images is sensitively responded by rod photoreceptors Bipolar cells and amacrine cells are the sub-layers.

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III. METHODOLOGY

We have proposed to exploit image blurriness to measure the scene depth instead of using DCP (Dark Chanel Prior). Combining image blurriness with IFM (Integrated Formal Methods), we presented pleasing Proposed an underwater enhancement approach by differential evolution algorithm based contrast enhancement in RGB space.

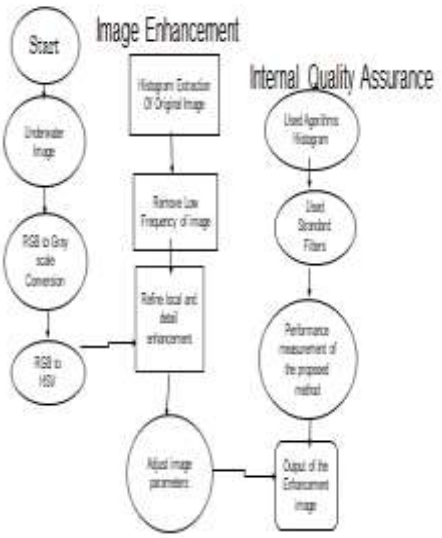

FIG. FLOW CHART OF PROPOSED MODEL

In the first stage of the proposed method underwater image separated into its R, G and B components. RGB components of an image represent each pixel color as a set of three values, which are representing the red, green, and blue intensities that make up the color.

Second is the R, G, and B components of the colored image are obtained, contrast stretching procedure was performed to these components separately. The proposed method is used on different underwater images and according to the obtained results, it can be said that the approach effectively improves the visibility of underwater images.

Then Join with original image, after that extract histogram of the image, run the histogram equalization algorithms ad different filters.Compose the performance parameters of this enhancement image with original image

IV. CONCLUSION

In this study Comparative Analysis of Underwater Image Enhancement reviewed, The main purpose of this review is to provide the better quality of images using image enhancement and fish retina model and the . So the primary objective of to develop this project of an underwater image enhancement is to recover the quality of a blurriness images that has been degraded due to scatters and amalgamation within the underwater environment.

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