TO DESIGN COMPARATIVE ANALYSIS OF UNDERWATER IMAGE ENHANCEMENT USING RETINA MODEL

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***Abstract*: This 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.**

***Index Terms*: Underwater image enhancement, biologically, Adaptive Histogram Equalization (AHE), Colour correction (RGB), Dark Channel Prior. Visual attention model.**

I. INTRODUCTION

The underwater images from last decades it suffers from noise, color distortion and low contrast of images, only because of the light, when it evaporates through the 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. 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.

In this paper the more important factor is image enhancement due to its usefulness in virtually all image processing applications. Image enhancement tools are often classified into first is Point operations, and other is spatial operations. Within the point operations it includes contrast stretching, noise clipping, histogram modification, and therefore the pseudocoloring.The point operations are simple nonlinear operations that are documented within the image processing. The spatial operations utilized in image processing today, other hand typically linear operations. The spatial linear operations are simple and simply implemented it's the simplest advantage of this operations. Nonlinear image enhancement tools are less vulnerable to noise. Noise is usually present thanks to the physical randomness of image acquisition systems, ex is under exposure and low light conditions in analog photography conditions cause images with film grain noise which is alongside the image signal itself, and are captured during the digitalization. In the existing research observed that underwater images are the poor quality due to nature of sunshine. When the sunshine enters the water it got refracted, absorbed and scattered as water is denser medium then air, therefore the amount of sunshine drops when it enters from air to water and got scattered in several directions. This effects of water on underwater images are only undue to the character water but also due to the organisms and other material present within the water.

[1]The underwater images often suffer from noise, colour 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 colour correction aims to reduce the strong colour cast that typically exists in underwater images.

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II OBJECTIVES

- To create dataset of underwater images and analyse it.
- To implement quality tool for clearing an images.

- To apply different filtering and wavelet denoising.
- To show comparison of proposed enhancement with exist.

III METHODOLOGY

Retina model which is used in comparative analysis of underwater image enhancement for the capturing images. Image processing is a method to perform some operations on an image, in order to get an enhanced image or to extract some useful information from it.

- Importing Image
- Analysing and Manipulating Image
- Output Image

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.

Proposed Model Flowchart

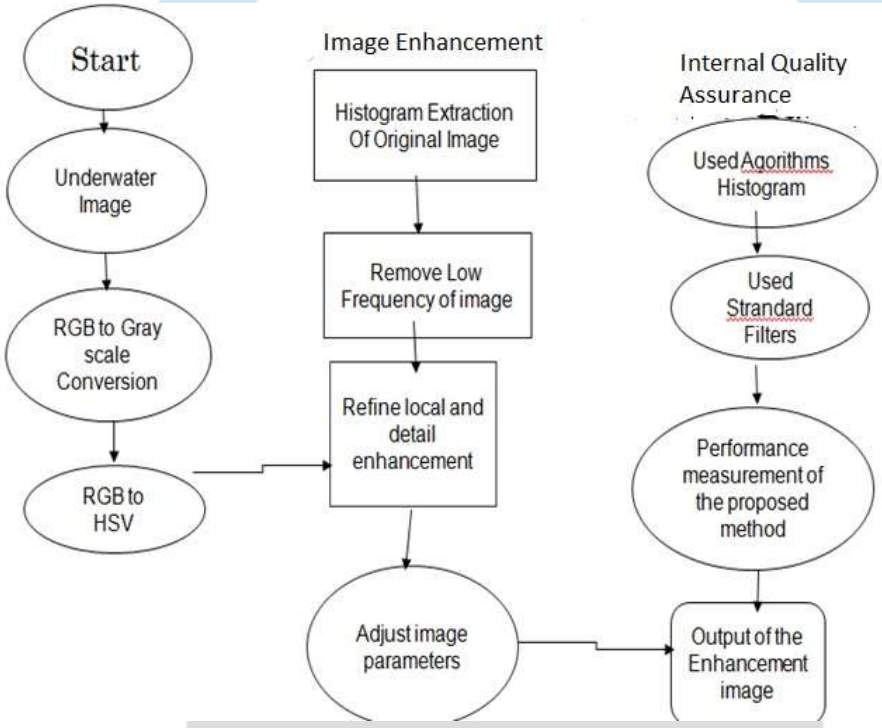


Figure: Underwater Image Enhancement Retina Model Implementation

Flow chart of our proposed underwater image enhancement framework which is made up of several steps, including inputting the single underwater image, pre-processing, image enhancement, and IQA (Internal Quality Assurance).

- During the image enhancement, the virtual retina computational model is first introduced to simulate the underlying image enhancement mechanisms at the specific level of human retina.
- We can come up with better and robust algorithms which are camera independent.
- 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 enhanced images.

A. RETINA MODEL

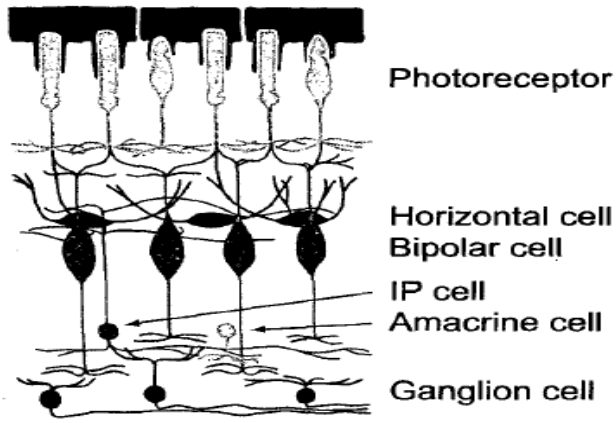
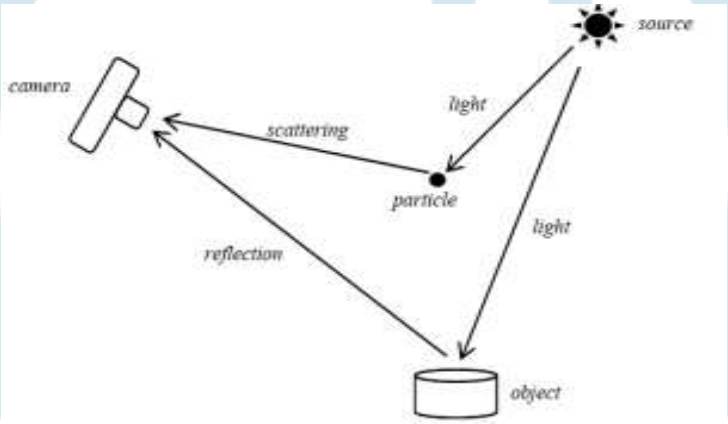


FIG: RETINA MODEL

The purpose of retina model is to receive light that the lens has focused, convert the light into neural signals, and send this signals on to the brain for visual recognition, as well as the retina is a thin layer of tissue that lines the back of the eye on the inside.

B. HOW THE UNDERWATER IMAGE IS GENERATED



- The components of R, G, B and brightness of the input colour image are sent into the corresponding photoreceptors.
- The outputs of photoreceptors are modulated by the feedback of horizontal cell and then transmitted into the RF centre of bipolar cell.
- The outputs of bipolar cells are transmitted into the colour-opponent ganglion cells for further processing
- The final output is obtained by integrating the outputs of ON- and OFF-ganglion cells.

IV TECHNIQUES FOR UNDERWATER IMAGE ENHANCEMENT

- **Contrast stretching-** Contrast stretching is a straightforward image enhancement method that is used to improve, enhance the image contrast by stretching' the series of intensity values.
- **Homomorphism filtering-** It is the most utilized system on the grounds that it redresses non-uniform lighting and sharpens the picture.
- **Anisotropic filtering-** This channel smoothest the picture in homogeneous range however conserve edges and upgrades them.
- **RGB colour model** -The first thing in this method to estimate is the colour of the water, The effect of full-colour RGB can be acquired by combining the individual components of model. Contrast by stretching' the series of intensity values.
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VI FUTURE SCOPE

In the recent upcoming years the new intelligent, digital species created entirely by the research scientists from the various nations of the world that may include various advances image processing applications. Due to the advances in image processing and upcoming different technologies there will be millions and millions of robots in the world in a few decades time, transforming the world is managed.

Advances in image processing and artificial intelligence is includes the commands, anticipating the information requirements of governments, translating languages, recognizing and tracking people and those things, diagnosing medical conditions,performingsurgery,reperforming defects in human DNA ,and automatic driving all forms of transport. With the development of underwater robotics, underwater exploration has become much easier and the less onerous. But from decades these robots are very expensive mainly because of the high end cameras.so with more research in this field, we cancome up with the better and robust algorithms as well as retina model which are the camera are independent.

CONCLUSION

In this paper of Comparative analysis of underwater image enhancement using retina model, I studied it's a challenge in itself, because of the different types of factors are affecting the captured images. The use of various image enhancement techniques likes, AHE, CLACHE, and BBHE which is used to improve the visual appearance from the captured image. There are different effect of noise, blurring, limited visibility on an image can be reduce. In the future we would like to work on building a algorithm which is helps to reconstruct images taken under the other liquids, whereas the amount of wavelength absorbed by the liquid is different when compared to water.

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