Underwater And Old Image Enhancement

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Abstract- *The purpose of project improve the color correction ability of the model, and overcome the problem of color distortion of underwater image. While improving the brightness of the image, the problem of color distortion and brightness blocking of the enhanced image is solved. The texture information of the image is effectively restored. Grayscale is the collection or the range of monochromic (gray) shades. Grayscale only contains luminance (brightness) information and no color information. To get a grayscale image, the color information from each channel is removed, leaving only the luminance values, that is why maximum luminance is white and zero luminance is black; everything in between is a shade of gray. That is why grayscale images contain only shades of gray and no color. Each channel also contains a luminance value to determine how light or dark the color is.*

Keywords- Grayscale color enhancement, Filter image processing and Restoration older images

I. INTRODUCTION

Underwater image enhancement refers to the process of improving the visual quality of images captured underwater. Due to the physical properties of water, underwater images often suffer from poor visibility, color distortion, and low contrast. Enhancing these images can help reveal details, restore natural colors, and improve overall image quality.

Image enhancement is the major process in the image processing techniques. Image enhancement would increase the sharpness and intensity of the underwater images. By increasing Images taken in Low light conditions such as unevenness, blur and noise make the image look bad.

All models that target brightness and noise issues in improving low quality images use a good strategy to create enhanced images. The most common methods are dental conversion, pixel coding, rainbow and false color enhancement picking etc.

Aiming at the serious problem of gray-scale loss in the existing pseudo color methods in high gray-scale image Enhanced, Pseudo color Enhancement Algorithm Neural Networks for Dynamic

II. METHODOLOGY

Algorithm: CNN Based Auto encoder and Decoder the image enhancement strategy is based on three main steps, the first step is to decolorize the image. Figure 1 shows the process of the plan. In the first step, color images consisting of several colors, mainly blue and green, are converted to gray images.

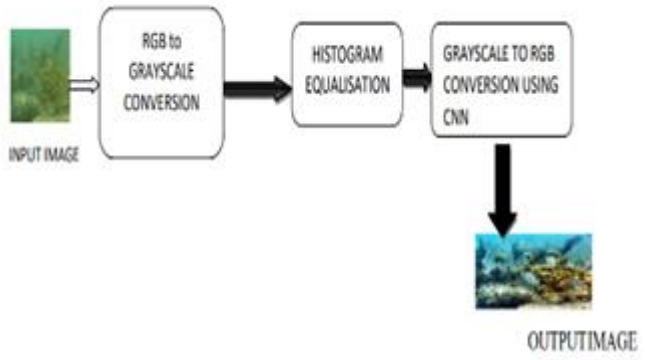


Figure 1: Flow diagram

The First step: is to convert the RGB image to grayscale.

The second step: in this process is to perform a histogram equalization of the converted image, where Necessary details are obscured by the shadows of a particular application. That has been exposed. In the case of color images, it looks like a primary color space (a blue or green layer). After syncing the histogram, the image appears to have the desired content that wasn't there initially.

The third step: Convert a histogram balanced grayscale image back to a color RGB image using a convolutional neural network model. The model was trained using data containing underwater Images.

Autoencoders: Autoencoders learn to view the data of the operation entered in the short code and then decompress the code into something similar to the original data. This forces autoencoders to do a reduction, for example by learning how to ignore noise. Some architectures use stacked sparse layers

of auto encoder for image recognition. First encoding layer can learn to encode simple features like vertices, second encoding layer evaluates output of first layer and then encodes less local features like nose, third encodes whole nose etc. encode tags. Till the end. The encoding layer encodes all images into a code that matches (for example) the concept of "cat". The decoding process will learn to return the learned code to its original form as best as possible.

III. IMPLEMENTATION

A. Techniques used in underwater image enhancement

1. Color correction: Underwater images are usually blue or greenish in color because the light is absorbed and scattered by the water. Color correction technology is used to restore more natural colors by correcting color balance and compensating for color distortion.

2. Contrast enhancement: Underwater scenes often lack contrast, resulting in loss of detail. Contrast technology is designed to improve the visibility of images by increasing the contrast between light and dark, thereby improving overall clarity.

3. Dehazing: Haze and suspended particles in the water will reduce visibility and image quality. Fog removal algorithms are used to predict and remove blur, reveal sharper details, and improve the visibility of underwater images.

4. Noise reduction: Underwater images can suffer from various types of noise, such as salt-and-pepper noise or speckle noise. Noise reduction techniques help to reduce these artifacts while preserving important image details.

5. Image fusion: In some cases, multiple images captured under different lighting conditions or from different angles are combined to create a more enhanced and visually appealing result. Image fusion techniques aim to merge the information from these images to generate a single enhanced image.

Steps in Project

To implement this project we are using the following steps:

Dataset: In this experiment, dataset is composed of underwater images. Images of clear images and underwater images were collected from the kaggle.com. The proposed model is trained for the enhancement of underwater images.

Image Preprocessing: In this module we are applying image processing concepts to resize the image size into 224x224.

Model Training: To evaluate the performance of our proposed approach and establish baselines we developed several other models, which comprises of end-to-end CNNs and DHFFNN. Specifically, we use various layers to train algorithm.

Image Enhancement: Effect fusion frame can improve image brightness in different areas. The principle is to divide the image into two parts, front and back, using the exposure model, and increase the brightness of the two parts of the Image to Different levels. The multi-threshold block Improvement algorithm was developed On the basis of the Exposure fusion framework. Because the overexposed area only has a small amount of image data, increasing the brightness of this area will not greatly improve the image quality, while increasing the brightness of the normal exposure area will make the image appear overexposed.

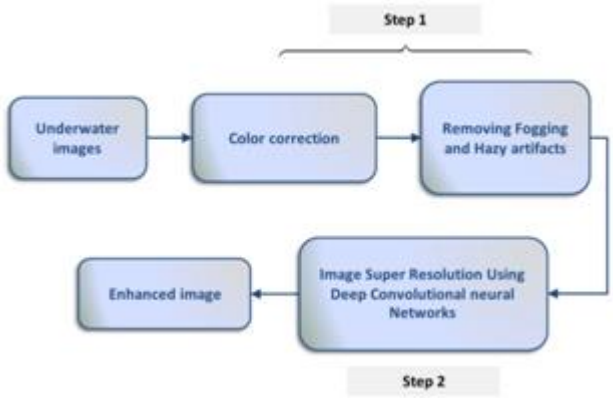


Figure 2: Workflow

In Figure 1, the frame of the plan. First, our system will use the underwater image as input, then determine the corresponding color in each pixel, and then use image processing to remove the fog. In the second step, our system will use deep learning techniques to improve underwater images without loss of information and noise.

B. Data Flow Diagrams

A flowchart is a way of representing the flow of information through a process or system (usually information systems). DFD also provides information about the outputs and inputs at each location and the process itself. Dataflow graphs have no control no decisions and no loops. A particular process based on data can be represented by a flowchart.

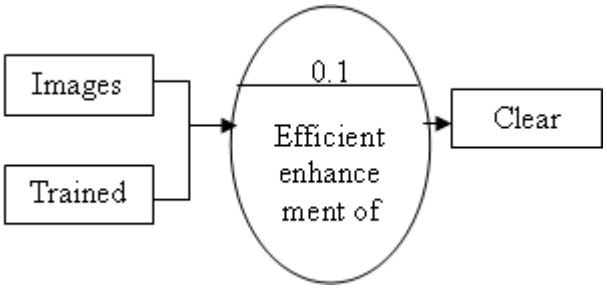


Figure 3: DATA FLOW DIAGRAM- Level 0

Level: 0 describes the overall process of the project. We are images and trained as input. By using the Deep learning algorithm it will efficiently enhance the quality of the underwater image.

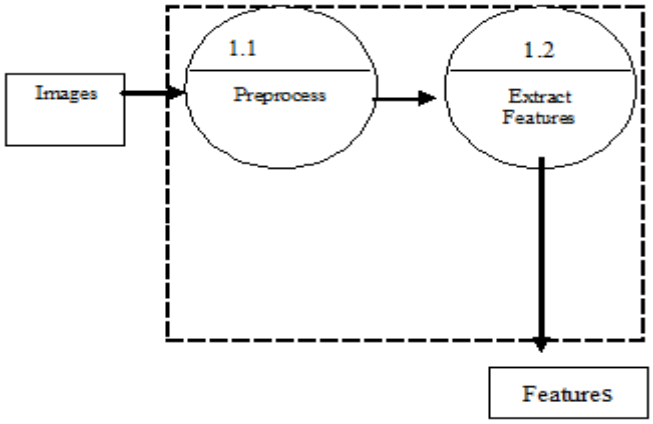


Figure 4: DFD-Level 1

Level: 1 describes the first step process of the project. We are passing underwater image as input. System will read and preprocess the image and extract the color co-relations in pixels then extract the image features.

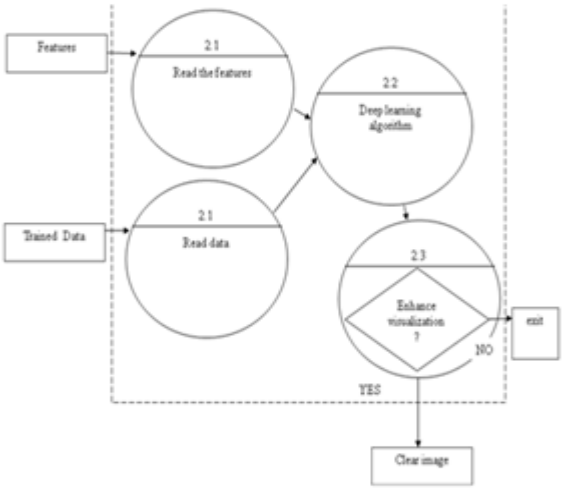


Figure 5: DFD-Level 2

Level: 2 describes the final step process of the project. We are passing extracted image features from level 1 and trained data as input. System will read features and load the trained model enhance image quality without noise and content loss using deep learning algorithm.

C. Workflow Chart

A workflow is a graphical representation of the operation of step-by step processes and actions that support selection, iteration, and concurrency. In Unified Modeling Language, activity diagrams are created to model calculations and integrations (e.g., workflows) and the flow of information about these activities. Although workflow diagrams usually show the entire management system, they can also contain elements that show the flow of information about activities from one or more stores.

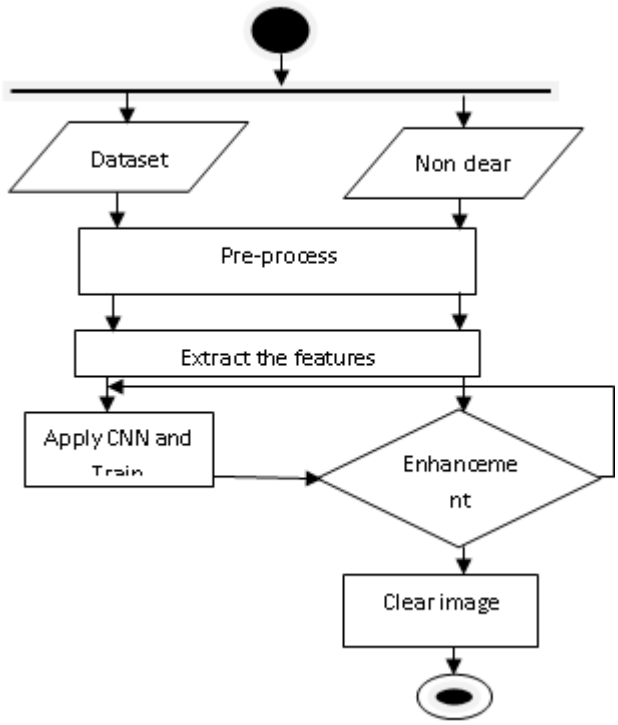


Figure 9: Activity Diagram

IV. RESULT

The results of the Underwater Image Enhancement Project demonstrated significant improvements in the quality and visibility of underwater images and older image. The enhanced images exhibited the following key attributes:

Enhanced Visibility: The project successfully enhanced the visibility of underwater scenes, making it easier to discern objects, structures. The enhanced images exhibited improved

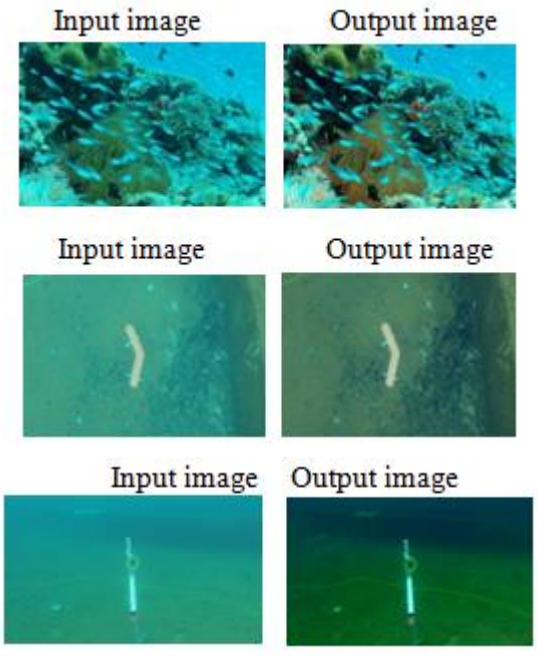
sharpness and clarity, enabling better analysis and interpretation.

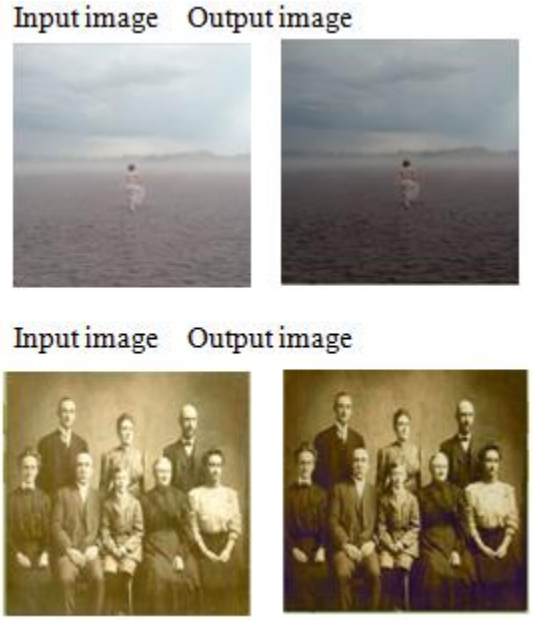
Natural Color Restoration: By applying color correction techniques, the project restored the natural color balance of underwater images. This resulted in images that closely resembled the original colors present in the underwater scene, improving the accuracy and realism of the enhanced images.

Improved Contrast: The contrast enhancement algorithms effectively increased the tonal range and dynamic range of the underwater images. This enhancement facilitated better differentiation between objects of interest and their surroundings, leading to improved visual perception and more immersive viewing experiences.

Reduced Noise Artifacts: The noise reduction techniques employed in the project effectively reduced the presence of noise in the enhanced images. As a result, the final images exhibited smoother textures, reduced visual disturbances, and improved overall image quality.

Dehazed Images: The dehazing algorithms successfully reduced the impact of haze and turbidity in the underwater images. This led to clearer and more detailed images, particularly for objects located at a distance or in areas with higher haze levels.





V. CONCLUSION

This paper suggests a low illumination enhancement method based on attention mechanism, residual dense blocks, and generation of countermeasure to address the issues with low illumination images. First, the technique makes use of giem to produce a global exposure attention map that directs the succeeding modules to improve illumination; second, to obtain more detailed information, various levels of features extracted by CRM and cardm are fused; to make the underwater image as accurate a representation of the underwater environment as possible, a generative countermeasure network is proposed.

Image enhancement improves the information content of the image by expanding the edges of the underwater image and changing the visual impact of the observer. The sharpness and contrast of images taken underwater suffer from poor color uniformity and poor visibility.

VI. ACKNOWLEDGEMENT

We would like to express our special thanks of gratitude to our professors Dr. ShilpaBiradar of Dr. Ambedkar Institute of Technology, Bengaluru who supported and helped us doing the research on this paper. And also, we would thank Department of Information Science and Engineering of Dr. Ambedkar Institute of Technology which gave us this opportunity to do this project “UNDERWATER AND OLD IMAGE ENHANCEMENT”, which helped us to learn new things and new technologies in this field.

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