



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**

# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 4, April 2023

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 8.423

9940 572 462

6381 907 438

[ijirset@gmail.com](mailto:ijirset@gmail.com)

[www.ijirset.com](http://www.ijirset.com)



# An Effectual Underwater Image Enhancement Using Deep learning Algorithm

S.Mallesha<sup>#1</sup>, I. Datri<sup>#2</sup>, Vadyanam Ramesh<sup>#3</sup>, Annadi Sai Kiran Reddy<sup>#4</sup>, Gottam Vamshikrishna<sup>#5</sup>

<sup>#</sup>Dept. of ECE, CMR Technical Campus, India

**ABSTRACT:** Digital image processing domain is growing day by-day by introducing novel technologies to provide assistance for several applications such as robotic activities, underwater network formation, and so on. In particular, underwater image processing is considered as the crucial task in image processing industry due to the flow of light waves that are not in the specific and expected range under the water level. While image restoration technology can adequately consider removing this same haze from source images, they need to obtain several images from a certain place that prevent it from being used in a real-time system. To overcome this issue, a deep study approach is developed by providing excellent outcomes of deep learning approaches in several other image analysis concerns such as colorizing images or object identification. A convolution neural network (CNN) model is trained to de-haze the individual images with image restoration in order to perform further with an image improvement. The proposed approach can produce images with image restoration quality by including a standard image input and here, the neural network is evaluated by using images and features, which are obtained from separate areas to prove its capacity to generalize. The efficiency of the proposed approach is high when compared to other existing methods.

**KEYWORDS:** Underwater image processing, deep learning, classification, image dehazing, convolution neural network.

## I. INTRODUCTION

The most important issues in underwater robotic activity estimation is the management of underwater images. In addition to the well-known issues in the automatic interpretation of the image in sort to engage nearer to world, submarine robotics must address other problems caused by image degradation by transferring the light waves in water. Proper construal of the camera-input is essential for building independent robots, which are capable of moving and interacting in a mysterious background. In case of submarine robotic activities, the underwater industry has many applications and unfortunately there are possibilities for tragedies like ship wrecks, shore drips or flight upsets. Such approaches are frequently conducted by remote vehicles (RVs) with a femoral information sharing cable, which is regulated by utilizing highly qualified pilots.

In last few decades, however, the much more independent infrastructure has built: Autonomous-Underwater-Vehicles (AUV) intervention. This architectural style offers many benefits, such as the nonexistence of delays between orders and the reaction of vehicles. In general, the first step in such systems is to process the input of the cameras, to locate the system, navigate carefully as well as to recognize the objectives of attention. As a result of the underwater nature of the transmission of light, mentioned images dilapidation possessions such as diffusion, dispersion, sea flurry or vignette. In addition to this effect, the effect of various underwater image processing such as sea snowfall also raises the quantity of dispersed light is a significant thing.

## II. LITERATURE SURVEY

- [1] Sneha Joseph, Suresh G, P. Jyothi, S. Ashok, D. Venkatesan, S. Agnes Shifani, "A Novel Enhanced EfficientNet Model for Identification of Floating Debris on Marine Surface", 2023 International Conference on Artificial Intelligence and Knowledge Discovery in Concurrent Engineering (ICECONF), pp.1-10, January, 2023.
- [2] T. Thivya, C. Kalaivanan, N. Juliet, Vengadapathiraj M, G. Mary Valentina, V. Mohanavel, "An Improved Network Segmentation Performance in Lesion Segmentation based on Mask R-CNN", 2022 6th International Conference on Electronics, Communication and Aerospace Technology, pp.1192-1198, June, 2022.
- [3] L. Vanitha, R. Kavitha, M. Panneerselvam, Ch Prathima, G.MaryValantina, "A Novel Deep Learning Method for the Identification and Categorization of Footpath Defects based on Thermography", 2022 3rd International Conference on Smart Electronics and Communication (ICOSEC), pp.1401-1408, September, 2022.



[4] Matheus Machado Dos Santos, Giovanni G. De Giacomo, Paulo L. J. Drews and Silvia S. C. Botelho, "Matching Color Aerial Images and Underwater Sonar Images Using Deep Learning for Underwater Localization", IEEE Robotics and Automation Letters, June, 2020.

### III. EXISTING SYSTEM

The proposed deep learning-based underwater image restoration framework consists of the four stages: (1) the underwater image grayscale stage relying on CNN to convert the underwater image to the best gray-channel image; (2) the grayscale underwater image details enhancement stage also relying on CNN to remove the noise and enhance the image quality; (3) the underwater image color restoration stage via end-to-end CNN; and (4) the generation stage of the final high image quality and correct color underwater image by integrating the outputs of the other three stages. The details of the four stage are in the following four subsections, respectively.

### IV. PROPOSED SYSTEM

A convoluted neural network is used in this work to learn to convert raw images to amplified images so that they're used as input for other image processing. Using clinical analysis, 20 sample size estimated for group 1 and group 2, totally 40 samples for 2 groups with alpha value 0.05, threshold 90 % and pretest power 80%. The images are already analyzed by using method in to train and improve the processes. In different real underwater interventions, the images used for training the neural network are taken by an underwater camera mounted on an autonomous underwater vehicle. The images were divided into six sets according to the qualities of the images.

#### BLOCK DIAGRAM

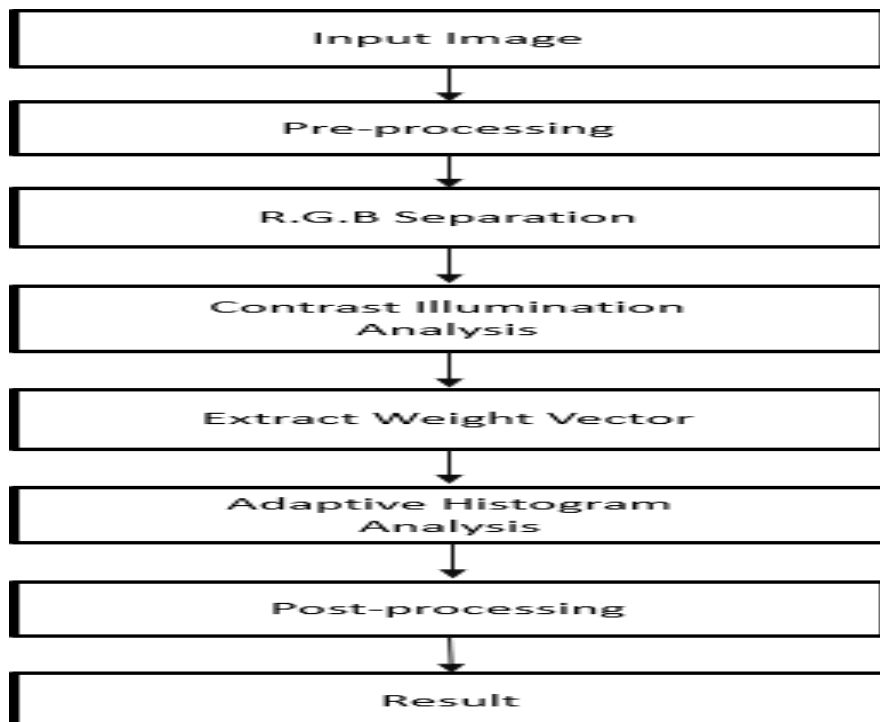


Fig 6.2 Block diagram of proposed method



V. RESULT

☐ This is the image which is similar to that of our input image, so there are no changes identified in this output image.



Fig 7.1 Original Image

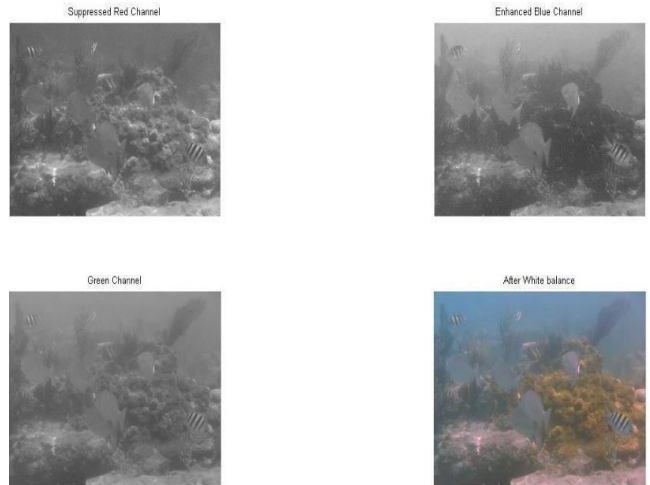


Fig 7.2 Separation of channel

Here, will have an image separation that can be divided into four channels:

- I. Suppressed Red Channel
- II. Enhanced Blue Channel
- III. Green Channel
- IV. After White Balance

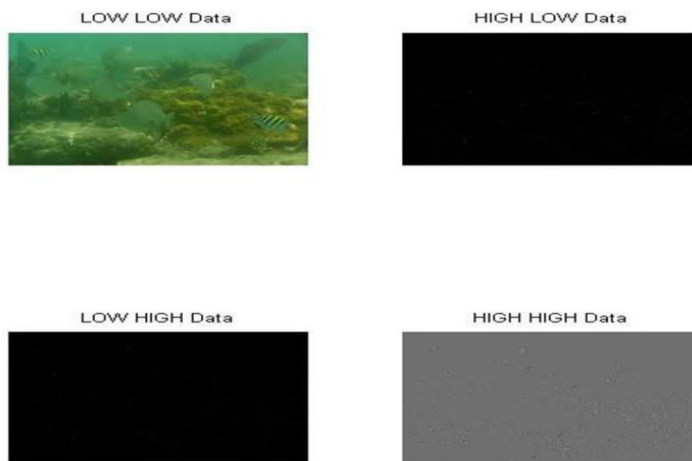


Fig 7.3 Data Separation of Data Sets

Here, will have separation of data sets into four levels:

- ☐ LOW LOW Data
- ☐ HIGH LOW Data
- ☐ LOW HIGH Data

☐ HIGH HIGH Data

### DWT (Discrete Wavelet Transform)

- ☐ DWT is a wavelet transform for which the wavelets are sampled at discrete intervals.
- ☐ DWT provides a simultaneous spatial and frequency domain information of the image



Fig 7.4 DWT Process Image



Fig 7.5 Optimal weighted multi-exposure fusion



Fig 7.6 Proposed Enhanced Output Image

## VI. CONCLUSION

In this work, a novel Deep Learning Approach Convolutional neural network is implemented for image dehazing, in which it is implemented in this piece in actual time and especially in comparison with classical SVM algorithm to prove the efficiency of the proposed approach. Only certain reconstruction algorithms are used to train the system and contain some many contributions so as to really be difficult to approximate mostly during interference. Once the framework is trained, however, it can properly unravel images in real-time with a core image as an contribution. The outcome process that the method can simplify and learn to dehaze images from a place and use them in a different location. The resulting performance estimations are clearly proved via the graphical results shown in resulting section as well as the proposed approach of CNN is far better than the classical SVM logic. Statistical analysis also performed, the results shows that the proposed algorithm perform well compare to the existing method and attained significant value  $p < 0.05$ .

### FUTURE SCOPE

In further we are going to implement our system with more efficient techniques with increasing the accuracy which will be used in real time application.



### **REFERENCES**

1. Sneha Joseph, Suresh G, P. Jyothi, S. Ashok, D. Venkatesan, S. Agnes Shifani, "A Novel Enhanced EfficientNet Model for Identification of Floating Debris on Marine Surface", 2023 International Conference on Artificial Intelligence and Knowledge Discovery in Concurrent Engineering (ICECONF), pp.1-10, 2023.
2. T. Thivya, C. Kalaivanan, N. Juliet, Vengadapathiraj M, G. Mary Valantina, V. Mohanavel, "An Improved Network Segmentation Performance in Lesion Segmentation based on Mask R-CNN", 2022 6th International Conference on Electronics, Communication and Aerospace Technology, pp.1192-1198, 2022.
3. L. Vanitha, R. Kavitha, M. Panneerselvam, Ch Prathima, G.MaryValantina, "A Novel Deep Learning Method for the Identification and Categorization of Footpath Defects based on Thermography", 2022 3rd International Conference on Smart Electronics and Communication (ICOSEC), pp.1401-1408, 2022.
4. Matheus Machado Dos Santos, Giovanni G. De Giacomo, Paulo L. J. Drews and Silvia S. C. Botelho, "Matching Color Aerial Images and Underwater Sonar Images Using Deep Learning for Underwater Localization", IEEE Robotics and Automation Letters, 2020.



**INNO SPACE**  
SJIF Scientific Journal Impact Factor  
**Impact Factor: 8.423**



**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

9940 572 462 6381 907 438 [ijirset@gmail.com](mailto:ijirset@gmail.com)



[www.ijirset.com](http://www.ijirset.com)

Scan to save the contact details