In et al. [1], a collective review by Raimondo Schettini and Silvia Corchs compared and summarized some current methods of underwater image processing, including image enhancement and restoration. He et al. [2] proposed a simple and powerful dark channel prior for single image input to dehaze. N.M. Kwok et al. [3] provided an effective approach for color correction based on gray world. The super-resolution restoration was addressed by using total variation combined with bregman iteration in et al. [4] Firstly ,the process of contrast enhancement and color correction as pre-processing was done , after which they get a haze-free and color-corrected image. In this process, in order to improve the clearness, they adopted dark channel prior to get information of dark channel and enhance image contrast. After that, they developed gray world algorithm to make it more eligible for underwater image processing . As traditional gray world algorithm neglects the special underwater environment where the colors of light principally consist of the blue and green, they set several coefficients to adjust for brightening according to the underwater visibility distance of the red, green, and blue light. After they get the enhanced image, the next part is called image restoration. Firstly, by comparing and subtracting two photos taken in succession, they recognize and remove the moving irrelated objects. Secondly, they narrowed the blank according to the direction its size towards and applied improved TV model to fill the blank. When resizing the image after the inpainting step, they upgraded the BP network and then apply the trained BP network to realize super-resolution restoration of some details in the image.

An underwater image enhancement process in et al. [6] is designed with deep learning principles and also analyzes the accuracy levels with the comparison of proposed CNN logic with classical SVM scheme And the resulting scenario is applies to the software testing tool designed by IBM called Statistical Package for the Social Sciences (SPSS) to identify the stability of the proposed design as well as the sustainable accuracy metrics are acquired from the tool. The overall limitations identified over the approach are it process the image with low contrast and such color casting consumes more time for processing. The number of groups (datasets) are used in this application to train the model is two as well as the sample size consideration for those datasets are 40. These variations of datasets are trained with CNN and SVM to create a proper model for analyzing the underwater images accordingly.

Links :

[1] Schettini, Raimondo, and Silvia Corchs. "Underwater image processing: state of the art of restoration and image enhancement methods." EURASIP Journal on Advances in Signal Processing 2010, no. 1 (2010): 746052

[2] He, Kaiming, Jian Sun, and Xiaoou Tang. "Single image haze removal using dark channel prior." IEEE transactions on pattern analysis and machine intelligence 33, no. 12 (2011): 2341- 2353.

[3] Kwok N M, Wang D, Jia X, et al. Gray world based color correction and intensity preservation for image enhancement[C]//2011 4th International Congress on Image and Signal Processing. IEEE, 2011, 2: 994-998.

[4] Li, Kangshun, Yunshan Wei, Zhen Yang, and Wenhua Wei. "Image inpainting algorithm based on TV model and evolutionary algorithm." Soft Computing 20, no. 3 (2016): 885-893.

[5] Wu, Zeling, and Haoxiang Wang. "Super-resolution reconstruction of SAR image based on non-local means denoising combined with BP neural network." arXiv preprint arXiv:1612.04755 (2016).

[6] Jiaying Xiong, Peixian Zhuang and Yanan Zhang, "An Efficient Underwater Image Enhancement Model With Extensive Beer-Lambert Law", IEEE International Conference on Image Processing, 2020.