Superposition of dual image fusion with improved dehazing methods for high visibility of underwater image

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Abstract:
Limited visibility is one of the problem in underwater imagery. As the images captured in deep blue or green ocean, the visibility becomes restricted as the color spectrum is filtered or absorbed by the water medium. This results the objects to be hardly seen and differentiated from the background. The propose method which is called integrated dehazed image fusion (IDF) superimposes two main steps in improving the visibility of the object in deep underwater image. At the beginning, the modified homomorphic filtering is applied to the input image to improve the homogeneous illumination of the image between the background and foreground. Dehazing process is then implemented with integrated of contrast boosting mechanism, followed by dual image fusion technique. Finally, the image is applied with specific local histogram enhancement with adaptive mechanism to improve the local contrast of the image. Implementation of dehazing process improves the effect of homogeneity in the output image which prevent the image from having imbalance color between fore- and background. Superposition with contrast enhancement improves the overall contrast quality of the image. Qualitatively, the output image has better contrast and visibility compare to the current stateof-the-art methods, beside the improvement of overall image color.

Keywords: Underwater Image; Contrast Correction; Dehazing; Dual Image Fusion; High Visibility Image

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