

ABSTRACT

Images captured under water are usually degraded due to the effects of absorption and scattering. Degraded underwater images show some limitations when they are used for display and analysis. For example, underwater images with low contrast and color cast decrease the accuracy rate of underwater object detection and marine biology recognition. To overcome those limitations, a systematic underwater image enhancement method, which includes an underwater image de-hazing algorithm and a contrast enhancement algorithm, is proposed. Built on a minimum information loss principle, an effective underwater image de-hazing algorithm is proposed to restore the visibility, color and natural appearance of underwater images. In this project, a novel self-similarity-based method for de-scattering and super resolution (SR) of underwater images is proposed based on ambient light and transmission map estimation. A simple yet effective contrast enhancement algorithm is proposed based on based on NLM (Non Local Means), which increases the contrast and brightness of underwater images. The proposed method can yield two versions of enhanced output. Interpolation works in two directions and tries to achieve a best approximation of a pixel's color and intensity based on the values at surrounding pixels, One version with relatively genuine color and natural appearance is suitable for display. The other version with high contrast and brightness can be used for extracting more valuable information and unveiling more details.