

# Red and Blue Channels Correction based on Green Channel and Median-based Dual-Intensity Images Fusion for Turbid Underwater Image Quality Enhancement

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**Abstract.** One of the main problems encountered in processing the turbid underwater images is the effect of greenish color cast that overshadows the actual color of an object. This paper introduces a new technique which focuses on the enhancement of turbid underwater images. The proposed method integrates two major steps. The first step is specially designed to reduce the greenish color cast problem. The blue and red channels are improved according to the difference between these channels and the reference channel in terms of the total pixel values. Then, the median-based dual-intensity images fusion approach is applied to all color channels to improve the image contrast. Qualitative and quantitative evaluation is used to test the effectiveness of the proposed method. The results show that the proposed method is very effective in improving the visibility of the turbid underwater images.

**Keywords:** Image Processing, Turbid Underwater Image, Contrast Stretching.

## 1 Introduction

The features of the turbid underwater images differ from deep underwater images, where not only the red channel but the blue channel also problematic due to absorption by the organic matter [1]. As a result, the greenish color cast dominates these images and causes the actual color of an object difficult to be determined accurately. In addition, the turbid underwater images also have low contrast issue, resulting in poor image quality.

Based on the aforementioned issues, it is very crucial for underwater researchers to focus on improving the turbid underwater images. In this paper, an idea to improve the visibility of turbid underwater images is presented. The proposed method involves two major steps: red and blue channels correction based on green channel, and median-based dual-intensity images fusion (RBCG-MDIF). The capability of the proposed method is validated through qualitative and quantitative evaluation results.

This paper is organized as follows: literature review is described in Section 2. Section 3 discusses the motivation of this research. Section 4 provides a detail explanation of the proposed method. In Section 5, the capability of the proposed method is