Single Fog Image Restoration with Multi-focus Image Fusion

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Abstract: The images and videos captured in bad weather usually have low quality caused by reduced contrast and faded color. However, traditional techniques are not sufficient to solve the problems of halo artifacts and brightness distortion. In this paper, a multi-focus fusion method for single fog image restoration is proposed. Firstly, we estimate the global atmospheric light only in the sky regions to minimize interference from other regions. Secondly, we introduce a novel fast local Laplacian filtering with adaptive boundary constraint to optimize the transmission properly so as to reduce the halo artifacts. Finally, we remove the haze and produce a more natural effect on visual recovery by using a new multi-focus image fusion method. Experimental results show that the proposed method outperforms state-of-the-art haze removal methods in terms of efficiency and dehazing visual effect.
Keywords: image restoration; histogram analysis; adaptive boundary constraint; multi-focus image fusion

I. Introduction

In object detection, recognition, and navigation, the clearly natural environment is important to execute visual activities successfully [1]. However, the quality of captured images and videos are usually