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Color Image Dehazing using Surround Filter and Dark Channel Prior

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Abstract

Outdoor images are often degraded by haze, resulting in a distinctive gray or bluish hue which diminishes visibility. Of the existing haze removal methods, the ones that are effective are computationally complex and memory intensive. In this paper, we propose a simple haze removal technique, whose computational complexity is that of a simple convolution. To this purpose, a center surround filter is employed to improve speed and memory requirements of the transmission estimation in image dehazing. This can be useful for real time applications such as driver assistance, runway hazard detection and surveillance. The proposed technique relies on deriving an alternative transmission estimate by filtering the input image in three different color spaces, namely RGB, Lab and HSV. The effectiveness of the proposed method is compared with that of other state of the art methods using a subjective quality assessment method and a number of objective quality assessment methods.

1. Introduction

Haze is an atmospheric effect which forms a gray or bluish hue over the scene, thus diminishing visibility in outdoor images. Particles such as smoke, moisture, dust and vapor present in the atmosphere scatter light and cause the formation of haze [1]. The manner in which a particle scatters incident

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