A New Intrinsic-Lighting Color Space for Daytime Outdoor Images

Abstract:

Extracting or separating intrinsic information and illumination from natural images is crucial for better solving computer vision tasks. In this paper, we present a new illumination-based color space, the IL (intrinsic information and lighting level) space. Its first two channels represent 2D intrinsic information, and the third channel is for lighting levels. The IL color space has a one-to-one correspondence with the RGB color space. One valuable benefit of the IL color space is that illumination-related processing can be realized by directly operating on the lighting channel. As an example, based on the extracted lighting channel, we propose a new algorithm to estimate the intrinsic lighting level of an image such that the shadow-free color image and relighting series are obtained. In contrast to the existing color spaces for display or printing, the IL color space intuitively shows the information of reflectance and lighting levels for colors separately.