Estimating Chromaticities of Multicolored Illuminations

Robby T. Tan   Katsushi Ikeuchi

In machine vision, many methods have been developed to estimate illumination color. But, few of these methods deal with multicolored illuminations. To our knowledge, no method that uses highlights as a main part to analyze has been proposed for the purpose of handling multicolored illuminations. Although several methods can be applied for that purpose, they need a separate process for each highlight region that has the same illumination color. This requirement is problematic for textured surfaces since, in different surface colors, whether two regions of highlight have the same illumination color is difficult to determine. In this paper, we introduce a method that can handle both single- and multi-colored illuminations. The method is principally based on inverse-intensity chromaticity space, a two-dimensional space that was originally proposed to estimate a single color of illumination. We extend the usage of the space by developing an iterative algorithm to deal with multicolored illuminations. The method requires only crude highlight regions of all illumination colors, without requiring any further segmentation process. Moreover, the method is still feasible even if the number of illumination colors is unknown.

Publications

[1] Robby T. Tan, Katsushi Ikeuchi, "Estimating Chromaticities of Multicolored Illuminations", in IEEE International Workshop on Color and Photometric Methods in Computer Vision (CPMCV, in conjunction with ICCV 2003), October 12, 2003, Nice France.
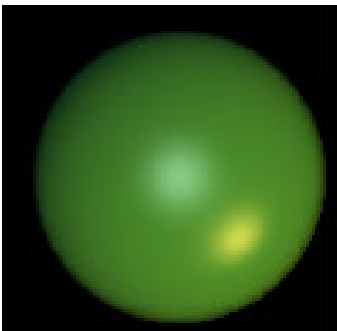
input: uniformly colored surface
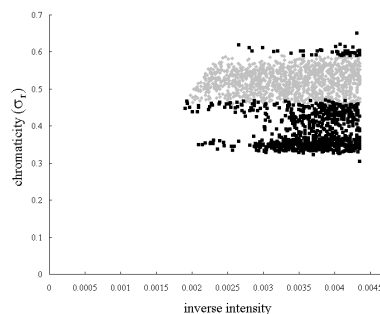lit by multicolored illuminations
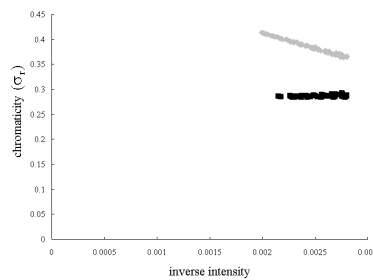
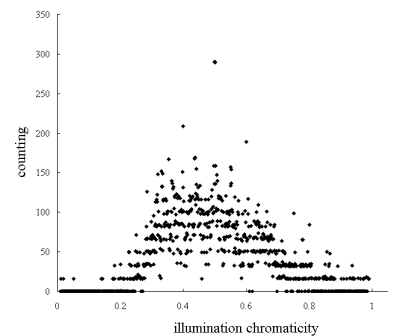Tranforming the input pixels
into inverse intensity chromaticity space
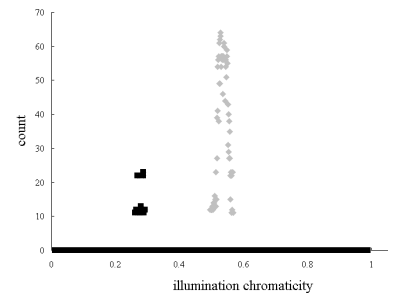
Tranforming the points in inverse
intensity chromaticity space
into histogram space

input: textured surface
lit by multicolored illuminations

Tranforming the input pixels
into inverse intensity chromaticity space

Tranforming the points in inverse
intensity chromaticity space
into histogram space