Physics-Based Spectral Sharpening through Filter-ChartCalibration

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Abstract

The spectral overlap of color-sampling filters increases errors hen using a!iagonal Matri" Transform, !MT, for color correction and reduces color distinction#\$pectral sharpening is a transformation of colors that as introduced to reduce color-constancy errors hen the colors are collected through spectrally overlapping filters# Theearlier color constancy methods improved color precision hen the illuminant color ischanged, but they overloo% ed the color distinction# &n this paper, e introduce a ne "spectralsharpening techni'ue that has a good compromise of color precision and distinction, based onreal physical constraints# The spectral overlap is measured through observing a gray referencechart ith a set of real and spectrally dis(oint filters selected by the user# The ne "sharpeningmethod enables to sharpen colors obtained by a sensor ithout %no ing the camera responsefunctions#

E"periments ith real images sho ed that the colors sharpened by the ne " methodhave good levels of color precision and distinction as ell# The colorconstancy performance compared ith the data-based sharpening method in terms of both precision and distinction#

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