Vector fields color constancy correction within the CoLIP framework

Thomas Crozier[1], Yann Gavet[1]

[1]Mines Saint-Etienne, Univ. Lyon, CNRS, UMR 5307 LGF, Centre SPIN, F - 42023 Saint-Etienne, France.

Email: gavet@emse.fr

Abstract

Color constancy is the phenomenon that allows human vision to perceive the right color of an object or of a scene despite the scene is enlighted by a non neutral illuminant that leads to a biased reflection of the light on the object. The stake of White Balance Correction is to make an estimation of the scene illuminant and to correct the image. This illuminant is generally estimated with referenced grey objects placed on the scene, the measured chromaticity of these objects is then considered as the chromaticity of the global illuminant of the scene. This method gives a consistent neutral chromaticity on grey objects but may not give the desired result on colored objects.
In this work, a method is proposed to tackle Color Constancy problems within the CoLIP framework. Since we use a dataset having McBetch ColorChecker on each image, with patches of standardized values (18 colored patches and 6 neutral ones going from white to black), we propose a method to adjust the entire image chromaticity so that in the resulting image all the patches correspond to their theoretical values. The 24 patches present on the chart are not enough to correct the whole image, we thus use an interpolation to compute the correction of each pixel. The resulting interpolation gives us a vector field.
These transformations are performed in the CoLIP colorspace [1,2], that has been designed to be physically consistent with the laws of human visual perception. This color space has three channels, an achromatic one and two chromatic ones. Since this color space has not been used in many color constancy tasks, we considered it was necessary to show it can be used for this task. To do so, we applied classic White Balance algorithms such as the White Patch and the Grey World one [3], to show the CoLIP colorspace can provide consistent results.

References

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