Dear Editor,

We write to submit a manuscript entitled “TITLE” for consideration as an article in the journal of vision.

Color constancy, the ability to stably perceive the color of an object under variations in its surround, is a significant invariance detection ability of our visual system. But, little is known about the computations that lead to constancy. To understand such mechanism, we have taken a supervised learning approach in this paper. We have used a biologically-inspired supervised learning algorithm to identify receptive fields (RFs) that are optimal to achieve constancy. This paper makes the two significant advances:

As largescale database of naturalistic images labeled with the spectral properties of the objects and illuminants are not available, first we developed a software to generate multispectral image of naturalistic scenes. This software has the ability to precisely control various aspects that define a natural scene and can be used to generate databases of well labeled naturalistic images. Moreover, the software provides the option to systematically vary one or several aspects of a scene, thus allowing us to study the effect of each aspect individually and in combination. We envision that this software would be useful in study of color constancy, and vision in general.

Second, using a biologically inspired learning algorithm on these images, we identified RFs that are optimal to estimate the luminance of an object in a naturalistic scene. The optimal RFs have a center surround structure with emphasis on the L and M cones of the retinal mosaic. This is consistent with prior work on luminance constancy and shows the power of the approach developed in this work.

Color constancy is one of the several invariance detection problems the visual system solves. An understanding of its mechanism can provide insights to other invariance detection problems. We hope that the approach developed in this work and the insights gained from studying luminance constancy will be of interest to others researchers in vision.

Sincerely,

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