

Chromatic Noise Perception in Digital Photography

Abstract:

In order to better predict the visibility of chromatic noise in digital photography, we build an optimal CSFs/opponent color space combination. A variety of opponent color spaces were first investigated. Three psychophysical experiments were performed. Principle Component Analysis was applied on the results of the first experiment to derive a PCA space with luminance channel independent to chromatic channels. Comparison with other opponent color spaces illustrates their relative properties regarding cross-talk of chromatic noise into the luminance channel (or vice versa). Our optimal opponent space was derived from the PCA space. In the second experiment, thresholds measurements for various noise images were carried on in the optimal color space obtained from the first experiment. In the third experiment, suprathreshold measurements were performed by matching the magnitude of the noise to a fixed achromatic noise pattern. Such an optimal CSFs/opponent color space combination will be used to improve iCAM color appearance model and extend its application in digital photography.

Biography:

Xiaoyan Song is a second year master student in Munsell Color Science Laboratory at Rochester Institute of Technology. She is going to receive her M.S. degree in Color Science in May 2004. She also holds a B. S. in Information Management and Information System from Shandong University in China. Her research interest is on color appearance, color management, and psychophysical experiment design.