MIT CSAIL

6.869 Advances in Computer Vision

Fall 2013

Problem Set 4: Filtering Statistical models of images

Posted: Thursday, September 26, 2013	**Due:** Tuesday, October 8, 2013

You should submit a hard copy of your work in class, and upload your code (and all files needed to run it, images, etc) to stellar.

Your report should include images and plots showing your results, as well as pieces of your code that you find relevant.

Problem 1 *Retinex: improving the input for the simple visual system*

One of the main issues that the simple visual system from the first lecture had is that it was very sensitive to the illumination conditions. For instance, the background/foreground segmentation assumed a constant intensity value for the background. Also, images were corrupted with noise if the illumination intensity was not strong enough. The goal of this problem is to implement the Retinex algorithm as described in the class slides and to apply it to images of the simple world.

In the attached code, your task is to complete the script *retinex.m*. The script computes the image derivatives with filters $[-1, 1]$ and its transpose, using the trick described in [1].

Attach the code with your changes and comments, and examples of pairs of input and output images. Use *simpleworld.jpg* and some other image (or several) that have strong illumination effects that you want to remove.

To better show the effects of the Retinex algorithm make a plot of a 1D line (or column) from the input and output images. If you plot both lines in the same graph, it should be clear that the gradient due to illumination disappears.

References

[1] Yair Weiss. Deriving intrinsic images from image sequences. pages 68–75, 2001. `http://www.cs.huji.ac.il/~yweiss/iccv01.pdf`.