Digital Imgae Analysis : Assignment 1

Tone Mapping HDR Images

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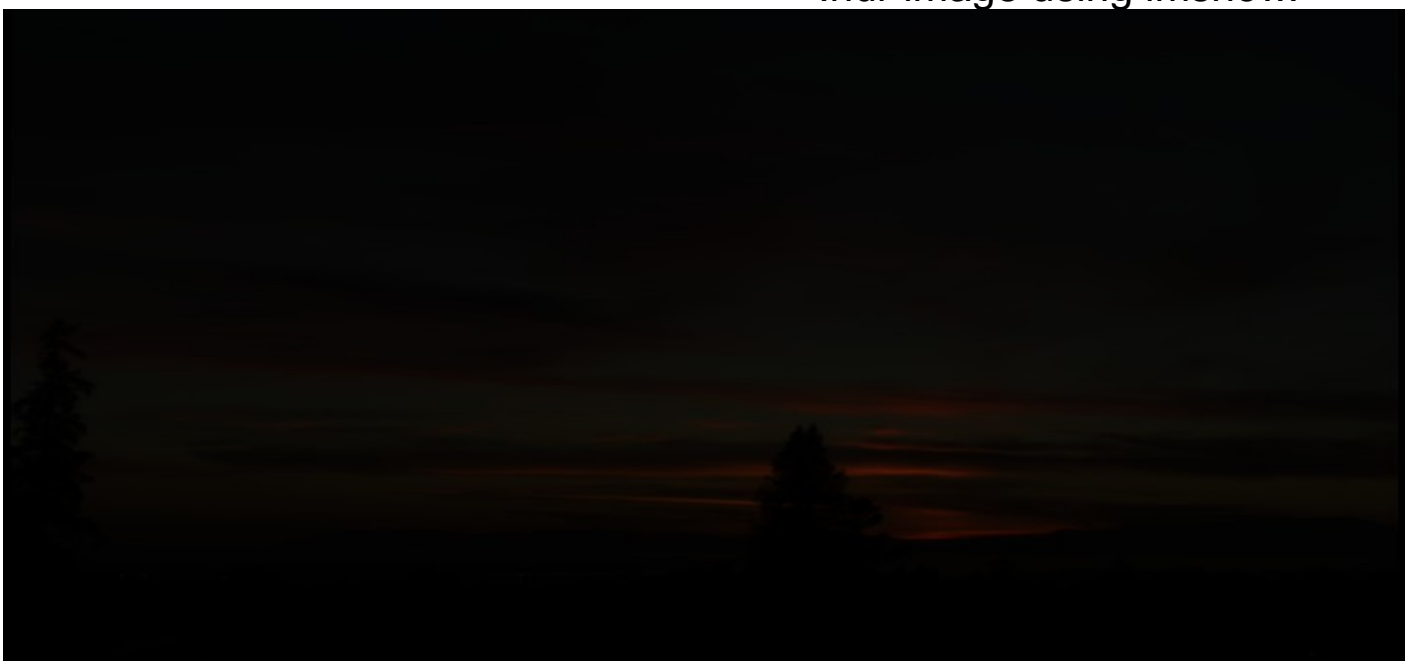
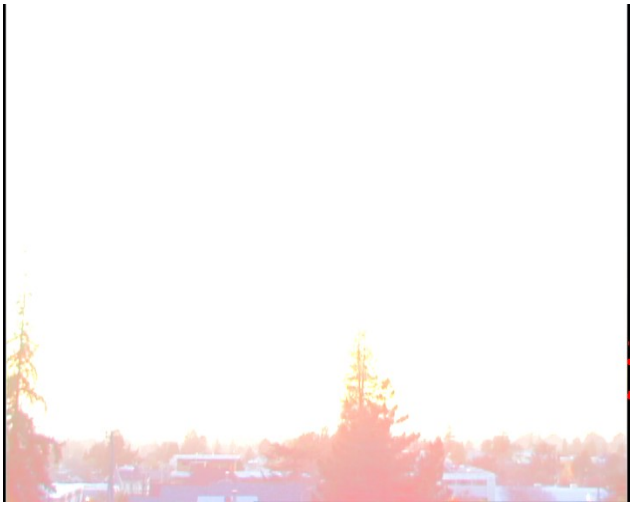
[1] Vinesunset image without preprocessing : Directly displaying .hdr image using imshow.



Little obsevation of red sky and trees are visible.

[2] Linear Rescaling the pixel value-

Scale = 0.01



Scale = 0.05

Scaling image by positive quantity will brighten the image and all the values will be clipped to [0, 255]. Contrast in brighter region is not visible as all pixel intensities are mapped to 255, thus no red sky is visible.

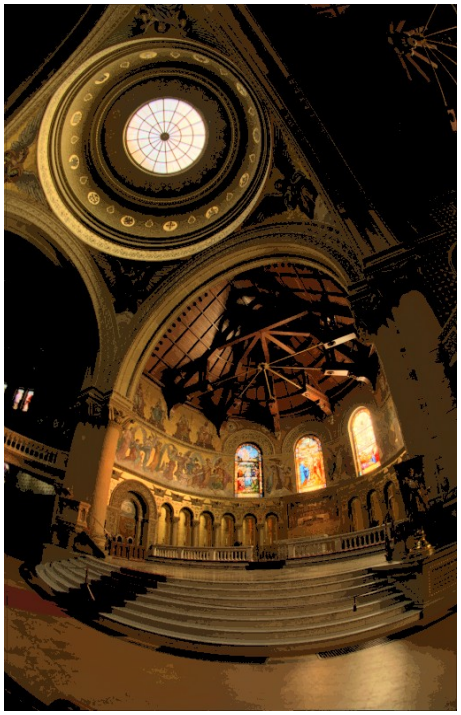
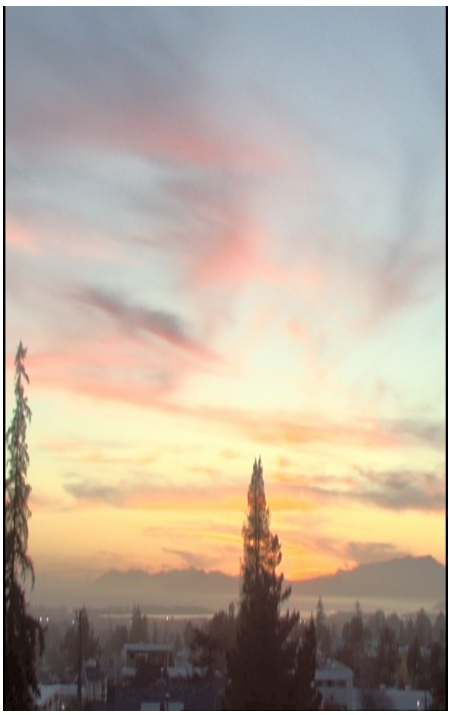
[3] Log rescaling the pixel values in log luminance domain -

Scale = 0.01

Scale = 0.5

It is similar to linear rescaling. More features are visible as compared to unprocessed image

[4] Histogram equilization -
Spacial domain enhancement

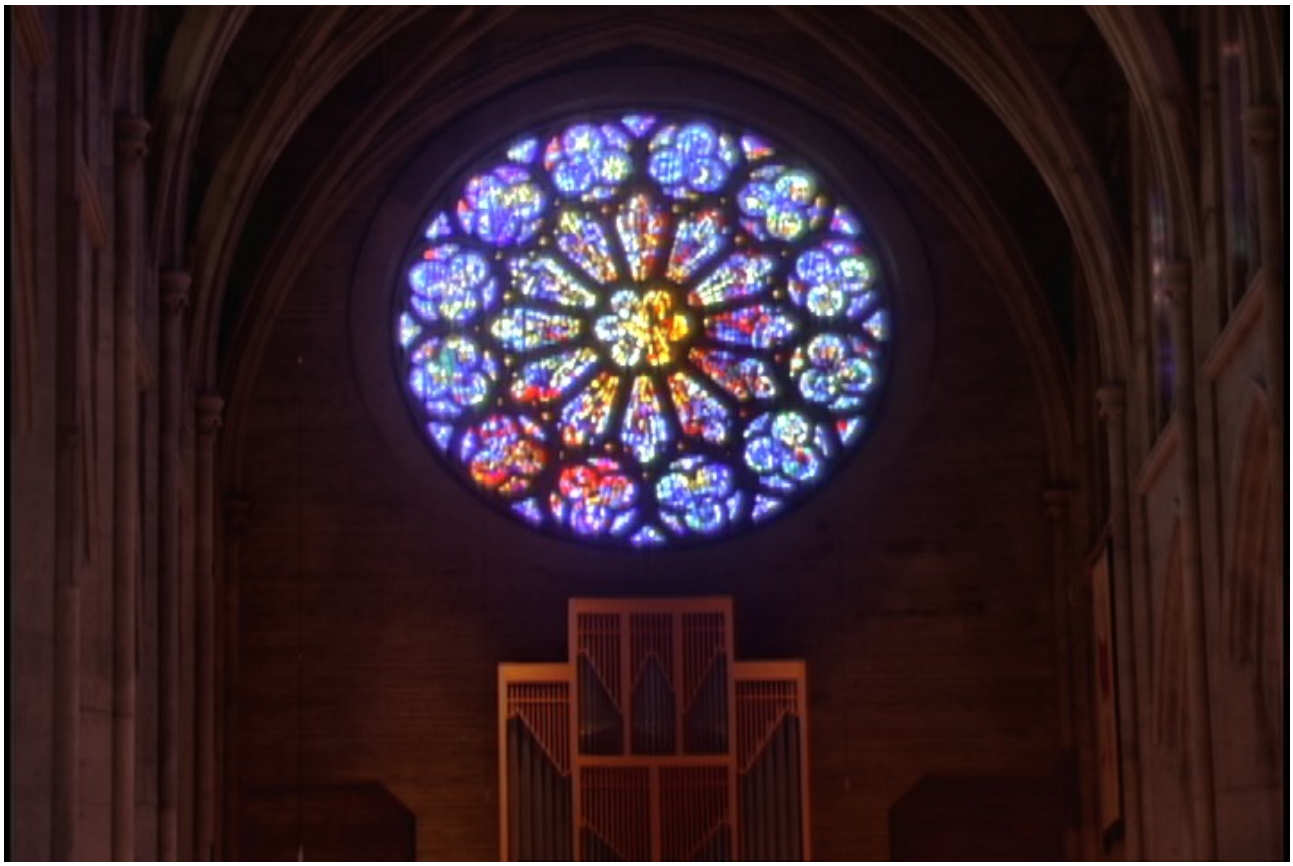

as can be seen it give very good result in vinesunset image as colors and contrast in sky is properly visible.

[5] Tonemapped Image - Durand and Dorsey, "Fast Bilateral Filtering for the Display of High-Dynamic-Range Images".

All the colors and local contrast is shown in tone mapped image. I have implemented fast approximation of the bilateral filter based on a signal processing interpretation.

Kernel size = 5*5*5 .
Space sigma of gaussian = min(width,height) /16
Range sigma of gaussian = (max_value – min_value) / 10
And for every image gamma correction is applied.

Results of **Durand and Dorsey** Tone mapping algorithm



References -

[1] wikipedia
[2] Stackoverflow
[3] C++ and Matlab implementation of paper by author (mentioned in paper itself)-
https://people.csail.mit.edu/sparis/bf/ and
http://people.csail.mit.edu/jiawen/software/bilateralFilter.m

[4] Collaboration with Katik kumar and Ansh Prakash