

## CSCE 689 Computational Photography

### Report on Assignment 6

#### I. Overview

The objective is to perform tone mapping by using multiple exposure images and combining them into a HDR radiance map and lastly converting the map into a suitable image.

#### II. Deliverables

The contents of the submission have the following:

Code\	Directory containing python source files: main.py, gsolve.py
Report_430000753_RizuJain.pdf	This report.

#### III. Setup

The assignment was developed in the following environment:

- Host OS: Windows 10
- IDE: Spyder (Python 3.7)

## IV. Task 1

The following steps were performed to accomplish this task:

1. Read the images in a list
2. Randomly sampled  $5 \times 256 / (P-1)$  indices from all the indices in a flattened image
3. For each channel, take these pixels and pass them to the `gsolve` function
4. Also create the `w` triangular weighted map for  $Z = 0$  to 255
5. We get a separate `g` for each channel

## V. Task 2

### Getting Irradiance (E):

1. Created a vectorized function that returns the  $g(z)$  for specific channel
2. Steps 2 to 5 are done for each image
3. Map this function to each channel in the numpy array
4. Subtract the log of exposure for the specific image from all pixels
5. Multiply each pixel with the weights using  $w$ , simultaneously creating a denominator with just the sum of weights
6. After this we have a list of new images which are the irradiances of original images
7. Divide this with the denominator image and we get our weighted irradiance

### Global tone mapping:

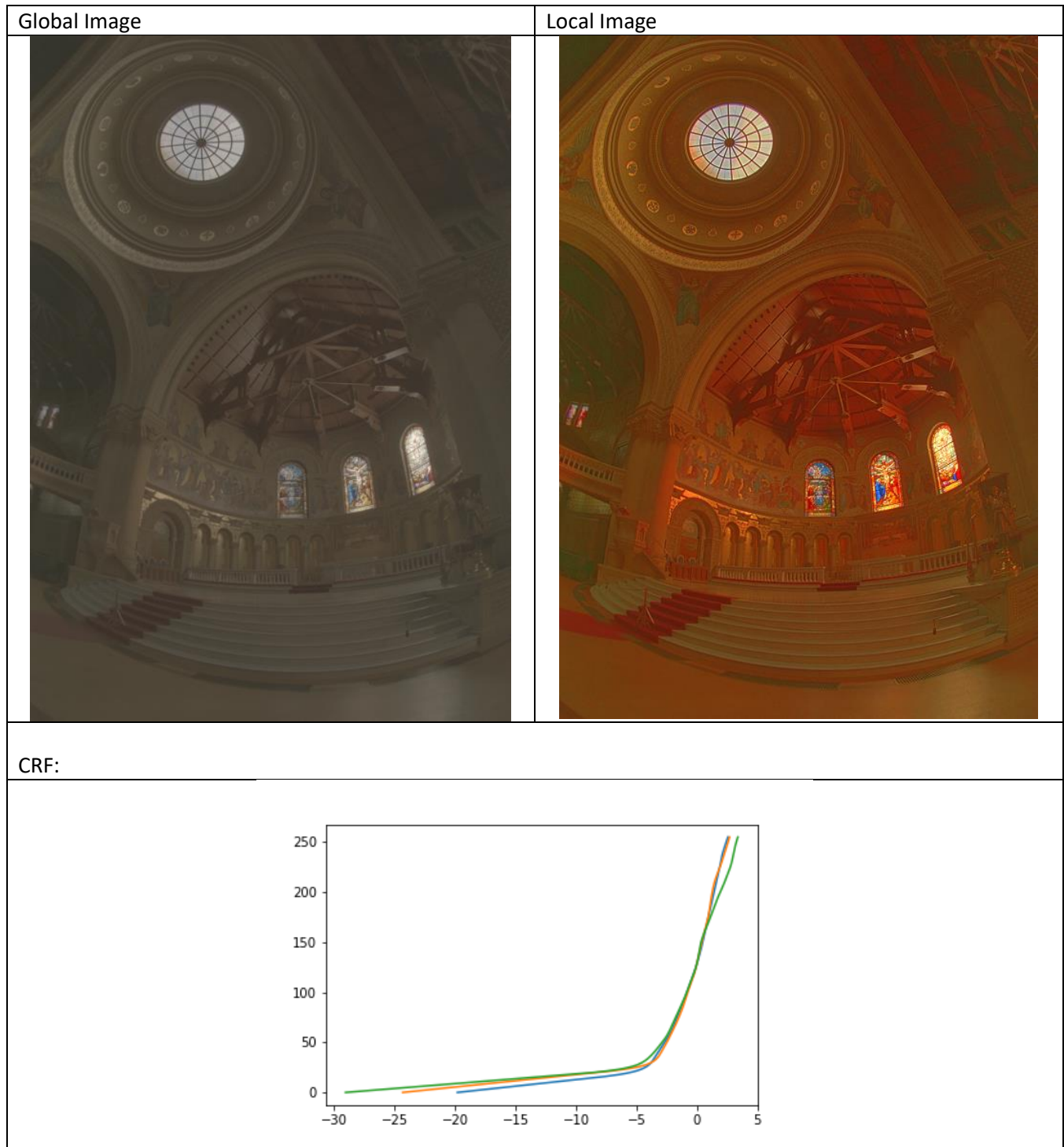
1. Normalize with the maximum irradiance
2. Raise it with a Gamma
3. Tune Gamma to get good results

### Local tone mapping:

1. Performed the steps as mentioned in the assignment
2. Tuned  $dR$ , Sigma (gaussian filter) and Gamma for satisfactory image results

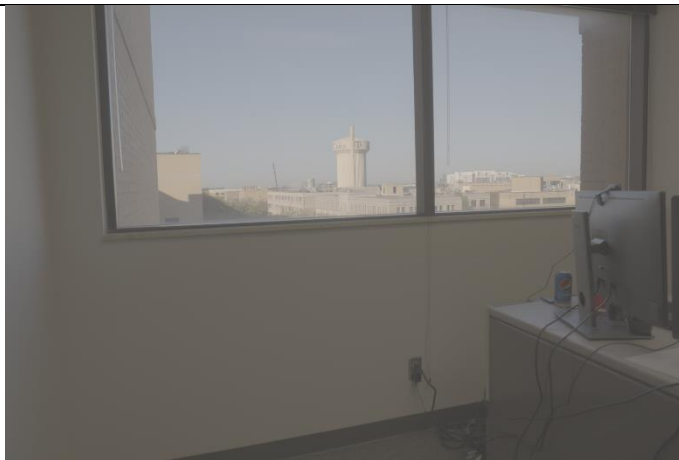
## VI. Results

### Chapel Results

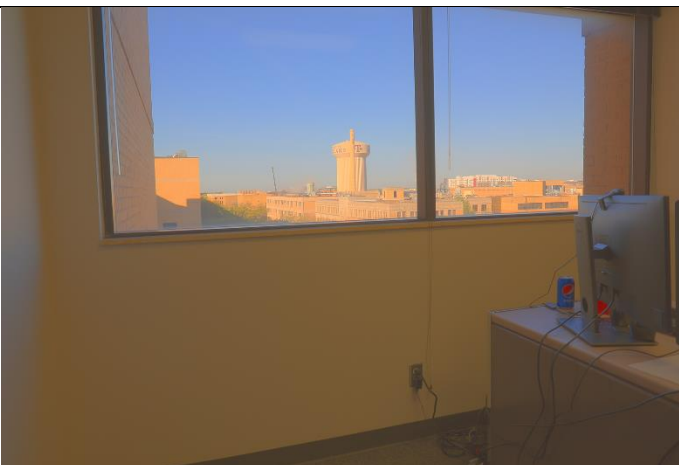


## Office Results

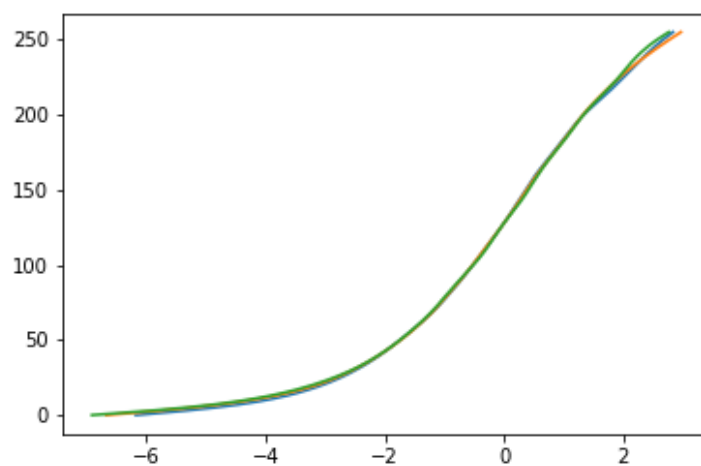
Global Image:



Local Image:



CRF:



## VII. References

- i. P. E. Debevec and J. Malik. "Recovering High Dynamic Range Radiance Maps from Photographs," in Proceedings of SIGGRAPH97 , Computer Graphics Proceedings, Annual Conference Series, pp. 369-378, August 1997.

~ End of Report ~