High Dynamic Range(HDR) Imaging

Sanjana Prabhu EE17B072

April 6, 2021

1 Introduction

In this assignment, we implement HDR imaging and obtain a HDR image from several LDR image captures.

2 Implementation

The code has been implemented and tested to run on MATLAB R2019b. The helper functions are present in the scripts folder and image files are assumed to be present in the data folder. The scripts and data folder are assumed to be present in the same directory as main.m which is the main file. Results to different sections can be obtained by executing individual sections in main.m, which have been separated using MATLAB's operator and named appropriately. All figure write statements have been commented and the figures and .HDR file are present on this *link*.

3 Camera Response Function(CRF) Estimation

Using the method described in the paper and using only 1000 pixels from the given .jpg images, the CRF was estimated for all three channels and they have been shown in Figures 1-3.

4 Constructing the HDR Radiance Map

The obtained HDR radiance map has been uploaded on the drive link that has been shared.

5 Photographic tonemapping

While using $I_{white} = \infty$, the most appealing tone mapped outputs were obtained for K = 0.4, 0.5 and 0.6. These have been uploaded on the figures

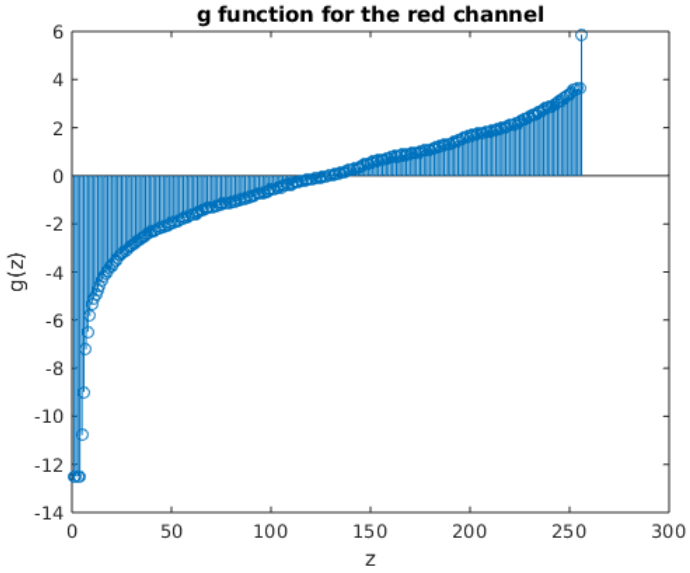

Figure 1: CRF for red channel

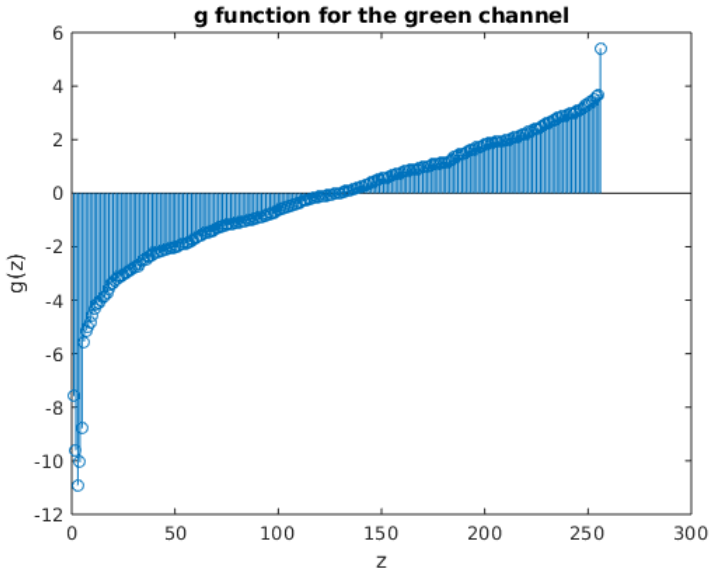

Figure 2: CRF for green channel

Google Drive folder and are named as hdr-tonemapped-K.png.
The most appealing tone mapped outputs were obtained for K = 0.5, B = 0.85; K = 0.5, B = 0.95 and K = 0.5, B = 1. These have been uploaded on the Drive folder and are named as hdr-tonemapped-K-B.png.
Differences between the results:

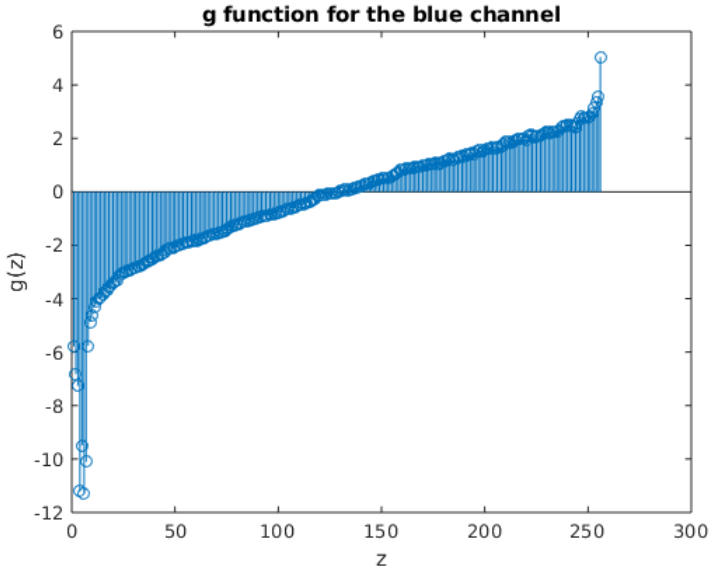

Figure 3: CRF for blue channel

- On varying B near the given value, there is not much difference as shown in the results.
- On setting I_{white} to ∞, the resulting images look slightly brighter.
- On increasing K, the images become brighter as expected since we are scaling the image with K.