Solution 1

(a) Based on x, when $x > 0$ we can get the following:

$$(x-y)^2 + \lambda * x \tag{1}$$

when $x < 0$ we can get the following:

$$(x-y)^2 - \lambda * x \tag{2}$$

Based on (1) and (2), their minimum limit will be $x = y + \frac{\lambda}{2}(x < 0)$, $x = y - \frac{\lambda}{2}(x > 0)$ and $x = 0$. In the image, the minimum value will be determined by one of these three x value.

(b) denoise

Figure 1: Denoising

Solution 2

(a) white balance(1)

Figure 2: balance2a-1

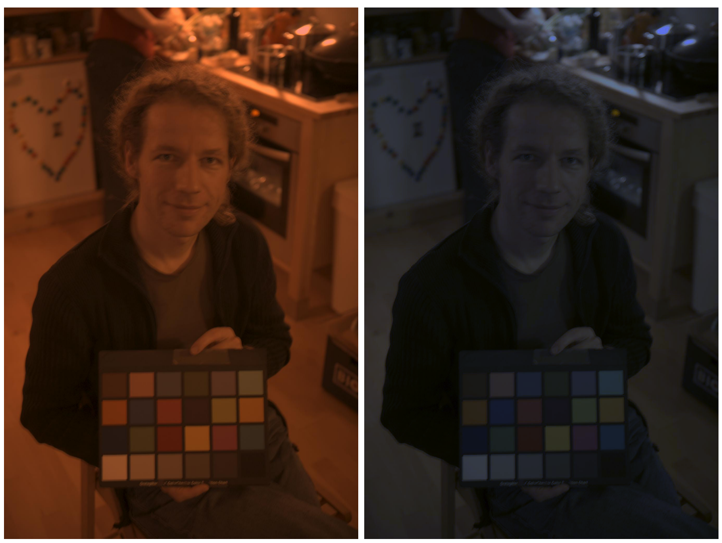

Figure 3: balance2a-2

Figure 4: balance2a-3

(b) white balance(2), in each Figure the first image is the one from part(a)

Figure 5: balance2b-1

Figure 6: balance2b-2

Figure 7: balance2b-3

Solution 3

(a) image of normals

Figure 8: normals

(b) image of the surface color *albedos*

Figure 9: albedos

Solution 4

Depth map by using Frankot-Chellappa method

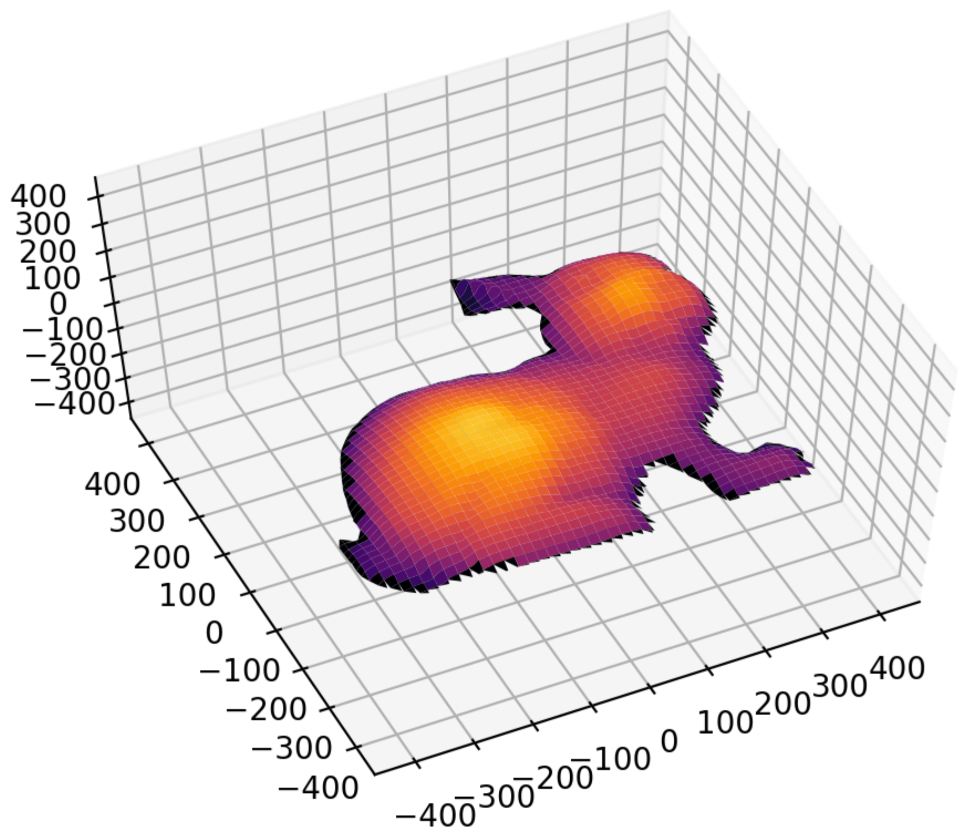

Figure 10: depth map

Solution 5

Depth map by using conjugate gradient method

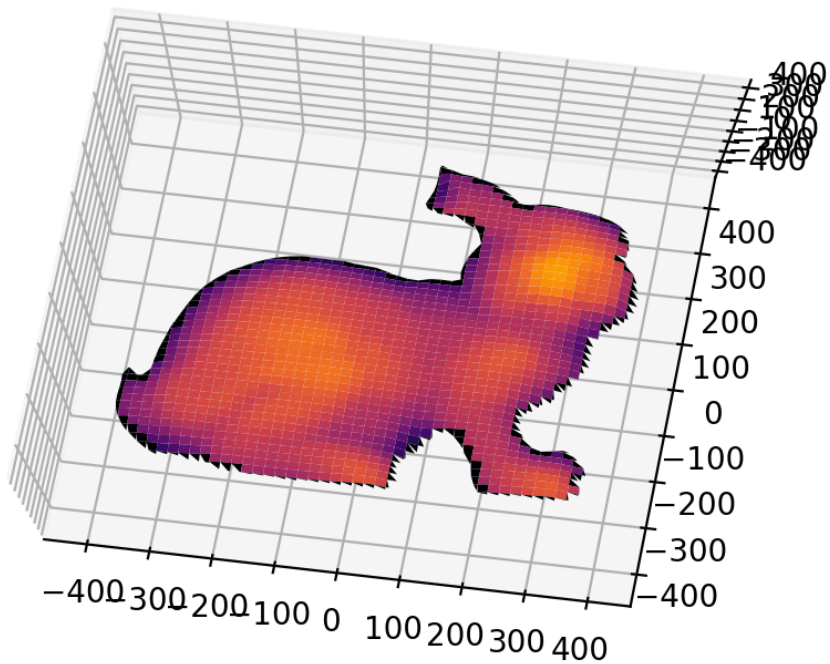

Figure 11: depth map

Information

This problem set took approximately 30 hours of effort.

I discussed this problem set with:

- Sijia Wang
- Jiarui Xing

I also got hints from the following sources:

- lecture ppts