Homework 2

1 Mean shift algorithm

I use the GPU for the mean shift algorithm. The average time for an iteration is around 1.03 seconds with the batch version. The version without batch takes in average 378 seconds for each iteration. I use the CPU of my computer. For the batch part, I implement the same methods but I do everything with reductions / expansions instead of loops.

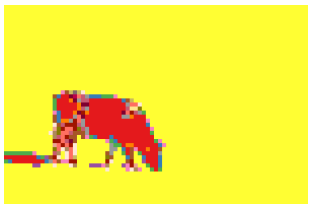

Figure 1: Result of the algorithm

1.1 Implementation of distance

I iterate through all points and I compute the euclidean distance between all points.

1.2 Implementation of gaussian

This is a standard implementation of the Gaussian distribution with a custom bandwidth.

1.3 Implementation of update point

First of all, I multiply the colors with the distances. Then I sum and I divide by the sum of the distances.

2 Segnet

2.1 Implementation

The implementation has nothing special. I just follow the instructions unsing the right layers. Of course I have to take into account the hyperparameters of the network. I created my network using three parts. The first is the encoder. The second is the decoder. There is at the end an output layers.

2.1 Training

I train the NN with the CPU because my GPU runs out of memory. The training is working fine and I am getting an accuracy with is higher than 0.8. After 10 iterations my algorithm cannot run anymore because of some strange erros. The accuracy is higher than 0.8 so I can assume that the network is working correctly.