Assignment 1 Report

Heinrich Dinkel
ID: 1140339107

E-mail: heinrich.dinkel@sjtu.edu.cn

Caution : You need to give an English Abstract by begin-abstractbook.This is a template for SJTU speech lab tech reports.

1   Task

The Task for Assignment 1 is it to evaluate a histogram equalizer. The methods of implementing this histogram equalizer are not specified which means that every student can use different approaches.

2   Implementation

My implementation was done using python, especially numpy and scipy. Generally the implementation follows three steps:

1. For the ith element in k-graylevels , we firstly estimate the counts by using the current pixel $p(x, y)$

$$c_i = \sum_{i=0}^{k-1} p(x, y) = i \tag{1}$$

2. Afterwards the distribution is calculated by using

$$\frac{c_i}{c} \tag{2}$$

$$c = \sum_i c_i \tag{3}$$

3. The cdf is then calculated by summing up the last j frames of i. Furthermore these cdf's need to evaluated by multiplying them by the Grayscale-1, to find an appropriate mapping into the new space.

$$cdf_i = \sum_{b=0}^{j=i} c_b \tag{4}$$

$$new_i = cdf_i * 255 \tag{5}$$

4. Finally the old pixels need to be mapped into the new space, where a simple lookup in the new_i array is sufficient.

3   Usage

The written program can be used with the following syntax.

```
python __init__.py inputimagepath -oh1 orighistpath -oh2
    transhistpath -o pictureoutpath
```
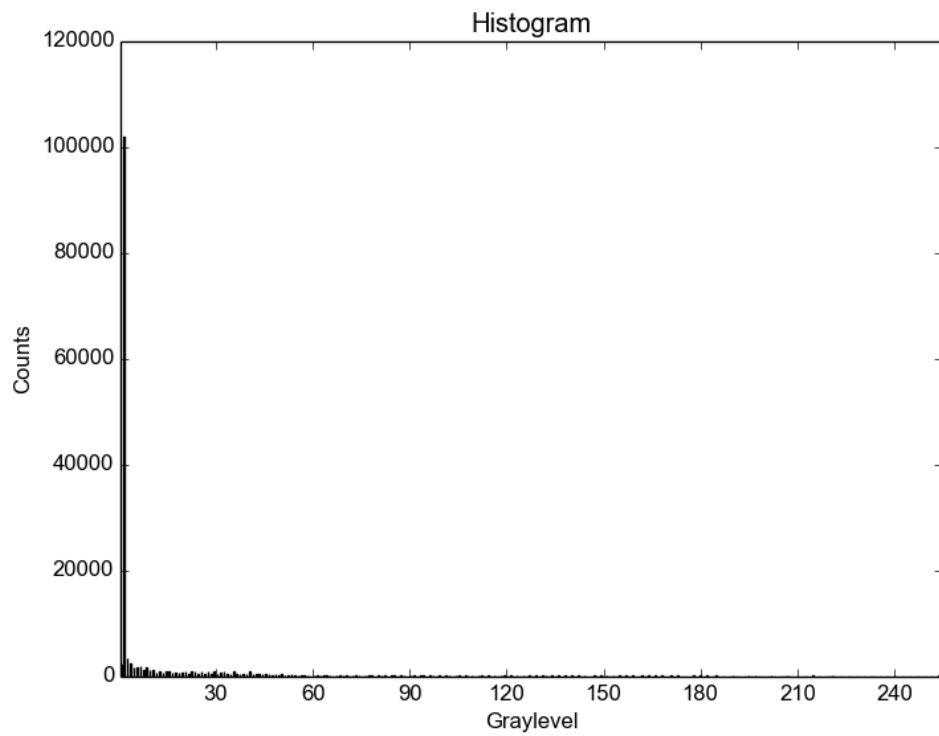
The results can be seen below

Figure 1: Original Histogram of Figure 1
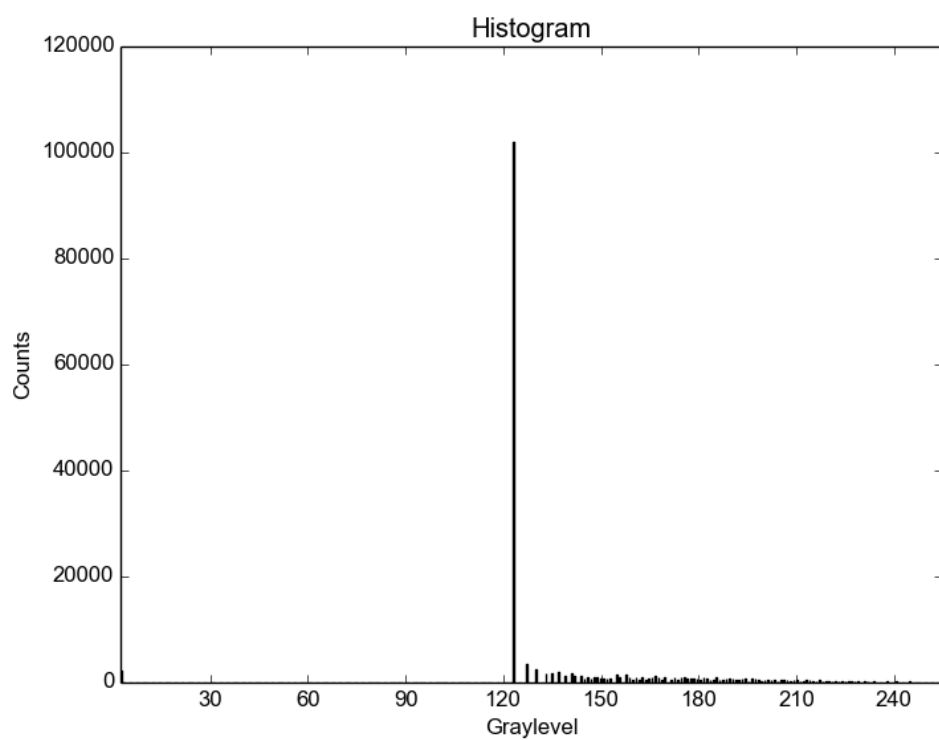
References
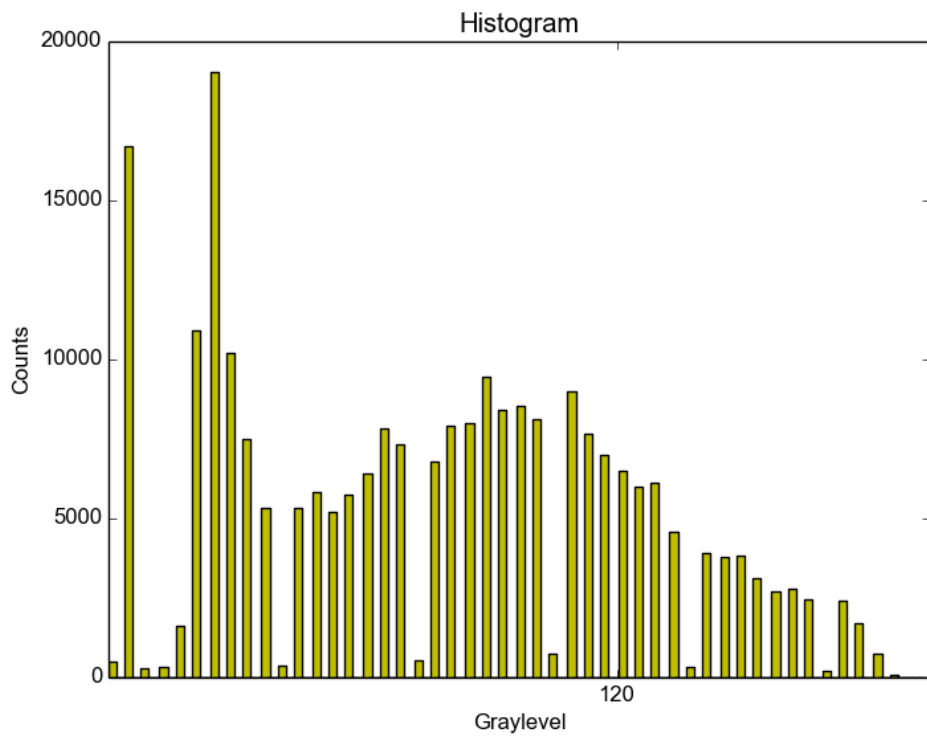
Figure 2: Transformed Histogram of Figure 1

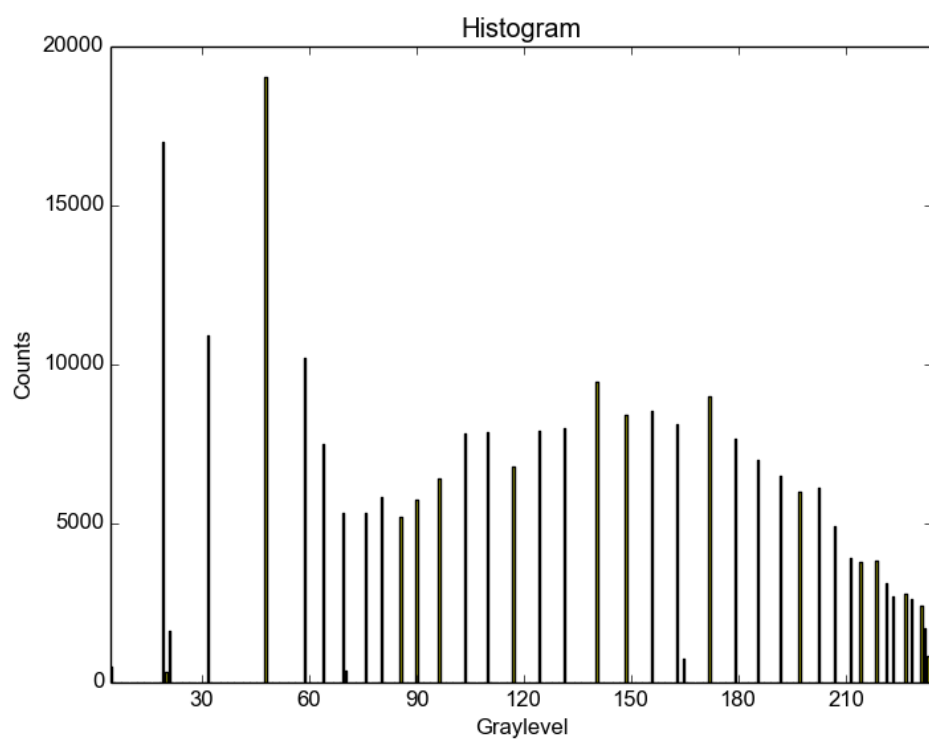Figure 3: Original Histogram of Figure 2

Figure 4: Transformed Histogram of Figure 2

Figure 5: Output image of Figure 1

Figure 6: Output image of Figure 2