

Sample 2-4

画像データの入出力

ヒストグラム均等化

画像処理特論

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動作確認: MATLAB R2023a

Input and output of images

Histogram equalization

Advanced Topics in Image Processing

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Verified: MATLAB R2023a

サンプル画像の準備

(Preparation of sample image)

本サンプルで利用する画像データを収めた data フォルダにパスをとおす。

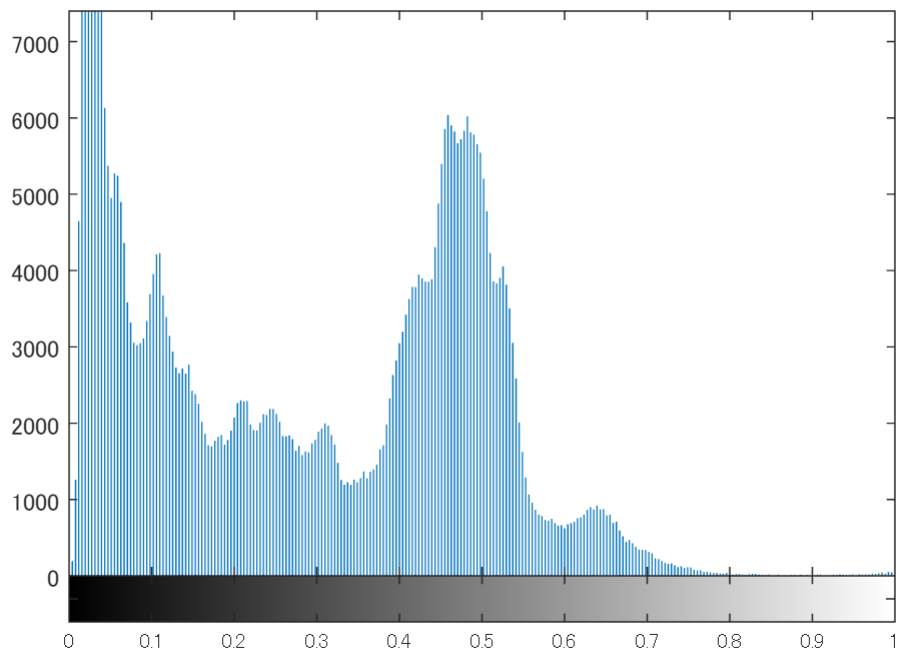
Create a path to the data folder that contains images used in this sample.

```
addpath('./data')
close
% Reading original image
I = im2double(rgb2gray(imread('firenzeRgb.jpg')));
figure(1)
imshow(I)
title('Original')
```

Original



```
figure(2)
imhist(I)
```



ヒストグラム均等化前の加工
(Process before histogram equalization)

$$v = T_1(x) = x^\gamma$$

$$y = T_2(v) = \frac{1}{2}(\text{sign}(2v - 1)|2v - 1|^{10^{-\alpha}} + 1)$$

```
% Definition of process
```

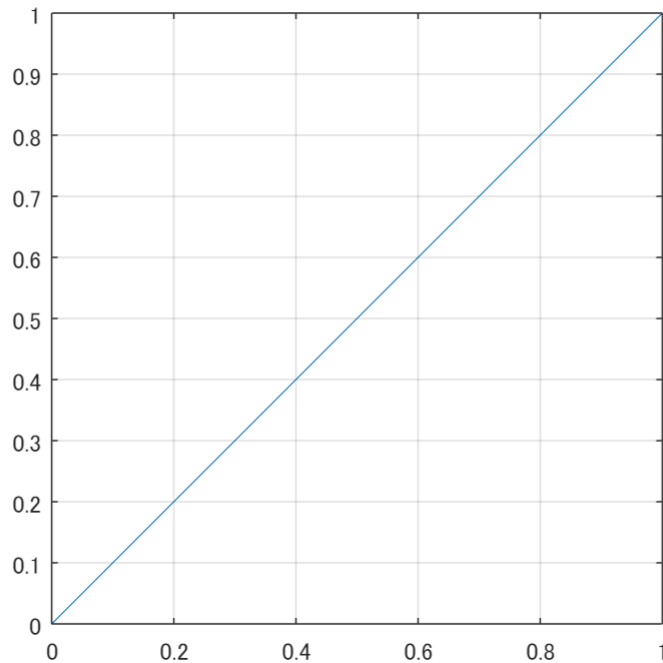
```
gamma = 1
```

```
gamma = 1
```

```
alpha = 0
```

```
alpha = 0
```

```
T1 = @(x) x.^gamma;
T2 = @(v) 0.5*(sign(2.0*v-1.0).*abs(2*v-1.0).^(10^(-alpha))+1.0);
Tp = @(x) T2(T1(x));
figure(3)
fplot(Tp,[0,1])
axis square
grid on
```



```
% Preprocessing for histogram equalization
```

```
J = Tp(I);
```

```
figure(4)
```

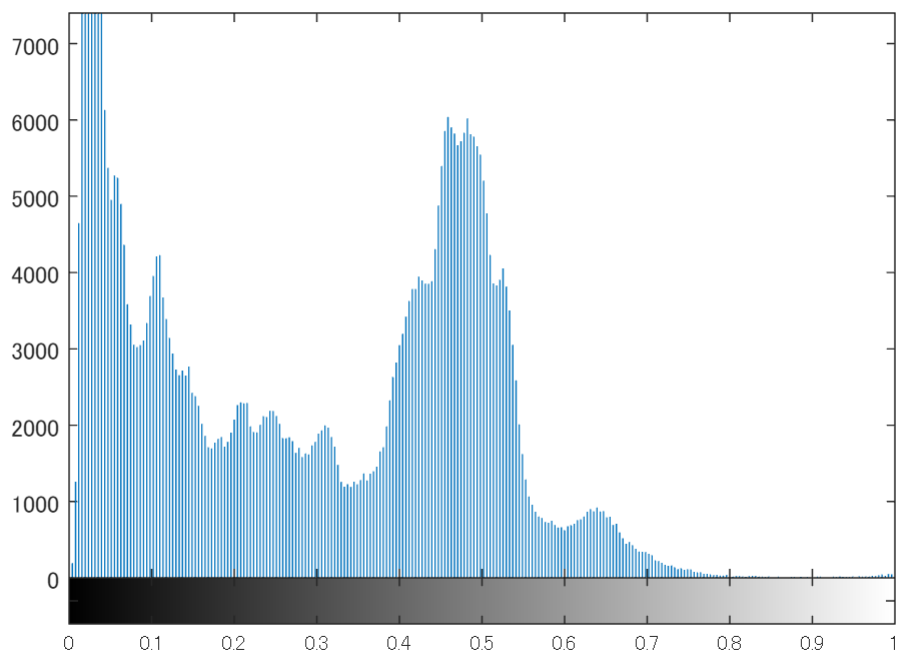
```
imshow(J)
```

```
title('Preprocessed image for histogram equalization')
```

Preprocessed image for histogram equalization



```
figure(5)  
imhist(J)
```



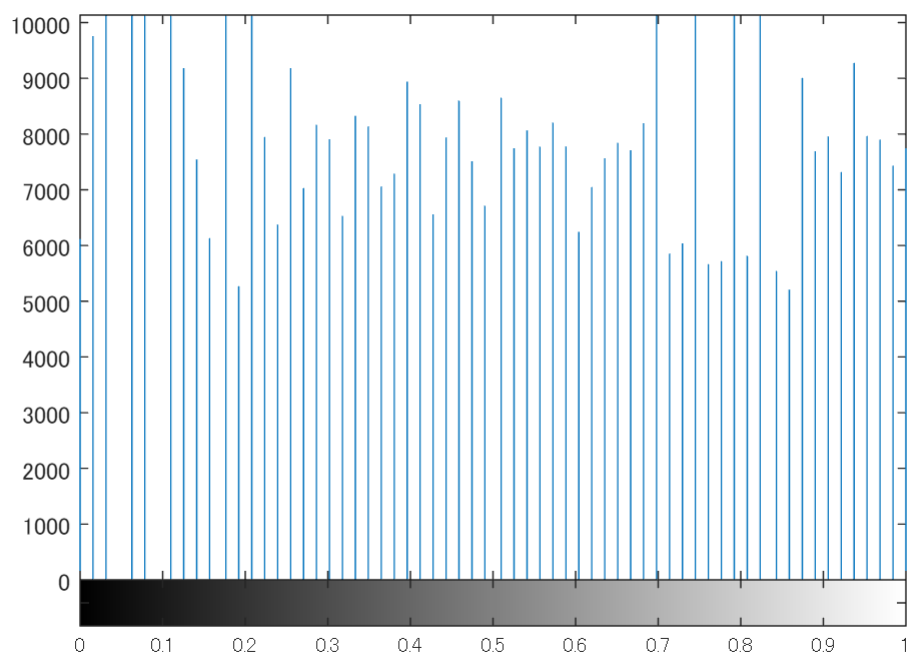
ヒストグラム均等化
(Histogram equalization)

```
% Power law conversion with IMADUST function  
K = histeq(J);  
figure(6)  
imshow(K)  
title('Result of histogram equalization')
```

Result of histogram equalization



```
figure(7)  
imhist(K)
```



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