Pattern Recognition – HW#1

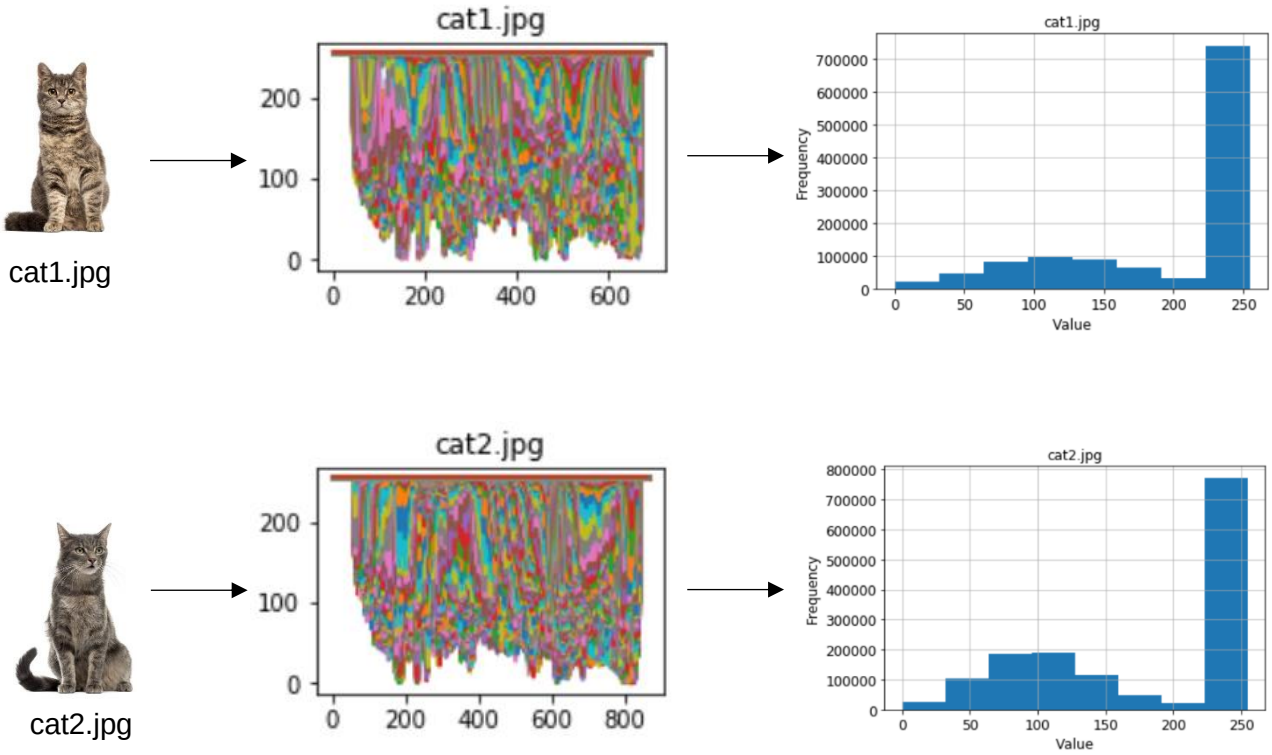
About the Assignment

The main purpose of the homework is to obtain some basic information about the images shown in Fig 1 and to reveal the differences between them.

Fig 1. Original Images

Pre-Information

The originals of the pictures are in the homework file. Use the pictures given to you while doing your homework. First **draw out histograms** of the given pictures and then **interpret the histograms**.



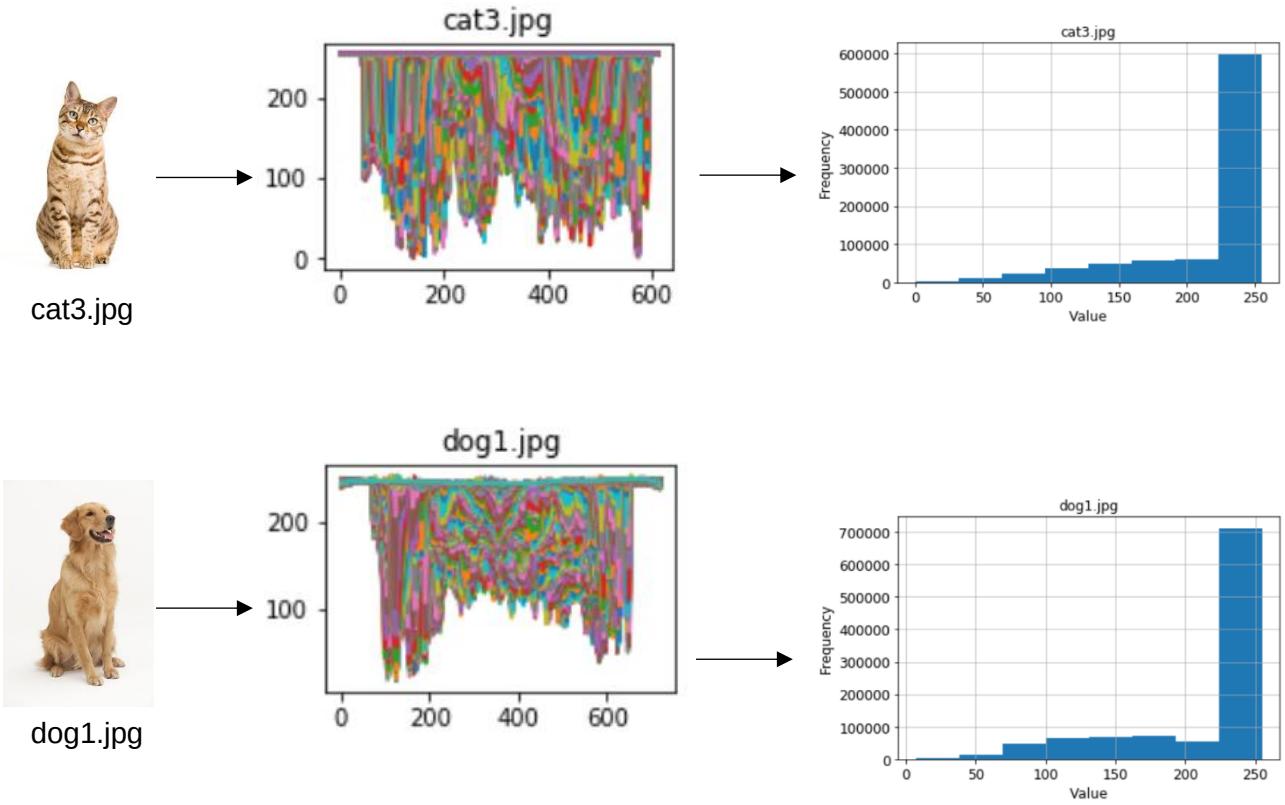


Fig 2. Picture histograms

As you can see, the original images have been transformed into colorful graphics. You must use the subplot() function for color graphics representation. To use this function, you need to import matplotlib.pyplot library. You can add the library by saying "import matplotlib.pyplot as plt".

- First, start by reading the pictures. While reading, you must give the file path with the pictures in the code.

  img1 = plt.imread('cat1.jpg')

- If you want to see the pictures on the screen, use the “plt.imshow(img1); plt.show()” function.

- These graphics should be drawn separately for each picture. You can use plot() function to draw graphs and show() functions to show them.

- The hist() function in pyplot module of matplotlib library is used to plot a histogram.

While drawing histograms with the above images:

- The x and y axes are formatted with the grid() function.

  plt.grid (axis = 'x', alpha = 0.75)
  plt.grid (axis = 'y', alpha = 0.75)

- The xlabel () function was used for the x-axis naming, and the ylabel () function was used for the y-axis naming.

```
plt.xlabel ('Value', fontsize = 12)
plt.ylabel ('Frequency', fontsize = 12)
```

- Title () function was used in histogram titles.

```
plt.title ("name of image", fontsize = 12)
```

Task:

- You are expected to compare two image by using their histogram information as feature.
- Firstly, calculate the histogram of each image by using numpy array (float16). For this purpose, you should convert each image to vector format. Next, you have to compute a histogram array which is in 1x256 format (starting from 0 to 255).
- Secondly, plot histogram of each image by using pyplot.
- Thirdly, compare two image by using histogram arrays. Save differences between histogram of dog1.jpg and other images in array. You will obtain three distance as shown below:

  d1 = difference between histogram of dog1.jpg and cat1.jpg

  d2 = difference between histogram of dog1.jpg and cat2.jpg

  d3 = difference between histogram of dog1.jpg and cat3.jpg

  distance_array = np.array([d1, d2, d3])

  Select the minimum distance as best matched image. Print the name of best matched image.

Things to Pay Attention

Write your code in Python.

Don’t use any snipped code available online.

Your code have to be run on other images.

Send your code as Zip.

Use the **"StudentId_NameSurname_HW1"** format for zip naming.

Good Luck.