Multimedia Information Retrival and Computer Vision

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Contents

1 Introduction

In this project we implemented a Web Search Engine working on "ArtImages" dataset and "MirFlickr" dataset as distractor. The Web Search Engine is based on the Locality Sensitive Hashing (LSH) index and on the pre-trained convolutional neural network ResNet50 with weigths computed on the "Imagenet" dataset.

2 Data Analysis and Preprocessing

The Art dataset is composed of 5 categories of images, corresponding to the 5 classes:

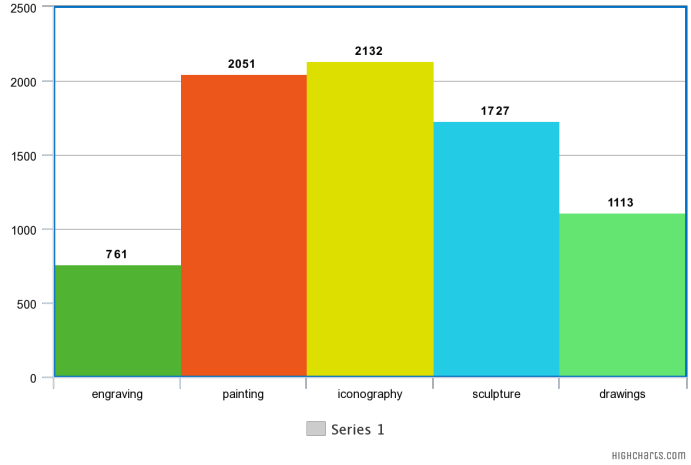
- Engraving
- Sculpture
- Iconography
- Painting
- Drawings

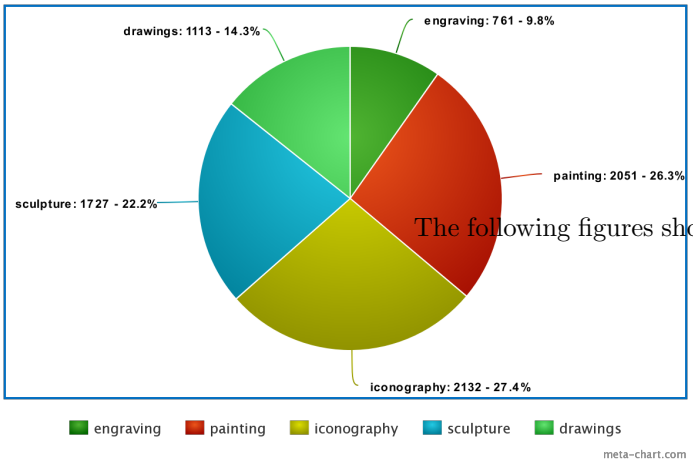
2.1 Data cleaning

After a preliminary analysis of the dataset, we realized that some images are corrupted both on trainingset and validationset, so we detected and deleted them using the following script.

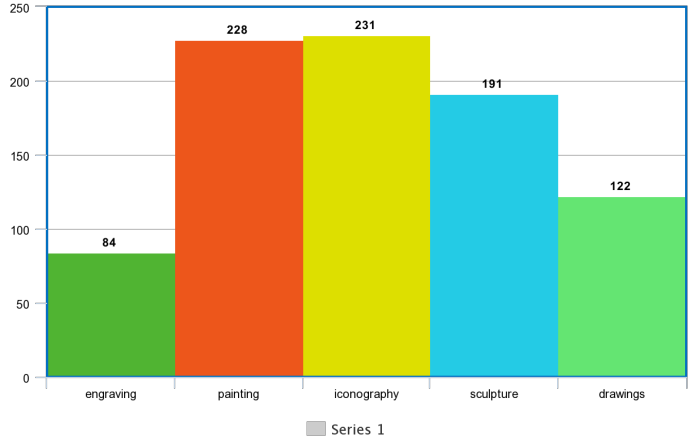
```
from PIL import Image
import glob

for filename in os.listdir(VALIDATION_DATA):
    try:
      image.load_img(VALIDATION_DATA + filename, target_size=(300, 300))

    except :
      print("ERROR" + VALIDATION_DATA + filename)
      os.remove(VALIDATION_DATA + filename)
```

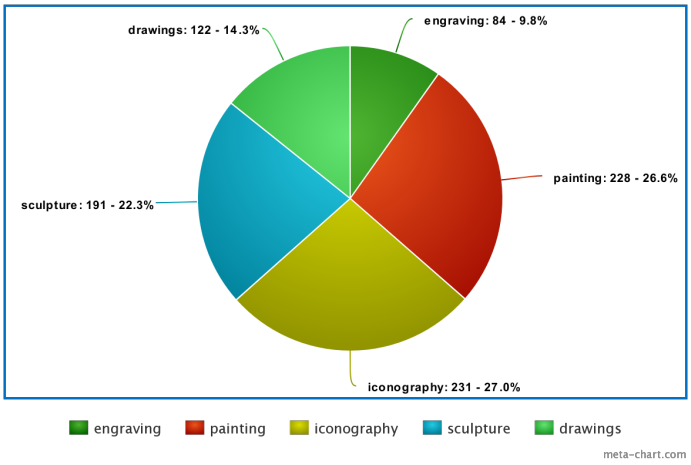
The following figures show the distribution of the classes of the trainigset, after the execution of the snippet of code shown above :





The following figures show the distribution of the classes of the validationset, after the execution of the snippet of code shown above :


250
200
150
100
50
0
84
228
231
191
122
engraving
painting
iconography
sculpture
drawings
Series 1
Highcharts.com


drawings: 122 - 14.3%
engraving: 84 - 9.8%
painting: 228 - 26.6%
sculpture: 191 - 22.3%
iconography: 231 - 27.0%
engraving
painting
iconography
sculpture
drawings
meta-chart.com

3 Sequential Scannig

The first implementation of our image search engine is based on a numpy array as data structure and a sequential scanning as search algorithm, using the following similarity distance:

- Euclidian distance
- Cosine similarity
- Hamming distance