Identify Artist from Art Based on Neural Networks

Project Overview

Topic

Painting is a visual expression of thoughts lying deep within the mind, expression of emotions, perceptions and desires. Using the magic of Machine Learning to identify arts is what our project aims at. The datasets we use gathered a collection of artworks of the 50 most influential artists of all time. With the model CNN, MLP, ResNet and VGG16 we create in this project, we would be able to identify who the genius is behind a mind-blowing painting with a desired high accuracy.

Data Set

Data can be accessed through this link : https://www.kaggle.com/ikarus777/best-artworks-of-all-time

Framework

We are planning to use Keras and Pytorch framework as they are the most popular open-source frameworks for deep learning among data scientists. Keras is a high-level API capable of running on top of TensorFlow, CNTK, Theano, or MXNet. And Pytorch is a lower-level API focused on direct work with array expression. It is a preferred solution for academic research, and applications of deep learning requiring optimizing custom expressions. They are easy and flexible frameworks.

Implemented Software

Keras, Pytorch, CNN, MLP, VGG16, ResNet

Deep Learning Network

We plan to use standard form of the networks including multi-layer perceptron, convolution neural network. And we also plan to try two different pre-trained neural networks: ResNet and VGG-16 in order to compare the performance among these methods. We may need to customize some of the models by varying hyperparameters such as number of layers and number/size of the filters (CNN).

Performance Measurement

We will use Cross-Entropy loss as our loss function, which measures the performance of a classification model whose output is a probability value between 0 and 1. During each epoch of training, we pass the data to the model in batches and also calculate the loss on the test dataset.

Reference Materials

https://www.kaggle.com/ikarus777/best-artworks-of-all-time

https://keras.io/preprocessing/image/

https://keras.io/applications/#vgg16

https://keras.io/applications/#resnet

https://en.wikipedia.org/wiki/Convolutional_neural_network

https://en.wikipedia.org/wiki/Multilayer_perceptron

Project Schedule

Date	DOW	Final Project Schedule	Notes
3/30/2020	Monday	Data Preprocessing	
3/31/2020	Tuesday		Create Google files
4/1/2020	Wednesday		Group meeting 1
4/2/2020	Thursday	EDA	
4/3/2020	Friday		
4/4/2020	Saturday		
4/5/2020	Sunday		
4/6/2020	Monday	Deep Learning (Model Training)	Create GitHub Account
4/7/2020	Tuesday		
4/8/2020	Wednesday		Group meeting 2
4/9/2020	Thursday		
4/10/2020	Friday		
4/11/2020	Saturday		
4/12/2020	Sunday		
4/13/2020	Monday	Performance Measurement	
4/14/2020	Tuesday		
4/15/2020	Wednesday		Group meeting 3
4/16/2020	Thursday	Code Merging	
4/17/2020	Friday		
4/18/2020	Saturday	Final Report (word)	
4/19/2020	Sunday		Presentation Rehearsal 1
4/20/2020	Monday	Final presentation (PPT)	Upload to GitHub
4/21/2020	Tuesday		Presentation Rehearsal 2
4/22/2020	Wednesday	**Final Presentation**	