



Graduation Research 1

- Supervisor: Do Phan Thuan
- Student: Ta Dinh Son
- Student ID: 20176862



Content

- ➡ Introduction
- ➡ Theory
- ➡ Face recognize



Introduction

Introduction



- Machine learning is a subfield of artificial intelligence (AI). The goal of machine learning generally is to understand the structure of data and fit that data into models that can be understood and utilized by people.
- Machine learning algorithms allow for computers to train on data inputs and use statistical analysis in order to output values that fall within a specific range.



Theory



2.1 Deep learning course on coursera website

- Neural networks and deep learning
- Improving Deep Neural Networks
- Structuring Machine Learning Projects
- Convolution Neural Networks
- Sequence Model



2.2 Pytorch

- Pytorch tutorial on github:

<https://github.com/yunjey/pytorch-tutorial>

- Youtube:

<https://www.youtube.com/watch?v=EMXfZB8FVUA&list=PLqnsIRFeH2UrcDBWF5mfPGpqQDSta6VK4>



Project: Face recognize



3. Face Recognize

1. Dataset
2. Preprocess
3. Model and training
4. Predict

3.1 Dataset

- Crawl about 2200 images from GG image
- 6 classes
- Train dataset:
 - 300 images each class
- Validate dataset:
 - 60 images each class
- Test:
 - 20 image



3.2 Preprocess

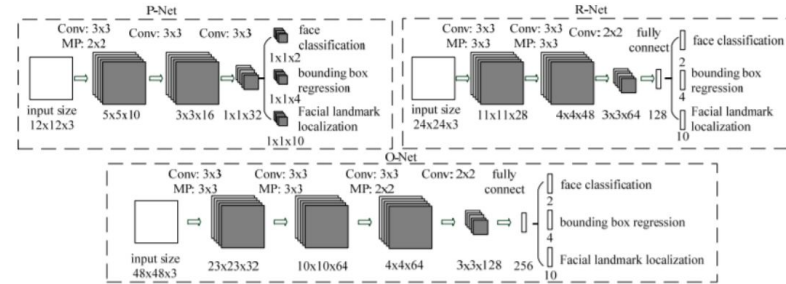


1. Detect face in image
2. Augmentation

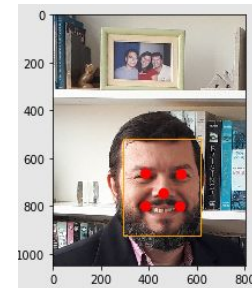
3.2.1 Detect image

- MTCNN stands for Multi-task Cascaded Convolutional Networks.

- Composing of 3 stacked CNNs and works at the same time when detecting faces. Each network has a different structure and plays a different role in the task.



- The output of MTCNN is the position of the face and points on the face such as eyes, nose, mouth.





3.2.2 Augmentation

- Using transforms from Pytorch

to augment image:

```
transforms.RandomGrayscale(p=0.1),  
transforms.RandomAffine(0, shear=5 , scale=(0.8,1.2)),  
transforms.RandomRotation(5),  
transforms.GaussianBlur(3, sigma=(0.1, 2.0)),  
transforms.ColorJitter(brightness=(0.8, 1.5), contrast=(0.8,1.5), saturation=0,  
transforms.RandomHorizontalFlip(),  
transforms.RandomVerticalFlip())
```

3.3 Model and training

- Using 2 model: VGG16 and Resnet18

- VGG16:

```
-----  
100%|████████████████████████████████████████████████████████████████████████████████| 104/104 [05:24<00:00, 3.12s/it]  
train loss: 0.3292, acc: 0.8935  
100%|████████████████████████████████████████████████████████████████████████████████| 21/21 [00:28<00:00, 1.37s/it]  
val loss: 0.2968, acc: 0.8929  
PS E:\Face_rec\main>
```

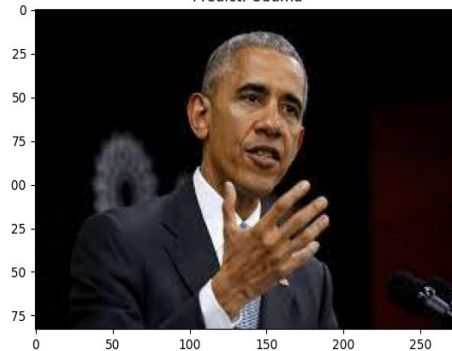
- Resnet18:

```
-----  
100%|████████████████████████████████████████████████████████████████████████████████| 104/104 [05:00<00:00, 2.89s/it]  
train loss: 0.0507, acc: 0.9856  
100%|████████████████████████████████████████████████████████████████████████████████| 21/21 [00:27<00:00, 1.30s/it]  
val loss: 0.1102, acc: 0.9673  
PS E:\Face_rec\main>
```

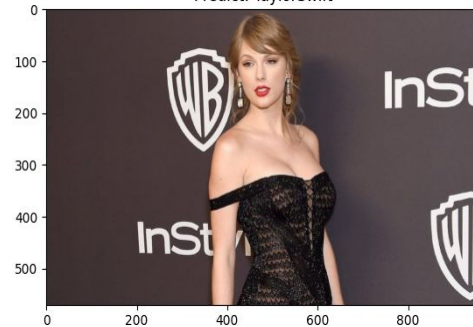
3.4 Predict

- Test folder have 20 images of 6 famous people
- Result: All 20 pictures were correctly predicted by 2 model

Predict: Obama



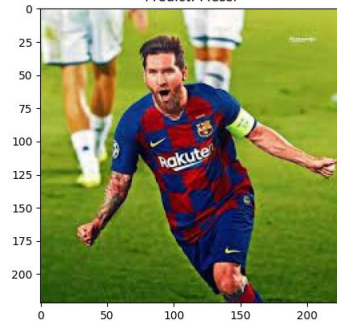
Predict: TaylorSwift



Predict: BlackWidow



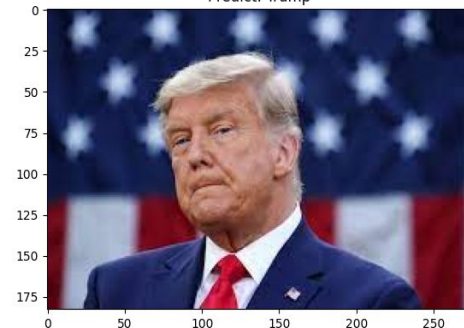
Predict: Messi



Predict: Ronaldo



Predict: Trump





Thank you for listening!