USER MANUAL

Final Year Project

'Image Recognition with Deep Neural Network'

Year Long 2017-2018

FC6P01NI

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1. Introduction

This document is compiled to guide the user on how to operate the developed system – 'Image Recognition with Deep Neural Network'. Basically, it is a facial recognition system predicting faces of people. This documents talks about the steps and to predict the faces from the wide variety of sources like sketches, normal image files and through webcam.

This document won't guide the user on how to prepare datasets or regarding training the model and other coding aspects. The sole purpose of this is to deliver the guideline to operate the designed face recognition system.

2. Installing Dependencies

To operate the developed system, following are the dependencies that you need to install:

1. Python
2. Tensorflow
3. Keras
4. NumPy
5. Pandas
6. Sklearn
7. Imutils
8. Pickle
9. Open-cv2

3. Initializing the System

To initialize the system, open a terminal and go to the project directory. Following commands were executed to show the current directory and the list of all list containing in that directory.

```
[rojan@DarkLord PROJECT]$
[rojan@DarkLord PROJECT]$ pwd
/home/rojan/PROJECT
[rojan@DarkLord PROJECT]$ ls
__pycache__    error       haarcascade_frontalface_default.xml
model.hdf5         script.py  test-backup
dataset_used  frens_test  helpers.py
model_labels.dat  test
[rojan@DarkLord PROJECT]$
```

Figure 1, Printing the current working directory and Listing all the files in that directory

Next, enter the command 'chmod +x script.py' to make the script file executable as follow:

```
[rojan@DarkLord PROJECT]$ chmod +x script.py
[rojan@DarkLord PROJECT]$
```

Figure 2, Making the script executable

Then, execute the following command to run the script:

```
[rojan@DarkLord PROJECT]$ python script.py
Using TensorFlow backend.
```

Figure 3, Executing the script to run the developed system

4. Running the System

Once, the script is executed, the system program is started. Following are some details of system after executing the 'script.py':

```
[rojan@DarkLord PROJECT]$
[rojan@DarkLord PROJECT]$ python script.py
Using TensorFlow backend.
Welcome to the Facial Recognition System. Let me show you the way
around!

Firstly, this system is capable of recognizing faces from videos and
image
files. The program is indeed ready for recognize faces from the CCTV
Cameras
too. But due to the unavailability of resource, the program has not
been tested
on CCTV Cameras yet.

Options:
To Predict Through Image Files, Select >>  ['image']
To Predict Through Video, Select >>  ['video']


Enter the option:
```

Figure 4, Choice to predict from image or video source

5. Predicting from the Image file

The functionality of the system allows to predict a face from the image files. The user will input the image file containing facial picture and then the system shows its magic. So, lets choose 'image' at first:

```
Enter the option: image
Success!
Please Wait...

This option allows you to predict multiple faces at once from the
entire directory.
Or You can opt out and only predict a single image file

To predict from the directory: Enter '1'
To predict a single image file, Enter '2'

Enter your choice:
```

Figure 5, Wishing to predict from the image file

Adding another functionality, the system also allows to predict from a group of image in directory. This is made available to simplify and fast deliver the prediction result. But the user can also wish to predict a single file at the time. The above choices allow to predict multiple files or single file at a time.

Again, there is an important thing to understand. The system will ask an accuracy metric at some point. The should be delivered as the decimal number in between '0.000 to 0.999'. This is what allows the system to have a control over its accuracy level. For most of the picture that is of good quality and has clear face, the recommended value of accuracy metric is '0.80'.

But if the picture is of bad quality or has unclear face in the picture then it is better to use the value below '0.80' as the accuracy metric. The system predicts a face with the percentage. If you would like system to above ninety percentages sure before predicting face, the accuracy metric will have to be '0.90'. If the system doesn't meet the prediction percentage, then it will show the nearest prediction the face might resemble with.

5.1 PREDICTING SINGLE FILE AT A TIME

Predicting single file at a time helps when there is necessity to predict only a file.

```
This option allows you to predict multiple faces at once from the
entire directory.
Or You can opt out and only predict a single image file

To predict from the directory: Enter '1'
To predict a single image file, Enter '2'

Enter your choice: 2
Please input the name of the image file you wish to predict: ajay.jpg
Please input the value of accuracy metric you wish to set[ standard --
0.70 ]: 0.9


Predicting the image with the file name >> ajay.jpg
Prediction >>>   ['ajay']              [99.99 percentage sure]



Do you wish to continue predicting [Y/n]:
```

Figure 6, Predicting single file at a time

'ajay.jpg' is the name of an image file that is in the current working directory.

Figure 7, 'ajay.jpg'

5.2 Predicting Multiple Files At A Time

Most of the time, predicting multiple files at a time can advantageous, especially if you have large pile of images predict.

```
This option allows you to predict multiple faces at once from the
entire directory.
Or You can opt out and only predict a single image file

To predict from the directory: Enter '1'
To predict a single image file, Enter '2'

Enter your choice: 1
Please input the name of the directory containing the image files:
image_folder
Please input the value of accuracy metric you wish to set[ standard --
0.70 ]: 0.7


Predicting image files from the directory >>
File Name >> prabesh--original0.jpg
Prediction >>>   ['prabesh']    [98.87 percentage sure]


File Name >> kabir--original11.jpg
Prediction >>>   ['kabir']    [97.95 percentage sure]


File Name >> ankit--original0.jpg
Prediction >>>   ['ankit']    [99.85 percentage sure]


File Name >> ajay--original0.jpg
Prediction >>>   ['ajay']    [99.99 percentage sure]


File Name >> ajay--original1.jpg
Prediction >>>   ['ajay']    [99.99 percentage sure]


File Name >> prabesh--original1.jpg
Prediction >>>   ['prabesh']    [99.84 percentage sure]



Do you wish to continue predicting [Y/n]:
```

Figure 8, Predicting multiple files at a time

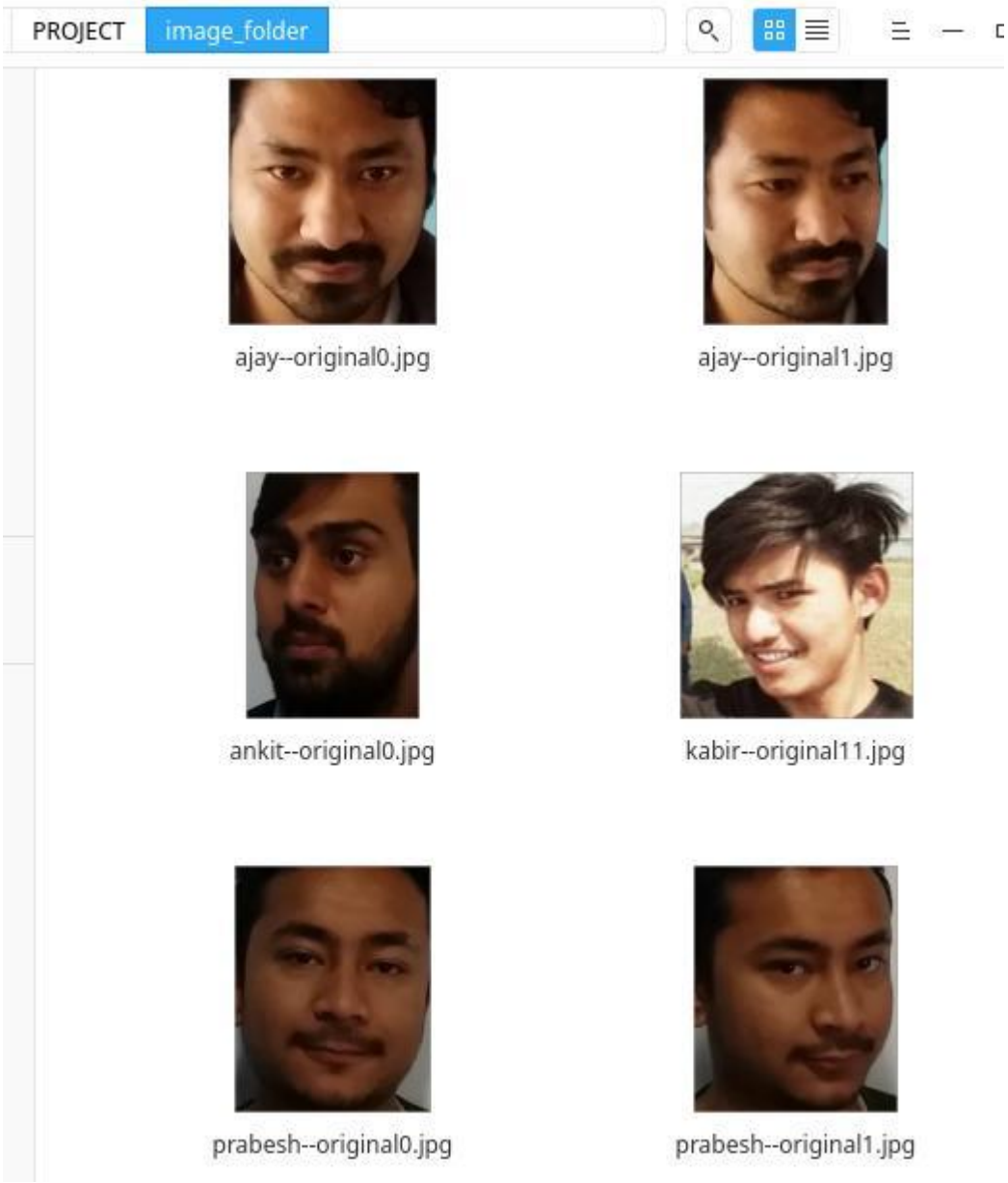

Figure 9, 'image_folder' containing multiple image files

6. Predicting Through Video

Here, in this section of the user manual, the demonstration of predicting faces through video is shown. The predicting system to predict faces from the webcam and CCTV camera is almost similar. The system can even predict multiple faces at a time from the live streaming video. The difference is webcam is pre-installed in the laptop computer while CCTV cameras are not. Hence, they do need to be connected to the system. Once, the CCTV camera is connected, it is just the matter of entering commands.

```
Welcome to the Facial Recognition System. Let me show you the way
around!

Firstly, this system is capable of recognizing faces from videos and
image
files. The program is indeed ready for recognize faces from the CCTV
Cameras
too. But due to the unavailability of resource, the program has not
been tested
on CCTV Cameras yet.

Options:
To Predict Through Image Files, Select >>  ['image']
To Predict Through Video, Select >>  ['video']


Enter the option: video
Success!

Predicting through video

This option allows to predict faces from the real-time video
processing.

To predict through webcam, Enter '1'
To predict through live cctv camera, Enter '2'

Do you wish to predict through webcam or cctv camera:
```

Figure 10, Predicting faces through video source

6.1 PREDICTING FACES FROM THE WEBCAM

This option allows the user to predict the face from the video. Here, the pictures from the video are taken in frame by frame and then predicted the face.

```
Predicting through video

This option allows to predict faces from the real-time video
processing.

To predict through webcam, Enter '1'
To predict through live cctv camera, Enter '2'

Do you wish to predict through webcam or cctv camera: 1
Please input the value of accuracy metric you wish to set[ standard --
0.99 ]: 0.99
[ INFO:0] Initialize OpenCL runtime...
```

Figure 11, Predicting faces in webcam's screaming video

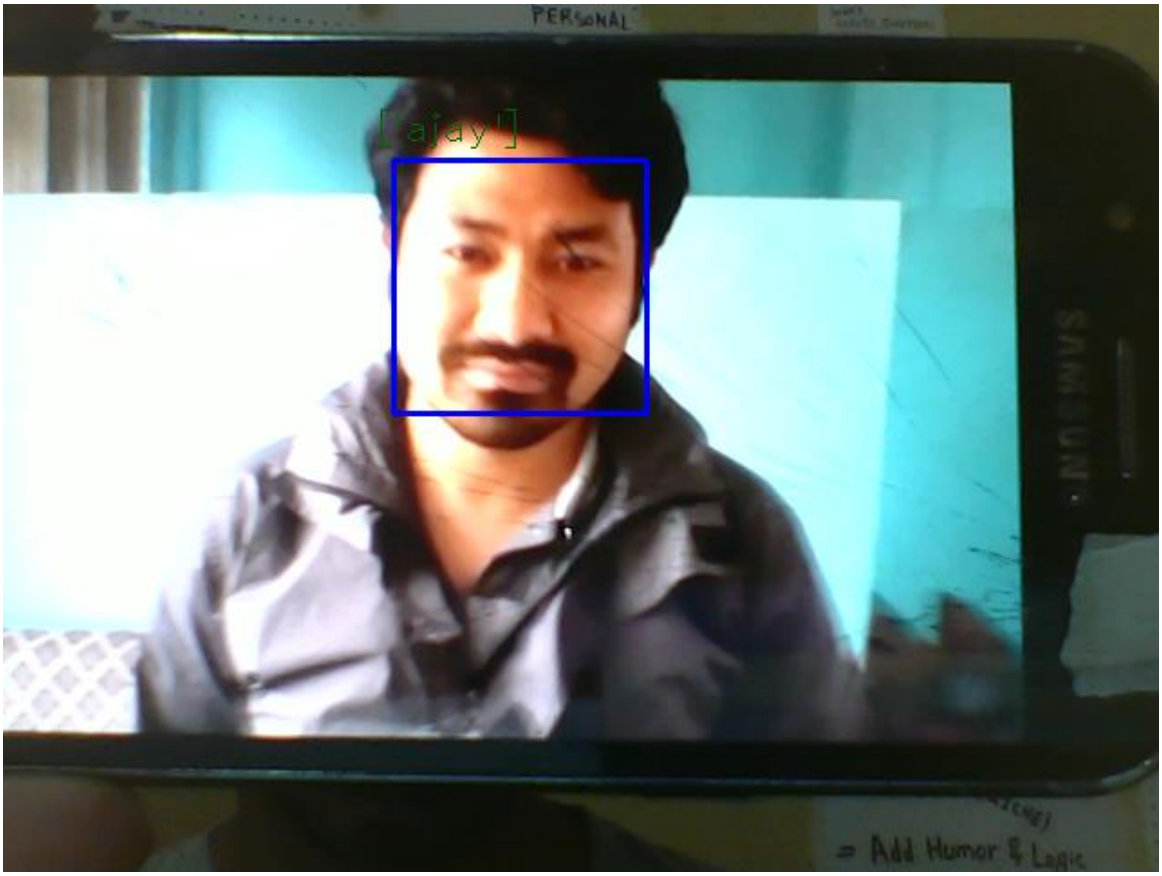

Figure 12, The system predicting the face from the webcam's video (the video was playing in the mobile)

6.2 PREDICTING FACES FROM THE CCTV CAMERA

In the figure shown below, predicting the faces through the CCTV camera is almost ready. But, because of unavailability of CCTV as a resource, the system is still untested. Once, a valid streaming URL along with username and password is provided, the system might just operate. For now, it is still a mystery.

```
Predicting through video

This option allows to predict faces from the real-time video
processing.

To predict through webcam, Enter '1'
To predict through live cctv camera, Enter '2'

Do you wish to predict through webcam or cctv camera: 2

To predict faces from the cctv camera live feed, you will need to
enter:
* Ip address
* Port number
* Admin username
* Admin password
#FORMAT: http://<admin>:<password>@<ipaddress>:<portnumber>
#EXAMPLE: http://admin:password@192.168.1.1:8080
Please input the ip camera's link:
```

Figure 13, System allowing to predict face from the CCTV Camera

The End

of

User Manual