Facial recognition

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Abstract—A facial recognition system is a technology capable of identifying or verifying a person from a digital image or a video frame from a video source. There are multiple methods in which facial recognition systems work, but in general, they work by comparing selected facial features from given image with faces within a database. It is also described as a Biometric Artificial Intelligence based application that can uniquely identify a person by analyzing patterns based on the person's facial textures and shape, In this paper LeNet used to extract features from given faces in data set .

Index Terms—Robot, IEEEtran, Udacity, LaTeX, deep learning.

1 Introduction

FACE recognition recognition (FR) has been the prominent biometric technique for identity authentication and has been widely used in many areas, such as military, finance, public security and daily life, In this paper convolution neural network "LeNet" used to extract face features, this features could be stored to use it as truth table to recognize persons in the systems.

2 Background / Formulation

Using Nvidia digits, LeNet network architecture [figure 1] was used to train face recognition model and GoogleNet used to train classification model for the given data set, It provided the best accuracy with the required inference time and it was the quickest in terms of training times with respect to accuracy [figure 2], 10 different faces used to train model, each face has 10 different pictures in different orientations and light conditions to generalize the model

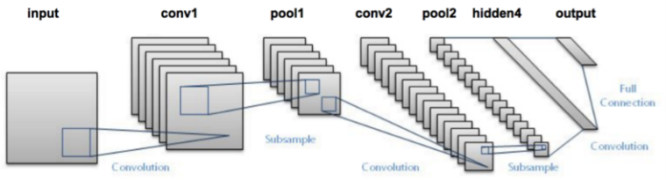

Fig. 1. LeNet architecture.

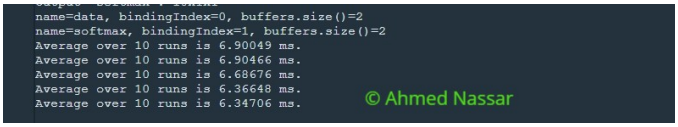

Fig. 2. Inference speed for LeNet.

3 Data Acquisition

Face recognition data was for political and actress persons with size 250 x 250 x 3 which means it was colored images, then using Nvidia digits to resize images to fit in LeNet which accept inputs with size 28 X 28

As mentioned before data contain images for different ten persons each one has ten different images so total data size is 100 images and structure of data was as shown below [figure 3]

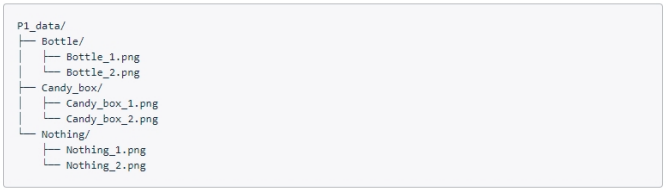

Fig. 3. data structured for supplied and face data set.

Fig. 4. Face data example.

4 Results

Face recognition model speed was very well and it trained fast, but it's accuracy was just acceptable because of data set not big enough but it worked fine for our purpose here.

classification model for supplied data which was GoogleLeNet was very good accuracy and speed as shown in the figure below

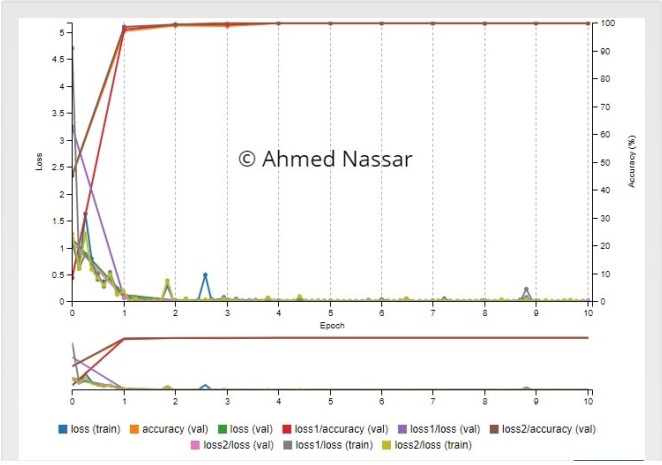

Fig. 5. GoogleLeNet training plots.

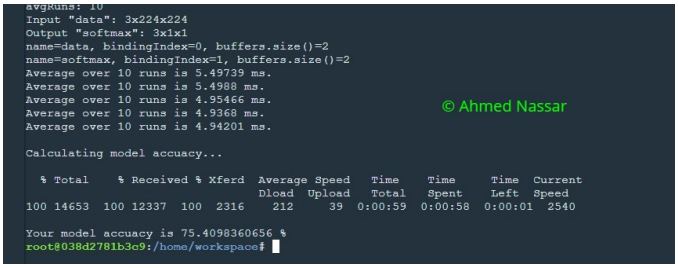

Fig. 6. GoogleLeNet Inference speed.

Fig. 7. face prediction test 1.

Fig. 8. face prediction test 2..

5 Discussion

For the face recognition the data was not good enough, collecting more data could help the model to achieve more accurate results, or trying other customize model which output is 128 features this model code be well choice to extract face features and build truth table for future using.

for

6 Conclusion / Future work

As can be seen from the results, this project proves the proof of concept and lays the foundation for further work. With further development and added features this system can be marketed and distributed as a customizable item sorting package. Future work will need to be done on the training data. further work will need to be done on training data and implementation of bounding boxes may need to be considered.