Face Recognition

A Comprehensive Analysis of Deep Learning Based Representation for Face Recognition

This article looks into two different approaches to solve face recognition in different kinds of face visibility. This includes pose, illumination, occlusion, and misalignment. To train the network a data base of 2.6 million facial images of 2,622 identities collected from the web.

The first of the two networks used are VGG-Face and is a deep convolutional network proposed for face recognition using the VGGNet architecture.

The second is Lightened CNN this is a CNN with a low computational complexity proposed for face recognition.

ImageNet Classification with Deep Convolutional Neural Networks

A large deep convolutional neural network, made for a contest called ImageNet LSVRC-2010 contest. Classifying 1.2 million images into 1000 different classes. No face recognition.

When Face Recognition Meets with Deep Learning: An Evaluation of Convolutional Neural Networks for Face Recognition

A comparison of different Convolutional Neural Networks and suggests different designs of CNNs. The article emphasizes the on the lack of design 'guides' and in general lack of theoretical arguments to support design choices.

The article finds that features from *softmax* layer perform slightly better than those from the most widely used fully connected layer.

An 8-layer CNN trained by Facebook AI group called **DeepFace** is presented. This makes use of pooling layers. Pooling layers are important for object recognition since objects in images are not

well aligned. This is not that big a problem with face images as these are well aligned before training a CNN. **DeepFace** is trained on a large face database which contains four million facial images of 4,000 subjects.

Another network presented is **DeepID** and different expansions of this called **DeepID+, DeepID2** and **DeepID2+**.

DeepID3 modified two famous networks: Inception and VGGnet by adding supervision information to each layer and network ensemble fusion.

General methods

The main methods used in several of the articles presented and others is a Convolutional Neural Network, which is first trained and then validated. The design of networks presented differs from each article. The designs of these rely of different kinds of networks, where both DeepFace, VGG-Face (made from VGGnet) or another is used.

Databases

Labeled Faces in the Wild (LFW): http://vis-www.cs.umass.edu/lfw/

Multi-PIE: 750.000 images:
https://www.sciencedirect.com/science/article/pii/S0262885609001711?via%3Dihub
http://www.cs.cmu.edu/afs/cs/project/PIE/MultiPie/Multi-Pie/Home.html
http://www.flintbox.com/public/project/4742/

Yale Face Database: 165 grayscale images:

http://vision.ucsd.edu/content/yale-face-database

Yale Face Database B: 5760 images:

http://vision.ucsd.edu/content/extended-yale-face-database-b-b

Several more databases here: http://www.face-rec.org/databases/