



Biometric Technologies and Behavioural Security

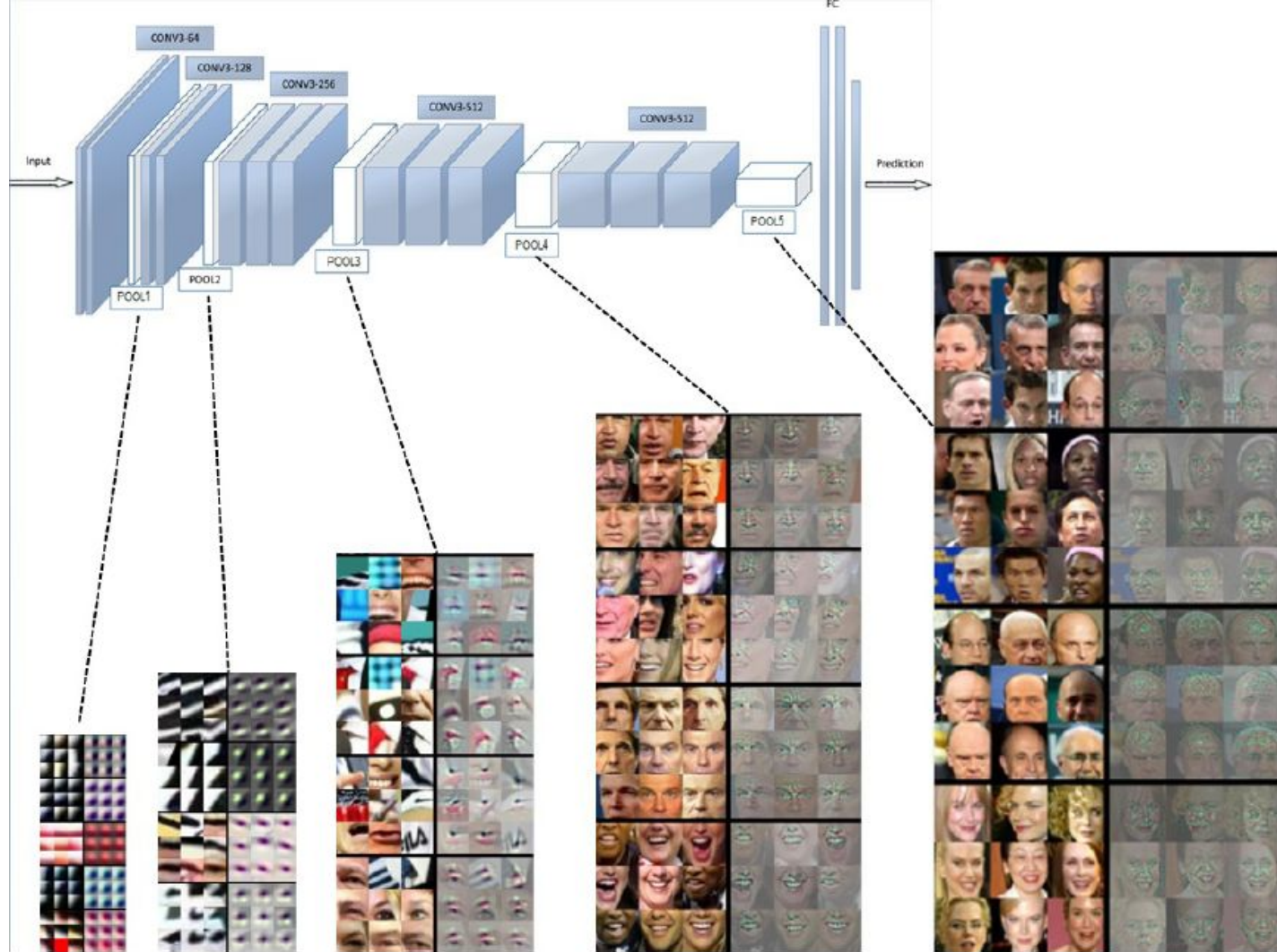
Tutorial 5 - Deep Face Recognition



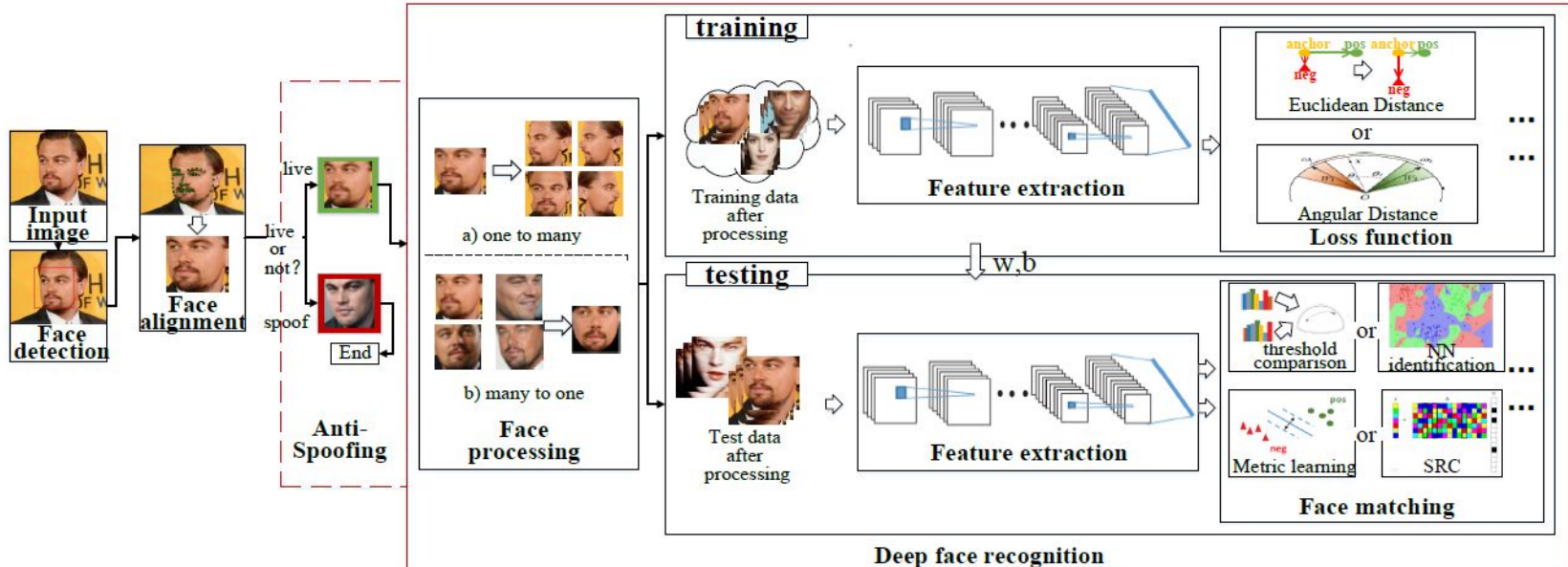
Deep Learning based Face Recognition

Deep FR algorithms consist of multiple layers of simulated neurons that convolute and pool input, during which the receptive-field size of simulated neurons are continually enlarged to integrate the low-level primary elements into multifarious facial attributes, finally feeding the data forward to one or more fully connected layer at the top of the network.

The output is a compressed feature vector that represent the face.



Deep Learning based Face Recognition





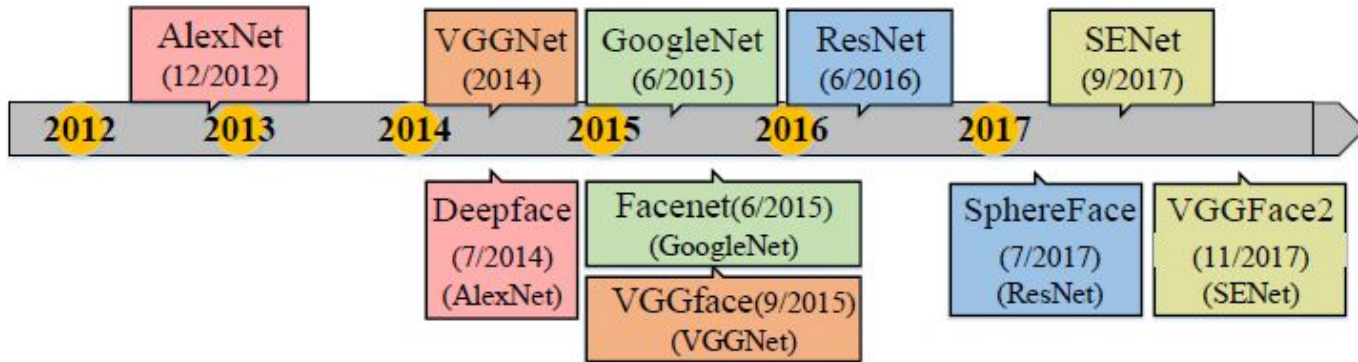
Deep Learning based Face Recognition with Keras

<https://bit.ly/2YFYt5>

Well-known algorithms of deep FR

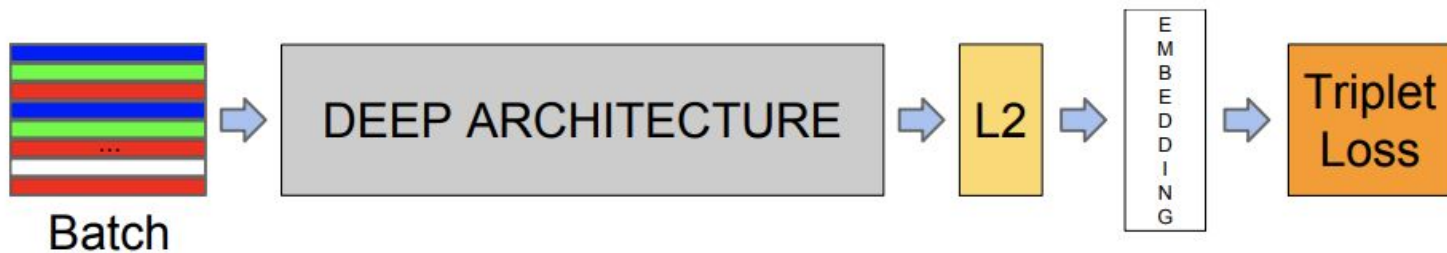
The top row presents the typical network architectures in object classification, and the bottom row describes the algorithms of deep FR.

The same color rectangles mean the same architecture.



FaceNet

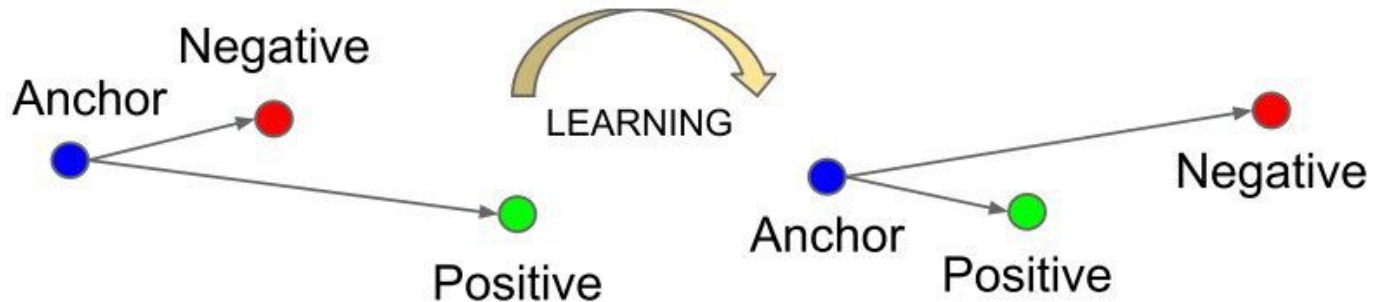
- based on GoogleNet, the winner of ImageNet 2014 challenge;
- maps a face into a 128D Euclidean space
- the L2 distance (or Eucliden norm) between two faces embeddings corresponds to its similarity
- employs triplet loss function.



FaceNet

Triplet loss function minimizes the distance between a positive and an anchor while maximizing the distance between the anchor and a negative.

<https://bit.ly/2VZdzUx>





VGGFace2

- Based on some well-know NN as ResNet-50 and a SqueezeNet-ResNet-50 (called SE-ResNet-50 or SENet) and trained on the VGGFace2 dataset

http://www.robots.ox.ac.uk/~vgg/data/vgg_face2/

VGGFace2 face matcher: <https://bit.ly/3feQDIM>