



Faculty of Computers and Artificial Intelligence
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IT443 Image Processing

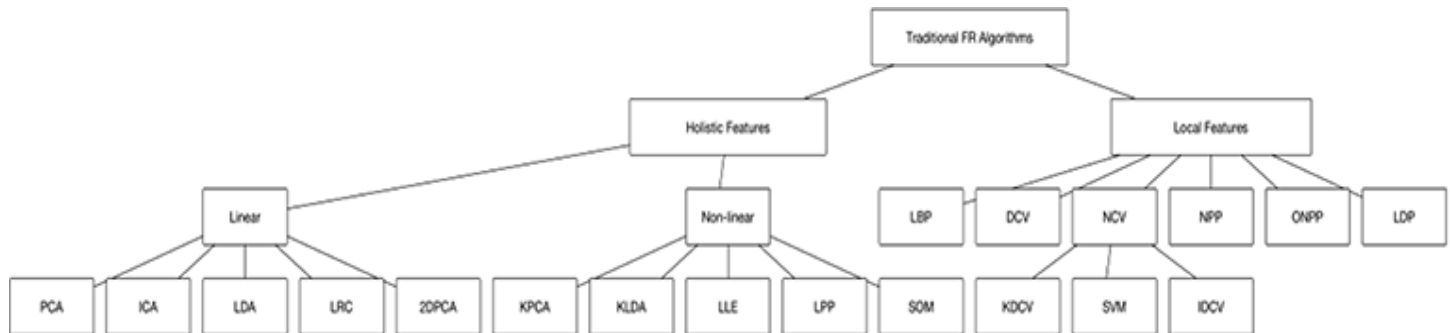
Project
Face Recognition

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Methods:

1. Classical face recognition algorithms:

- The traditional face recognition algorithms can be categorized into two categories: **holistic features** and **local feature** approaches.



2. Artificial Neural Networks in face recognition:

- Artificial neural networks are used to solve nonlinear problem.
- A radial basis function neural network integrated with a non-negative matrix factorization to recognize faces is presented.
- For face verifications, utilize a momentum back propagation neural network.
- Non-negative sparse coding method to learning facial features using different distance metrics and normalized cross-correlation for face recognition is applied.

3. Gabor wavelet-based solutions:

- Two kinds of strategies to capture Gabor texture information: Gabor magnitude-based texture representation (GMTR) and Gabor phase-based texture representation (GPTR).
- Gamma density to model the Gabor magnitude distribution characterizes GMTR approach. The GPTR is characterized by the generalized Gaussian density for modelling the Gabor phase distribution.
- It allows the estimated model parameters to be served as texture representation of the face.

4. Face descriptor-based methods:

- To determine image descriptors that are able to improve classification performance of multi-option recognition.
- Learning the most discriminant local features that can minimize the difference of the features between images of a same individual and maximize that between images from other people depending on the nature of these descriptors, which compute an image representation from local patch statistics stands the main idea of the approach.

5. 3D-based face recognition:

- A method for face recognition across variations in pose, which combines deformable 3D models with a computer graphics simulation of projection and illumination.
- In this method, faces are represented by model parameters for 3D shape and texture

6. Video-based face recognition:

- The first stage of video-based face recognition (VFR) is to perform re-identification, where a collection of videos is cross-matched to locate all occurrences of the person of interest.
- VFR approaches can be classified into two categories based on how they leverage the multitude of information available in a video sequence: (i) sequence based and (ii) set based, where at a high level, what most distinguishes these two approaches is whether or not they utilize temporal information.

Our Dataset:

<http://vis-www.cs.umass.edu/lfw/>

- Labeled Faces in the Wild is a public benchmark for face verification, also known as pair matching.
- It consists of :
 - 13233 images
 - 5749 people
 - 1680 people with two or more images

Our Method:

- We will use a deep convolutional neural network (CNN) to extract features from input images.
- Keras is used for implementing the CNN, Dlib and OpenCV for aligning faces on input images.
- Face recognition performance is evaluated on a small subset of the LFW dataset.
- We detect, transform, and crop faces on input images.
- Use the CNN to extract embeddings, of faces from the aligned input images.
- Then we compare input embedding vectors to labeled embedding vectors in a database.