Motivation for eigen faces

Most previous work – ignored which aspects of face stimulus important for identification - predefined measurements deemed sufficient.

Code & decode images – information content – emphasize features

→ Find principal components of distribution of faces - eigenvectors of covariance matrix of set of face images

→ Eigen vectors = set of features which characterize variation bw face images

→ Eigen vector = eigen face

→ Each face image = linear comb. of eigen faces

→ No. of eigen faces = no. of images in training set

→ However, faces can be approximated using the "best" eigenfaces – those that have largest eigen values = account for most variance

→ A collection of face images can be reconstructed by storing small collection of weights for each face and a small set of standard pictures.

→ Now, how is this useful for face recognition?

Training set → Build collection of weights

Test image → Find feature weights required to reconstruct this image

use eigenfaces ↙

Compare ↕

Weights of training images

Predict closest weight

Steps:

1] Calculate eigenfaces

2] For test image, calculate weights by projecting image on each eigenface

3] Classify wrt closest training img.