Assignment 1:

Face recognition using dimensionality reduction.

- Two databases are provided. YALE-B and part of PIE along with the face-class annotations.
- 20 random splitting of the data to training and testing are provided. The protocol to perform face recognition using single nearest neighbour rule is provided, as well (protocol).

Your task:

Implement PCA, whitened-PCA, LDA, Neighbourhood Preserving projections and Fast ICA and provide me with the code and recognition rates for each method.

You just need to replace the U_reduc (which is set to identity matrix) to the appropriate dimensionality reduction transform.

Provide comments on how you implemented the code. Also try to detail your observations (i.e., how recognition rate behaves with the number of dimensions kept, is LDA better than PCA and why?)

The sample code is in MATLAB but you can use whatever language you like.

Details:

(a) Implement the following techniques (with comments)

(1) Principal Component Analysis (PCA) and the whitened PCA
(2) Linear Discriminant Analysis (LDA)
(3) Neighbourhood Preserving Projections
(4) Fast ICA

You may use publicly available implementations but you need to provide comments on the code.

(b) for each of the methods provide a graph where the dimensions are plot versus the performance (it is already in the example).

(c) write a short report commenting on the performance.