Assignment 2

Topic: Eigen-Faces and Fisher-Faces

Due on or before: (To be announced)

Maximum Marks: 6

East is East, and West is West...The Twain Shall Never Meet

One normally does not mix, or compare unsupervised learning methods, and supervised ones. This is an exception.

Please also submit an ASCII .txt file, which contains a description of the specific parameters used. The recommended programming language is C/C++/Java, and the recommended software environment is OpenCV. No MATLAB for this assignment, please.

This assignment aims at getting experience with Machine Learning algorithms which can easily be coded up. (There are many which can not, and may be used as black boxes. Hence, please feel free to use routines such as the SVD, and methods to compute eigenvalues and eigenvectors. Please do not try to code these for this course!).

This assignment has been kept open-ended for a reason: to play around with parameters and try to find the physical significance of the operations involved. This will encompass most of what you have learnt in this course with regard to eigenspaces in unsupervised learning, and Fisher's linear discriminant, in supervised learning. Start from a 2-class problem (different views of faces of two separate individuals) For the supervised case, try to find the best separating hyper-plane. For the unsupervised case, try to find the corresponding decision boundary. Look at cluster centres, and distances. This assignment will also require you to divide the dataset into training and testing sets, for instance. Please feel free to use any face recognition database. You can find an extremely comprehensive list at the Face Recognition Homepage's databases section Try extending the 2-class cases to multiple classes. Please do not copy/cut-and-paste code from the Internet: this will be penalised, as mentioned on the course webpage (the front page). You may read up different implementations, but please code from scratch.

P. N. Belhumeur, J. P. Hespanha, D. J. Kriegman. Eigenfaces vs. Fisherfaces: Recognition using Class Specific Linear Projection. IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 19, no. 7, pp. 711 - 720, 1997.

Demo Schedule: (To be announced)