Computer Vision

It could be said that the central problem of pattern recognition is the relation between the within-class variability and the between-class variability for the patterns that one would like to recognise. Explain this problem in the case of face recognition, treating separately the problems of

(a) face detection (distinguishing faces from non-faces)

(b) face identification

(c) face interpretation (classifying the expression and pose angle of the face)

How do the forms of variability for faces influence each of the three tasks? Is within-class variability ever helpful, and between-class variability ever harmful, to the performance of the task? What role can statistical decision-theory play in formalising and solving these problems?

[20 marks]