

## 2002 Paper 7 Question 7

### Neural Computing

- (a) When using a feed-forward neural network to solve a classification problem, one alternative is to interpret the network's outputs as posterior probabilities of class membership, and then to use these posterior probabilities to make classification decisions. Alternatively, we can treat the network as a discriminant function which is used to make the classification decisions directly. Discuss the relative merits of these two approaches. [8 marks]
- (b) Explain the concept of a likelihood function, and the principle of maximum likelihood in model building and inference from data. [2 marks]
- (c) Explain the key ideas of a Hopfield neural network for content-addressable, associative memory. In explaining how memories are stored and retrieved, be sure to define the notions of:
- configuration space
  - connectivity matrix
  - stable attractor
  - basin of attraction
  - network capacity, and its dependence on the number of "neurons"

[10 marks]