Pattern Classification

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October 16, 2007

Homework 2
Due in class, Tuesday, October 30, 2007

From Chapter 2 in our textbook:

1. Problem 28.
2. Problem 40 (d).
3. Computer exercise 5.
4. Computer exercise 7 (b), (d), and (e).
5. Consider two one-dimensional normal distributions $p(x|\omega_1) \sim N(-1, 1)$ and $p(x|\omega_2) \sim N(1, 1)$ with zero-one loss function.
   (a) For each value of $P(\omega_1)$, there is a corresponding Bayes decision rule. The resulting overall risk is called the Bayes risk. Plot Bayes risk as a function of $P(\omega_1)$.
   (b) Please state the Bayes decision rule for $P(\omega_1) = 0.25$. For this decision rule, if the priors are then changed, the overall risk will change as well. For this fixed classifier, plot the over risk as a function of $P(\omega_1)$.
   (c) Please state the minimax decision rule and calculate the minimax risk. For the minimax classifier (fixed), plot the overall risk as a function of $P(\omega_1)$.