Bayesian Classification

Exercise 1 : Probabilities

Show the relationship between the prior, posterior and likelihood probabilities.

Exercise 2 : Application of Bayes Theorem

(adapted from Kashani 2021 "Deep Learning Interviews: Hundreds of fully solved job interview questions from a wide range of key topics in AI.")

The Dercum disease is an extremely rare disorder of multiple painful tissue growths. In a population in which the ratio of diabetics to non-diabetics is equal, 5% of diabetics and 0.25% of non-diabetics have the Dercum disease.

A person is chosen at random and that person has the Dercum disease. Calculate the probability that the person is diabetic.

Exercise 3 : Problems of Naïve Bayes

Give at least two reasons why the results of a Naïve Bayes classifier may or may not be very good and which steps could be taken to influence them.

Exercise 4 : Probability Basics (Kolmogorov)

Prove the implications of the Kolmogorov axioms from the lecture (Theorem 7).