Exercises for
Introduction to Pattern Recognition (IntroPR)
Simone Gaffling and Oliver Taubmann
Work sheet 1, 20.10.2014

General Information:

Lecture (3 SWS):	Wed 16:15 – 17:45 (0.68) and Thu 10:15 - 11:45 (0.68)
Exercises (1 SWS):	Mon 08:30 – 09:15 (00.151-113) and 10:15 – 11:00 (02.134-113)
Contact:	simone.gaffling@cs.fau.de, oliver.taubmann@cs.fau.de

Appetizers: statistics is trying to fool you (but this attempt will fail)

Exercise 1 In the interval $[0, 1]$ two numbers are randomly chosen. What is the probability that one number is greater than $\frac{3}{4}$ given that the other one is smaller than $\frac{1}{3}$?

Exercise 2 Vessel diseases are a growing problem in the western world. Now, there is a software that can classifiy a diseased person as actually diseased with 99% reliability. However, it may happen in 2% of the cases that a healthy person is mistakenly classified as diseased. A statistical analysis shows that the disease is apparent in one out of 100 patients. What is the probability that a patient is actually diseased if the system classifies a disease?

Exercise 3 Describe the structure of a pattern classification system and give detailed information about each module.

Exercise 4 The digitization of analog signals results in a countable number of patterns. The direct approach of template matching, however, is not practicable. For exact template matching, we are required to enumerate all examples which we want to match. The feasibility of this approach depends on the size of the problem space. How large is the problem space?

(a) Compute the number of possible speech signals with N samples and n bit quantization for the function values.

(b) Compute the number of $N \times M$ images that can be represented with an n bit quantization.