Pattern Recognition - Sheet 02

Tutor: Sebastian Mueller
Handed out: **Nov 02**
Discussion: **Nov 16**

Ex 2-0: More vocabulary

Answer the following questions in your own words within 2-4 sentences:

- What is the difference between the mean and the expected value of a r.v.? Under what circumstances do those two measures coincide?

- How is the normal distribution defined and how can the parameters be interpreted?

- Plot a standard normal distribution with matplotlib and color the areas corresponding to 68%, 95% and 99.7% of probability mass.

Ex 2-1: Markov Chains

The following graph shows the four basic states of a student and transition probabilities between them:
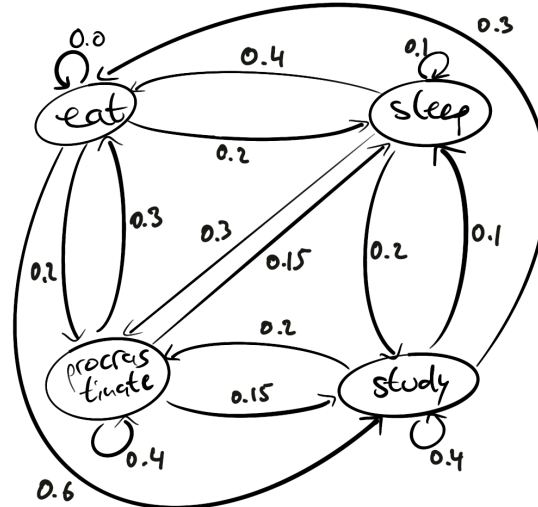
- Transfer graph to a state transition matrix

- Initialize a state vector for each node in the graph, do 42 steps with each vector. What do you notice?

Ex 2-2: Gaussian Naïve Bayes

The dataset "data.csv" accompanying this sheet in the LecturePatternRecognition repository contains 1700 samples with 2 features each and a classlabel.

- Visualize the data and use a different color for each class.

- Split the dataset into training and test sets. Try different ratios by using {50, 20, 10, 5}% of the data for training and the rest for testing.

- Fit a multivariate gaussian to each class.

- Compare the classification results if you

  - use the maximum a posteriori to classify the samples
  - only use likelihood

  What do you notice?

- Compare training and testing error for the different split ratios of training and testing data.