

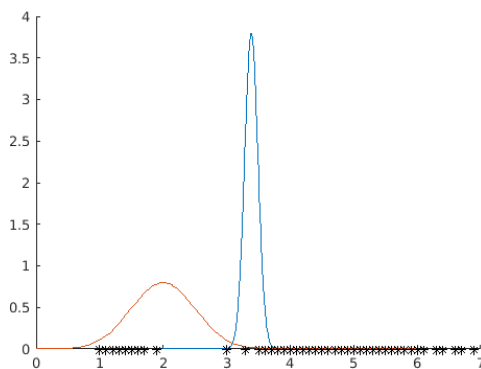
COMP4702/COMP7703 - Machine Learning

Prac 11 – Bayesian Learning and Gaussian Processes

Aims:

- To complement lecture material in understanding the principles of inference with Bayesian networks.
- To gain experience with implementing Bayesian inference and Gaussian Processes in software.
- To produce some assessable work for this subject.

Q1: Implement Bayesian learning for the case where the data is 1D (i.e. a single continuous variable) and the data is assumed to follow a Gaussian distribution with known/constant variance (i.e. the example in Alpaydin, Section 16.3.1 and discussed in lectures). Specifically, your code should use the third column from the Iris dataset and produce a graph of the model prior and posterior distributions. Add the data as well: this is essentially reproducing Fig.16.3 from Alpaydin, plotting the data instead of $p(x|\mu)$. It should look something like this:



Include your code for this question.

Q2: Gaussian processes are implemented in most machine learning libraries and software, including WEKA and Matlab. A separate GP Matlab toolbox (to accompany a book, both are freely available) is here:

<http://www.gaussianprocess.org/gpml/>

Download the toolbox and work through the tutorials:

<http://www.gaussianprocess.org/gpml/code/matlab/doc/>

If you are short on time, the demoRegression script covers what we discussed in lectures.