

What's Bayes

It's all about Conditional Probability.

Example:

What's Naive Bayes?

Here is the assumption:

$$p(x)$$

Why does it work?

Tom Mitchell puts it this way:

Consider: $x_j = \text{Rain, Thunder, Lightning}$.

Thunder is independent of Rain, given Lightning.

“Because we know Lightning causes Thunder, once we know whether or not there is Lightning, no additional information about Thunder is provided by the value of Rain. Of course, there is a clear dependence of Thun-

Does it look loistic?

And now, something completely different

Let's go all the way to AI: K-nearest-neighbor (KNN)

- not to be confused with NN.

In naive Bayes, logistic, ..., we estimate a probability density (or some function).

The estimation is usually done by optimizing some error/objective/cost function.

K-Nearest-Neighbor

Check the x_i values of a new data case.

Find the k nearest neighbors in the bag of data.

Forecast the majority class.

Enough Theory?

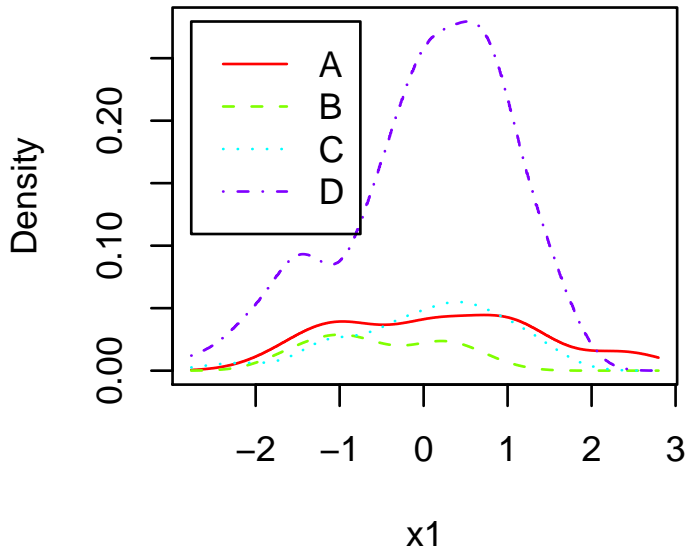
Let's compute.

The data (KACV) consist of 20 predictors:

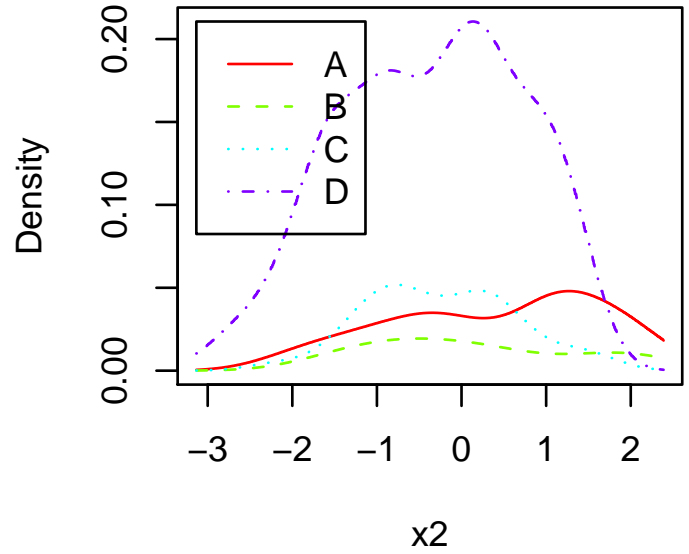
1. SLP
2. T2
3. Q2
4. U10m
5. V10m
6. Rain tot
7. Geopotential Height (H) at 850 (not at 700,500,300)

NaiveBayes results: Normal(top), Kernel(bottom)

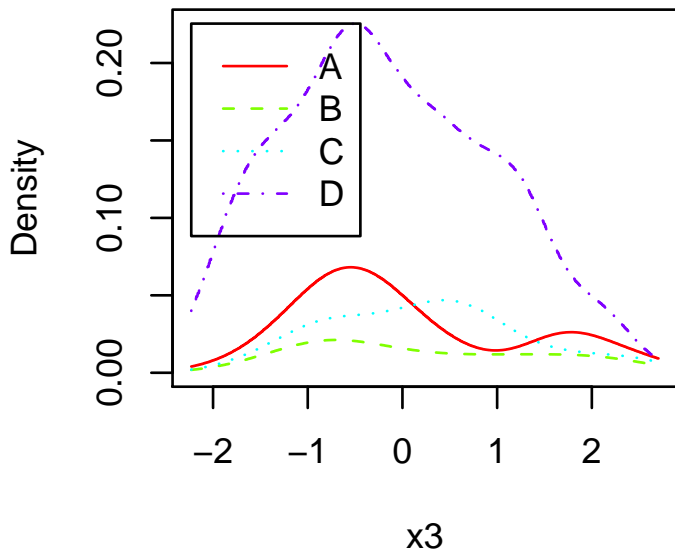
Naive Bayes Plot



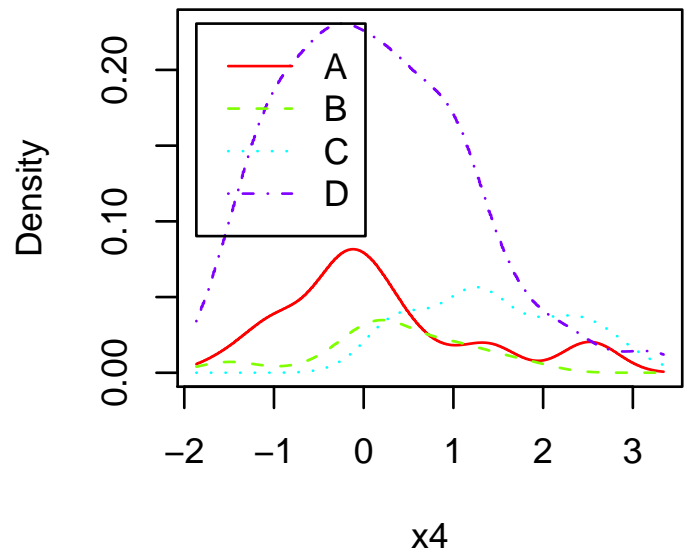
Naive Bayes Plot



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KNN-later!
In handout.