Non-parametric Bayesian Methods in Machine Learning

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May 8, 2014

Outline

- **FIX ME AT THE END**
- (My) Bayesian philosophy
- Gaussian Processes for Regression and Classification
    - GP preliminaries
    - Classification (including semi-supervised)
    - Regression application 1: clinical (dis)-agreement
    - Regressopn application 2: typing on touch-screens
- Dirichlet Process flavoured Cluster Models
    - DP preliminaries
    - Idenfitying metabolites
    - (if time) Cluster models for multiple data views

About me

- I'm not a statistican by training (don't ask me to prove anything!).
- Education:
    - Undergraduate Degree: Electrical and Electronic Engineering (Bristol)
    - PhD: Machine Learning Techniques for Microarray Analysis (Bristol)
- Currently:
    - Lecturer: Computing Science
    - Research Interests: Machine Learning and Applied Statistics in Computational Biology and Human-Computer Interaction (HCI)

Lecture 7: A mixture model for metabolite peak identification

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Metabolomics

- Metabolome: the set of small molecule metabolites found within an organism.
    - Hormones, sugars, etc
- Gives a reliable picture of the phenotype (Fu et al 2009)

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- Metabolome: the set of small molecule metabolites found within an organism.
  - Hormones, sugars, etc
- Gives a reliable picture of the phenotype (Fu et al 2009)
- But metabolites are hard to measure.
- Dominant paradigm is LC MS