Naïve Bayesians

Lockdown 2.0 Special | Episode 1: Bayesian Linear Regression with PyMC3

7th Nov 2020

Goal

Developing the Bayesian muscle to solve a wide range of problems

Naïve Bayesian Philosophy

Intuitive (Visual) Understanding of the Bayesian Reasoning

Ability to model real world problems in a Bayesian Setting

Starting from Simple Probabilistic modelling

Adapting it in a a Bayesian setting
And moving towards ML models

Fluency in the Calculus of Bayesian Stats & ML model

Recap of Specifying a Model

```
with pm.Model() as model:
    # Prior
    p = pm.Uniform(name="p", lower=0, upper=1)
    # Likelihood
    obs = pm.Bernoulli(name="obs", p=p, observed=occurrences)
    # Sample from the Posterior
    trace = pm.sample(draws=20000)
```

The Magic Bullet

```
with pm.Model() as model:
    # Prior
    p = pm.Uniform(name="p", lower=0, upper=1)
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    trace = pm.sample(draws=20000)
```

The Magic Bullet *...with more parameters*

```
with pm.Model() as model:
    # Prior
    p = pm.Uniform(name="p", lower=0, upper=1, testval=0.3)
    # Likelihood
    obs = pm.Bernoulli(name="obs", p=p, observed=occurrences)
    # Find the 'most likely' value
    p_map = pm.find_MAP()
    # Sample from the Posterior
    trace = pm.sample(draws=20000,
                      step=pm.Metropolis,
                      chains=4,
                      start=p_map)
```

The Folk Theorem of Statistical Computing

If you are having computational problems,
probably your model is wrong.