Computational Statistics-Report

David Niederkofler, Erlend Lokna

2022-11-30

```
mydata<-read.table("Report2_Dataset.txt", header=FALSE)
```

Statistical Analysis of Covariates

It is important to mention the use of notation before we proceed. We will in this section use the notation $\mathbf{x} = \{x_1, x_2, \cdots, x_n\}$ as our covariate vector.

Bernoulli - Beta, Ascicles

Since the Ascicles - covariate has a 0-1 outcome we can assume that it is Bernoulli distributed with parameter θ. A natural conjugate prior for the Bernoulli distribution is the Beta distribution. Therefor we have the following initial information:

$$f(x_i|\theta) = \theta^{x_i}(1-\theta)^{1-x_i}$$

$$L(\mathbf{x}|\theta) = \theta^{\sum_{i=1}^{n} x_i}(1-\theta)^{n-\sum_{i=1}^{n} x_i}$$

$$h(\theta) = Beta(a,b)$$

We proceed by calculating the posterior distribution for θ

$$h(\theta|\mathbf{x}) \propto L(\mathbf{x}|\theta)h(\theta) = \theta^{\sum_{i=1}^{n} x_i}(1-\theta)^{n-\sum_{i=1}^{n} x_i}\frac{1}{B(a,b)}\theta^{a-1}(1-\theta)^{b-1}I(0 < \theta < 1)$$

$$\propto Beta(\theta|a + \sum_{i=1}^{n} x_i, b + n - \sum_{i+1}^{n} x_i)$$

1.1 Model selection

1.2 Results