Ecole Centrale de Nantes

Projet methodes bayésiennes et modèles hiérarchiques

Oxford : smooth fit to log-odds ratios

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$$
\begin{aligned}
\pi(b_i \mid ...) &\propto \pi(b_i \mid \sigma^2) \times \pi(r_i^1 \mid ...) \\
&\propto e^{-\frac{b_i^2}{2\sigma^2}} \times (p_i^1)^{r_i^1} \times (1-p_i^1)^{n_i^1-r_i^1}
\end{aligned}
$$

$$
\begin{aligned}
\pi(\mu_i \mid ...) &\propto \pi(\mu_i) \times \pi(r_i^0 \mid \mu_i) \times \pi(r_i^1 \mid ...) \\
&\propto e^{-\frac{\mu_i^2}{2\times 10^3}} \times (p_i^0)^{r_i^0} \times (1-p_i^0)^{n_i^0-r_i^0} \times (p_i^1)^{r_i^1} \times (1-p_i^1)^{n_i^1-r_i^1}
\end{aligned}
$$

$$
\begin{aligned}
\pi(\alpha \mid ...) &\propto \pi(\alpha) \times \prod_{i=1}^{120} \pi(r_i^1 \mid ...) \\
&\propto e^{-\frac{\alpha^2}{2\times 10^3}} \times \prod_{i=1}^{120} [(p_i^1)^{r_i^1} \times (1-p_i^1)^{n_i^1-r_i^1}]
\end{aligned}
$$

$$
\begin{aligned}
\pi(\beta_1 \mid ...) &\propto \pi(\beta_1) \times \prod_{i=1}^{120} \pi(r_i^1 \mid ...) \\
&\propto e^{-\frac{\beta_1^2}{2\times 10^3}} \times \prod_{i=1}^{120} [(p_i^1)^{r_i^1} \times (1-p_i^1)^{n_i^1-r_i^1}]
\end{aligned}
$$

$$
\begin{aligned}
\pi(\beta_2 \mid ...) &\propto \pi(\beta_2) \times \prod_{i=1}^{120} \pi(r_i^1 \mid ...) \\
&\propto e^{-\frac{\beta_2^2}{2\times 10^3}} \times \prod_{i=1}^{120} [(p_i^1)^{r_i^1} \times (1-p_i^1)^{n_i^1-r_i^1}]
\end{aligned}
$$

$$
\begin{aligned}
\pi(\sigma^2 \mid ...) &\propto \pi(\sigma^2) \times \prod_{i=1}^{120} \pi(b_i \mid \sigma^2) \\
&\propto (\sigma^2)^{(-0.001-1)} e^{-\frac{0.001}{\sigma^2}} \times e^{-\frac{\sum_{i=1}^{120} b_i^2}{2\sigma^2}} \\
&\propto InverseGamma(0.001, 0.001 + \frac{\sum_{i=1}^{120} b_i^2}{2})
\end{aligned}
$$

où $p_i^0 = sigmod(\mu_i)$ et $p_i^1 = sigmod(\mu_i + \alpha + \beta_1 year_i + \beta_2(year_i^2 - 22) + b_i)$