Course Errata

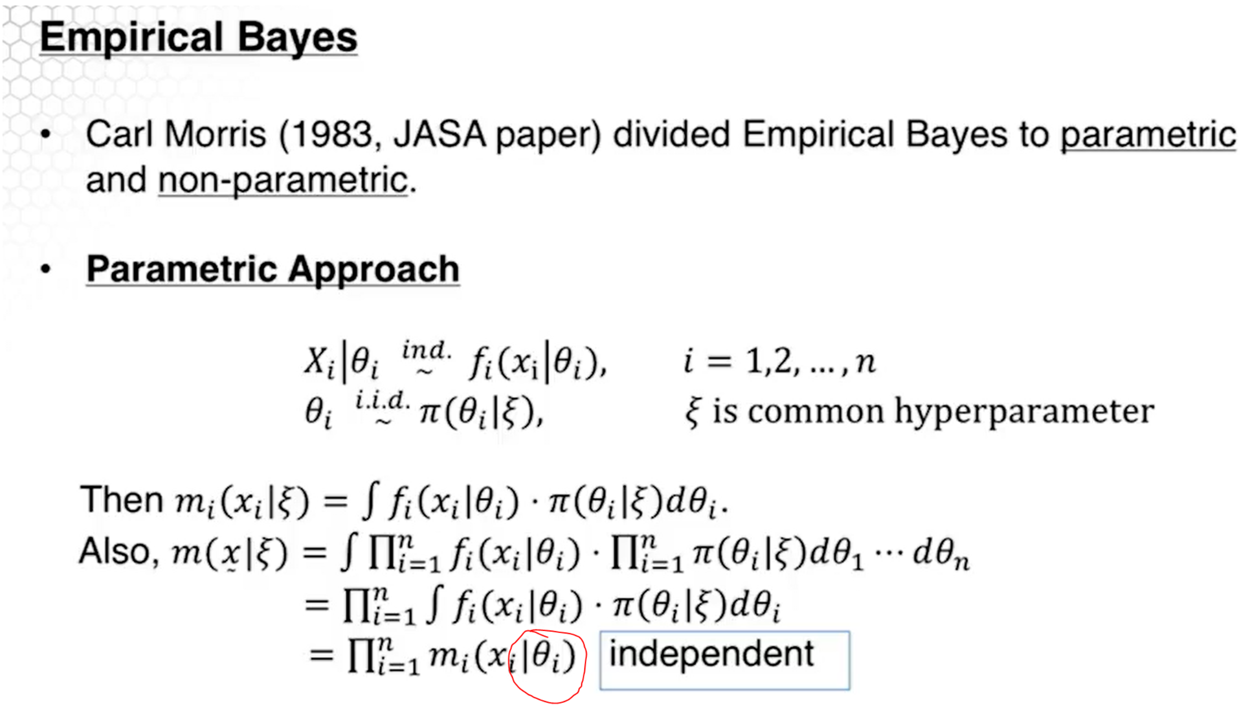
Lecture/Slide Errors

1. Unit 2 Lecture 5 FDA recommendations broken link. The correct link is here .
2. Unit 3 lecture 5 Manufacturing Bayes example. The correct calculation is

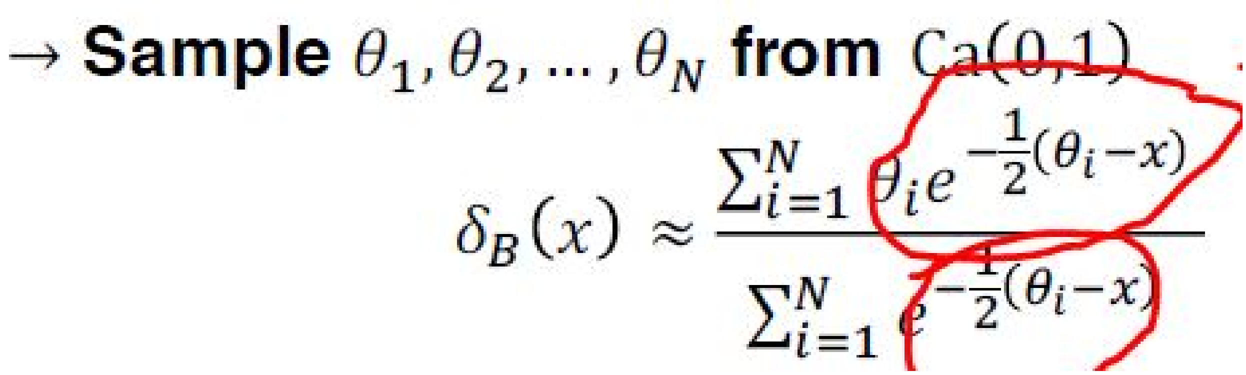
$$0.94 \cdot 0.3 + 0.95 \cdot 0.5 + 0.97 \cdot 0.2 = 0.951$$

3. Unit 3 example code: WinBUGS has an issue with the Alarm example code. Please run all course examples in OpenBUGS to get them to work properly.
4. Unit 4 Lecture 3 (10:29): There's an e in the denominator of the exponent that shouldn't be there, but the result should still be correct.
5. Unit 4 Lecture 8: The likelihood should be proportional to λ^{16} multiplied by $\exp(-6\lambda)$ i.e. the number 6 is missing and should be there.
6. Unit 4 Lecture 13 Example 1: the formula for a Gamma prior is incorrectly specified in lecture; it should be $\pi(\lambda) = \frac{\beta^\alpha \lambda^{\alpha-1}}{\Gamma(\alpha)} e^{-\beta\lambda}$. I have fixed this in the U4L13 lecture notes I created due to slides being unavailable for this part.
7. Unit 4 Lecture 18 has an incorrect calculation on the sample variance of Jeremy's data. The variance of the sample $(98, 107, 89, 88, 108)$ is $S^2 = (0+9^2+9^2+10^2+10^2)/(5-1) = 90.5$. The calculation may be updated as follows:
   $\hat{B} = \frac{\sigma^2}{\sigma^2+\hat{\tau}^2} = \frac{80}{80+(90.5-80)} = \frac{80}{90.5}$
   $\hat{\theta}_1 = \frac{80}{90.5} \cdot 98 + \frac{10.5}{90.5} \cdot 98 = 98; \hat{\theta}_2 = \frac{80}{90.5} \cdot 98 + \frac{10.5}{90.5} \cdot 107 = 99.044$ etc.

8. Unit 4 Lecture 18-19: The circled part should be $m_i(x_i|\xi)$:



9. Unit 5 Lecture 1 - where he samples from Cauchy, the exponential terms are missing a square (e.g. $e^{\frac{1}{2}(\theta_i - x)^2}$). This is just the leftover part of the integral that he is approximating:



10. Unit 5 Lecture 3. There are two mistakes in the slides here:

(1) In the expression for univariate Q, we should retain the negative sign: it should be

$$Q = \left[-\frac{\partial^2}{\partial\theta^2}\log\left(g\left(\theta\right)\right)\right]$$

instead of

$$Q = \left[\frac{\partial^2}{\partial\theta^2}\log\left(g\left(\theta\right)\right)\right]$$

(2) The second derivative of $\log(g(\theta))$ should be $-\frac{r+\alpha-1}{\theta^2}$ not $-\frac{r+\alpha-1}{(x+\beta)^2}$. The important point is that the second derivative is negative, so the value obtained for $\hat{\theta}$ is a maximum.

11. Unit 5 Lecture 19: $$X_1, \ldots, X_n \sim \mathrm{N}\left(\theta, \frac{1}{\tau}\right); \quad \tau \text{ precision}, \ \frac{1}{\tau} = \sigma^2$$ $$\mu \sim \mathrm{N}(0,1) \quad \tau \sim \mathrm{Ga}(2,1)$$

    should instead be $$X_1, \ldots, X_n \sim \mathrm{N}\left(\mu, \frac{1}{\tau}\right); \quad \tau \text{ precision}, \ \frac{1}{\tau} = \sigma^2$$ $$\mu \sim \mathrm{N}(0,1) \quad \tau \sim \mathrm{Ga}(2,1)$$

12. Unit 8 Lecture 3: Bayesian inference about $\longrightarrow L\left(\theta \mid y_1, \ldots, y_n\right) + \pi(\theta)$

    should instead be

    Bayesian inference about $\longrightarrow L\left(\theta \mid y_1, \ldots, y_n\right) \cdot \pi(\theta)$

13. Unit 10 Dental example (growth.odc) has data for 15 (and not 16) boys. Resolved issue by figuring out which data is missing and then adding it. Have yet to update website repository with this new file.

Errors in the Supplementary Exercises

Supplementary exercises are available here.

1. From Exercises 4.3: Joint, Marginals, Conditionals #4

   The hint/solution provided has the incorrect order of integration listed: it should be
   $1 = \int_0^\infty \int_{-x}^{x} C(x^2 - y^2)e^{-x} dy dx$
   and not
   $1 = \int_0^\infty \int_{-x}^{x} C(x^2 - y^2)e^{-x} dx dy$
   but the result obtained for C is still correct.

2. From Exercises 4.8: Two scenarios for probability of success

   $\hat{p}_B = 2/21$ instead of the stated $2/19$

3. Exercise 5.4 Georgia Death from Kidney Cancer. The joint likelihood should be
$f(\boldsymbol{y}, \boldsymbol{\lambda}, \alpha, \beta) = \prod_{i=1}^{k} \left[\frac{\lambda_i^{y_i}}{y_i!} e^{-\lambda_i n_i} \times \frac{\beta^\alpha {\lambda_i}^{\alpha-1}}{\Gamma(\alpha)} e^{-\beta\lambda_i}\right] \times \frac{1}{A}\mathbf{1}(0 \le \alpha \le A) \times \frac{1}{B}\mathbf{1}(0 \le \beta \le B)$
instead of
$f(\boldsymbol{y}, \boldsymbol{\lambda}, \alpha, \beta) = \prod_{i=1}^{k} \left[\frac{\lambda_i^{y_i}}{y_i!} e^{-\lambda_i n_i} \times \frac{\beta^\alpha {\lambda_i}^{\alpha-1}}{\Gamma(\alpha)} e^{-\beta\lambda_i}\right] \times \frac{1}{A}\mathbf{1}(0 \le \alpha \le A) \times \frac{1}{B}\mathbf{1}(0 \le \alpha \le B)$
Also in the conditional distribution, the following is corrected:
$$\begin{aligned}\pi(\beta \mid \boldsymbol{y}, \boldsymbol{\lambda}, \alpha) &\propto f(\boldsymbol{y}, \boldsymbol{\lambda}, \alpha, \beta)\\ &\propto \beta^{k\alpha} e^{-\beta \sum_{i=1}^{k} \lambda_i} \times \frac{1}{B}\mathbf{1}(0 \le \beta \le B)\end{aligned}$$
instead of
$$\begin{aligned}\pi(\beta \mid \boldsymbol{y}, \boldsymbol{\lambda}, \alpha) &\propto f(\boldsymbol{y}, \boldsymbol{\lambda}, \alpha, \beta)\\ &\propto \beta^{k\alpha} e^{-\beta \sum_{i=1}^{k} y_i} \times \frac{1}{B}\mathbf{1}(0 \le \beta \le B)\end{aligned}$$

Other Material

(a) In the Gibbs.pdf handout, there is a missing exponent of 0.5 on the τ_0 in the definition of $f(y, \mu, \tau)$. However since we are solving for the marginal distribution of μ and τ this does not affect our numbers or results.