ReadMe_Hsuan Lee

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ZIP file Contains:

1. Report_HsuanLee

2. R code_HsuanLee

*3. Body_Fat_Prediction (**dataset used for this study**)*

My Own Functions:

*1. line 7- 68, Create my own Gibbs Sampler: **Gibbs_Sampler()***

*2. line 70- 146, Create my own M-H Sampler: **MH_Sampler()***

3. line 148- 226, Create my own Convergence Plot:

- *line 152- 165, Trace Plot: **Trace_Plot()***
- *line 167- 176, Density Plot: **Density_Plot()***
- *line 179- 189, Autocorrelation Plot: **Autocor_Plot()***
- *line 192- 225, Gelman-Rubin Plot: **Gelman_Plot()***

*4. line 228- 249, Create my own Summary function: **Bayes_Summary()***

*5. line 251- 276, Create my own DIC function: **DIC()***

*6. line 278- 312, Create my own Bayes Factor function: **Bayes_Factor()***

Report :

1. Data

- *line 1- 3, Read the Data*
- *line 5, Center the variables*
- *line 371- 373, Create the data without variable "Age" and "Height" for INTERCEPT ONLY MODEL*
- *line 387- 389, Create the data without variable "Height" for MODEL WITH AGE ONLY AS A PREDICTOR*

2. Estimation & Metropolis-Hasting Sampler

- *line 318- 322, Specify the Initial Values*
- *line 324- 343, Implementation of Gibbs Sampler with normal prior of b_1 and b_2*
- *line 347- 350, Implementation of M-H Sampler with b_1 and b_2 (**FULL MODEL**) – CONVERGENCE ASSESSMENT, INTERPRETATION OF ESTIMATES & INTERVAL are all based on this model*
- *line 375- 378, Implementation of M-H Sampler (**INTERCEPT ONLY MODEL**)*
- *line 391- 394, Implementation of M-H Sampler with b_1 (**AGE ONLY AS A PREDICTOR MODEL**)*

3. Convergence

*# Note: If the first run shows **"Error in plot.new() : figure margins too large"**, please enlarge the lower right part (the area that shows the plots) to give it more space. And run the function again line by line from 148 to 226; then also re-run the plots below line by line.*

- *line 353, Trace Plot*
- *line 354, Density Plot*
- *line 355, Autocorrelation Plot*
- *line 356, Gelman-Rubin Plot*

*4. **Interpretation of Estimates & Intervals***

- *line 359, Summary of the **full model** (**Table 1**)*
- *line 400, Summary of the **model with Age only as a predictor***

5. Model Selection Using DIC

- *line 362, DIC of the **full model***
- *line 381, DIC of the **intercept only model***
- *line 397, DIC of the **model with Age only as a predictor***

6. the Bayes Factor

- *line 363- 364, Bayes Factor that test for the informative hypotheses*

7. Comparison of Bayesian and Frequentist Approach

- *line 405- 406, full model fitted with the Frequentist approach*