

Bayesian final project

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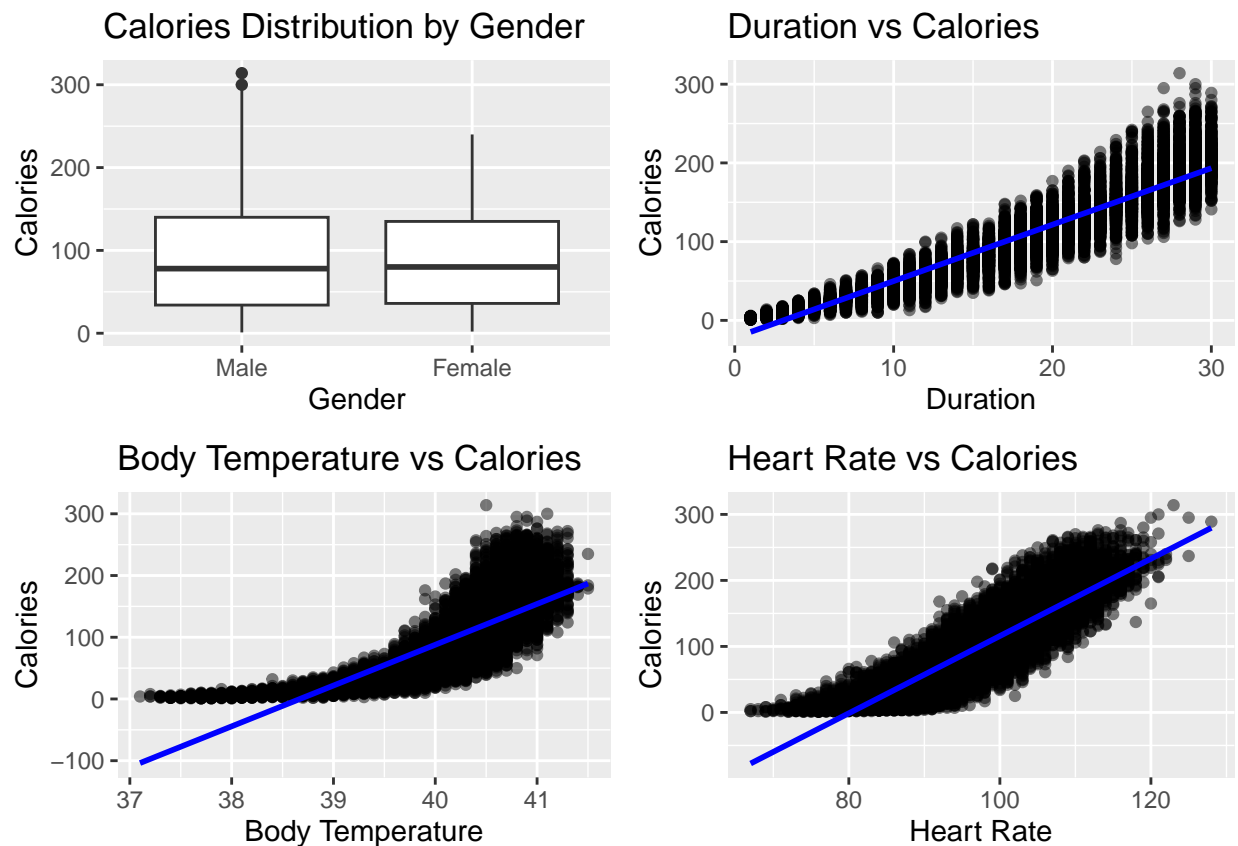
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1 introduction

The proposed project aims to establish a predictive relationship between physical exercise attributes and calories output. The reason why I choose this project is that: nowadays, The health industry's standard exercise and nutrition advice doesn't fit everyone's unique body responses. Personalized plans are needed for better health outcomes, which requires understanding how individual traits and exercise reactions affect calorie burning. Besides, The study will analyze two datasets: 'exercise.csv' containing variables such as user demographics and post-exercise vitals, and 'calories.csv' detailing corresponding caloric expenditure.

1.1 visualization

For this part, I will show some visualization of the data.



2 Method and analysis

2.1 Bayesian linear regression model

```
## $summary
##           mean      se_mean      sd      2.5%      25%
## beta[1]    5.536008 0.0008878598 0.02492448    5.488649    5.518759
## beta[2]    2.097826 0.0009384323 0.02461012    2.050044    2.081373
## beta[3]   -4.918233 0.0019210465 0.05155707   -5.020121   -4.953287
## sigma     15.032626 0.0021042467 0.08858846   14.861487   14.973106
## lp__    -48151.630603 0.0414319043 1.46960570 -48155.479750 -48152.297392
##           50%      75%      97.5%      n_eff      Rhat
## beta[1]    5.535756    5.552055    5.586056   788.0677   1.0025249
## beta[2]    2.097687    2.114649    2.146396   687.7359   1.0042792
## beta[3]   -4.917606   -4.884361   -4.818631   720.2790   1.0043120
## sigma     15.031920    15.093099    15.210064  1772.3968   0.9996796
## lp__    -48151.299239 -48150.566720 -48149.812928 1258.1484   1.0008961
##
## $c_summary
## , , chains = chain:1
##
##           stats
## parameter      mean      sd      2.5%      25%      50%
## beta[1]    5.535480 0.02450994    5.488536    5.518072    5.535748
## beta[2]    2.098672 0.02415249    2.052527    2.083022    2.098225
## beta[3]   -4.920095 0.05058726   -5.021021   -4.955631   -4.919409
## sigma     15.030556 0.09101805    14.852266    14.967867    15.035498
## lp__    -48151.639516 1.46585468 -48155.518489 -48152.310383 -48151.314564
##           stats
## parameter      75%      97.5%
## beta[1]    5.551630    5.583597
## beta[2]    2.115169    2.146508
## beta[3]   -4.887163   -4.822972
## sigma     15.093535    15.197030
## lp__    -48150.581984 -48149.843275
##
## , , chains = chain:2
##
##           stats
## parameter      mean      sd      2.5%      25%      50%
## beta[1]    5.536150 0.02469454    5.488817    5.519001    5.534737
## beta[2]    2.097433 0.02441596    2.049053    2.080528    2.097690
## beta[3]   -4.917357 0.05139466   -5.020311   -4.952416   -4.917398
## sigma     15.032298 0.09080278    14.855390    14.973268    15.027325
## lp__    -48151.706498 1.50501759 -48155.686566 -48152.533883 -48151.341067
##           stats
## parameter      75%      97.5%
## beta[1]    5.553389    5.584566
## beta[2]    2.114338    2.146400
## beta[3]   -4.882501   -4.817677
## sigma     15.093277    15.224256
## lp__    -48150.620521 -48149.831380
##
## , , chains = chain:3
```

```

##
##          stats
## parameter      mean      sd      2.5%      25%      50%
##  beta[1]      5.535464 0.02594516  5.485624  5.518785  5.535008
##  beta[2]      2.098217 0.02545163  2.052245  2.081462  2.097242
##  beta[3]     -4.918915 0.05320163 -5.026790 -4.953703 -4.916244
##  sigma      15.031780 0.08709370  14.870270  14.971133  15.028123
##  lp__     -48151.648251 1.47171638 -48155.064155 -48152.279528 -48151.351979
##          stats
## parameter      75%      97.5%
##  beta[1]      5.551219  5.587984
##  beta[2]      2.114696  2.149714
##  beta[3]     -4.883564 -4.822674
##  sigma      15.093748  15.203390
##  lp__     -48150.581506 -48149.799376
##
## , , chains = chain:4
##
##          stats
## parameter      mean      sd      2.5%      25%      50%
##  beta[1]      5.536937 0.02452787  5.491043  5.519459  5.537040
##  beta[2]      2.096982 0.02440174  2.048539  2.080789  2.097632
##  beta[3]     -4.916567 0.05101109 -5.014506 -4.951824 -4.916735
##  sigma      15.035870 0.08535125  14.871405  14.978668  15.036000
##  lp__     -48151.528148 1.43144252 -48155.396305 -48152.227074 -48151.166063
##          stats
## parameter      75%      97.5%
##  beta[1]      5.552138  5.588218
##  beta[2]      2.114034  2.142519
##  beta[3]     -4.883522 -4.815736
##  sigma      15.091438  15.215551
##  lp__     -48150.502260 -48149.796386

```

3.result and conclusions