

DNAm Hierarchical Model - Prior Sensitivity Analysis

Kevin Murgas

2020-10-12

Contents

Prior sensitivity is assessed by looking at Stan fit results of different sets of priors, each with an increasing level of variance relaxation. Current data: 1x (original), 2x, 3x, and 5x.

Priors are assessed by 3 metrics: n_{eff} and R_{hat} to assess Stan MCMC convergence, and Kullback-Leibler divergence to assess prior constraints.

```
[1] "FullResultsTCGA_gamma.Rdata"
[1] "loaded"
[1] "FullResultsTCGA_relaxgamma2.Rdata"
[1] "loaded"
[1] "FullResultsTCGA_relaxgamma3.Rdata"
[1] "loaded"
[1] "FullResultsTCGA_relaxgamma5.Rdata"
[1] "loaded"
[1] "N_eff"
```

Params	1x	2x	3x	5x
mu	3417.97	3377.90	3342.44	3274.55
betaT	3340.76	3238.87	3187.70	3122.52
sigmaP	1105.93	836.45	725.71	620.89
sigmaPT	2093.16	1730.63	1564.73	1395.50
sigmaT	444.12	296.65	242.04	193.71
sigmaE	490.99	391.06	356.36	322.51
lp	321.17	245.79	207.35	166.08

```
[1] "Rhat"
```

Params	1x	2x	3x	5x
mu	1.001	1.001	1.001	1.001
betaT	1.001	1.001	1.001	1.001
sigmaP	1.004	1.006	1.007	1.009
sigmaPT	1.002	1.003	1.004	1.006
sigmaT	1.011	1.015	1.019	1.023
sigmaE	1.015	1.017	1.018	1.020
lp	1.021	1.023	1.026	1.031

```
[1] "KLdiv"
```

Params	1x	2x	3x	5x
mu	1.619	2.455	3.347	4.689
betaT	1.841	1.679	2.307	4.061
sigmaP	13.529	15.841	18.306	22.457
sigmaPT	7.577	10.746	14.150	7.790
sigmaT	40.837	13.267	14.347	19.777
sigmaE	52.175	56.005	58.473	60.999

ewpage

```
[1] "BCdist"
```

Params	1x	2x	3x	5x
--------	----	----	----	----

Params	1x	2x	3x	5x
mu	0.040	0.071	0.105	0.159
betaT	0.050	0.058	0.084	0.148
sigmaP	0.079	0.095	0.110	0.137
sigmaPT	0.033	0.057	0.083	0.126
sigmaT	0.077	0.046	0.047	0.066
sigmaE	0.394	0.429	0.452	0.478

[1] "EMdist"

Params	1x	2x	3x	5x
mu	0.692	0.765	0.780	0.721
betaT	0.244	0.290	0.372	0.592
sigmaP	0.066	0.107	0.142	0.202
sigmaPT	0.128	0.244	0.328	0.434
sigmaT	0.028	0.050	0.070	0.104
sigmaE	0.528	0.506	0.484	0.457

Plots

```
## [1] "FullResultsTCGA_gamma.Rdata"
## [1] "loaded"
## [1] "FullResultsTCGA_relaxgamma2.Rdata"
## [1] "loaded"
## [1] "FullResultsTCGA_relaxgamma3.Rdata"
## [1] "loaded"
## [1] "FullResultsTCGA_relaxgamma5.Rdata"
## [1] "loaded"
```

