Note on EI Usage

July 2021

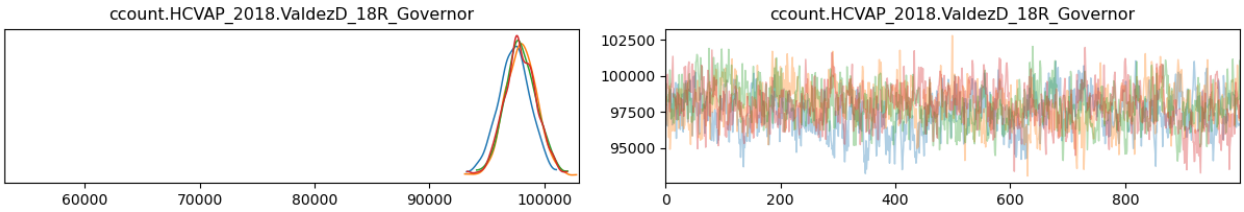
Script 1 shows an example from our EI runs, specifically the Democratic Primary Runoff for the 2018 Texas Governor's race.

We use the outputs of these runs to identify candidates of choice and to determine our confidence levels for those identifications. We emphasize that this component of our workflow is quite modular and can be replaced by a user's own choice of method. Our particular choice of methods and parameter settings were suitable for the cases in our paper, but we do not claim that these choices are necessarily well suited for adapting our framework to new states or even new elections. Users are advised to verify that their choice of methods are generating consistent and reasonable values including an exploration of the EI parameters beyond the default settings.

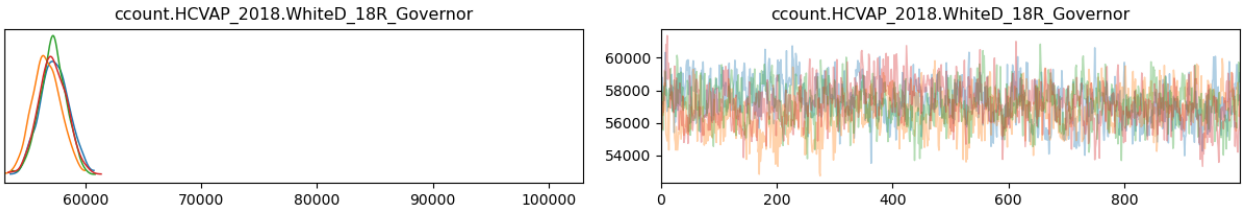
Figure 1 shows trace plots of estimated Latino and Black votes for Valdez and White from four different runs of the above script. Though there is small variation run-to-run, the results are consistent enough for our purposes. In particular, the runs have converged enough to consistently identify clear candidates of choice (as is the case with Valdez for Latino voters) and consistently recognize when a candidate of choice is very uncertain (as is the case with Black voters).

```r
library('eiPack')
library(readr)
library(stringr)

elec_data <- data.frame(read_csv('TX_cvap_for_EI.csv'))

ntunes_val <- 10
tunedraws <- 10000
thin_mcmc <- 100
burnin_mcmc <- 100000

e <- '18R_Governor'
form <- "cbind(ValdezD_18R_Governor, WhiteD_18R_Governor,
 ↪  X18R_Governor_abstain) ~ cbind(BCVAP_2018, HCVAP_2018, WCVAP_2018,
 ↪  OCVAP_2018, X18R_Governor_CVAP)"

tune.nocov <- tuneMD(form, data = elec_data, ntunes = ntunes_val, totaldraws =
 ↪  tunedraws)
out.nocov <- ei.MD.bayes(form,covariate = NULL, data = elec_data,tune.list =
 ↪  tune.nocov, ret.mcmc = TRUE, burnin = burnin_mcmc, thin = thin_mcmc)

sink("18R_Governor_ei_summary.txt")
print(summary(out.nocov, quantiles = c(.025, .05, .5, .95, .975)))
sink()

mcmc_df <- data.frame(as.matrix(out.nocov$draws$Cell.counts, iters = TRUE))
write.csv(mcmc_df,"18R_Governor_EI_SAMPLES.csv")

mcmc_df_prec <- as.matrix(out.nocov$draws$Beta)
x <- colMeans(mcmc_df_prec)
y <- apply(mcmc_df_prec, 2, sd)
probs <- c(0:8/8)
q_0 <- apply(mcmc_df_prec, MARGIN = 2, FUN = quantile, probs = probs)
write.csv(t(q_0), "18R_Governor_prec_quants.csv")
write.csv(x, "18R_Governor_prec_means.csv")
write.csv(y,"18R_Governor_prec_sd.csv")
```

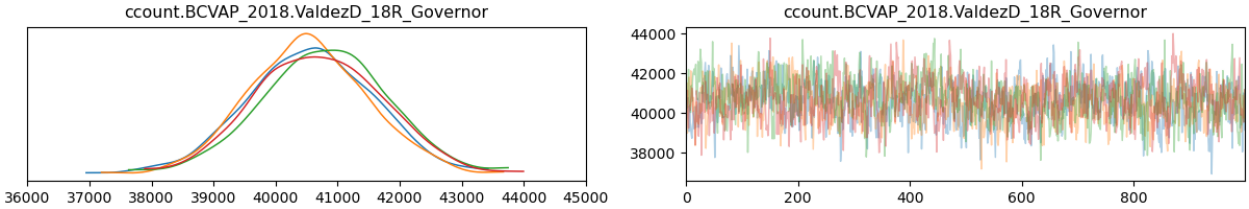
Script 1: EI Example using the Texas 2018 Gubernatorial Democratic primary runoff election



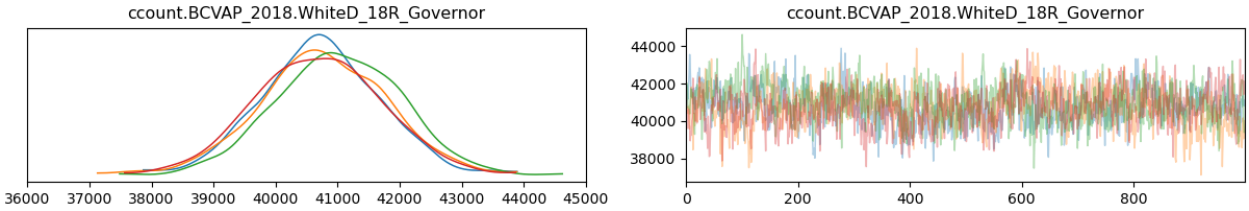
(a) Latino Votes for Valdez



(b) Latino Votes for White



(c) Black Votes for Valdez



(d) Black Votes for White

Figure 1: Trace plots comparing four different runs of Script 1