Cross Validated

How to use blasso function in R package “monomvn”? [closed]

Asked 2 years, 8 months ago Active 2 years, 7 months ago Viewed 1k times

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I am a freshman with Bayesian lasso. I searched online and found that the only package I can use is monomvn. There's only one example about diabetes data in its R document. However, the parameters set in that example is quietly simply. Just "blasso(x,y)". I tried to follow this but when it comes to my data, all coefficients were shrunk to zeros. Should I give initial values to beta? Appreciate it if anyone could provide examples describing how to set parameters for this function? Thanks a lot.

r bayesian lasso

asked Mar 20 '17 at 21:08

purod
157 11

closed as off-topic by Jake Westfall, kjetil b halvorsen, gung - Reinstate Monica ♦, Juho Kokkala, Michael R. Chernick Apr 5 '17 at 17:11

This question appears to be off-topic. The users who voted to close gave this specific reason:

- "This question appears to be off-topic because EITHER it is not about statistics, machine learning, data analysis, data mining, or data visualization, OR it focuses on programming, debugging, or performing routine operations within a statistical computing platform. If the latter, you could try the support links we maintain." – Jake Westfall, kjetil b halvorsen, gung - Reinstate Monica, Juho Kokkala, Michael R. Chernick

If this question can be reworded to fit the rules in the help center, please edit the question.

Questions about how to use software are generally off topic here, & tutorials are explicitly outside our mandate. – gung - Reinstate Monica ♦ Apr 5 '17 at 16:59

1 Answer

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I am not an expert but I would be happy to share my experience with the monomvn package.

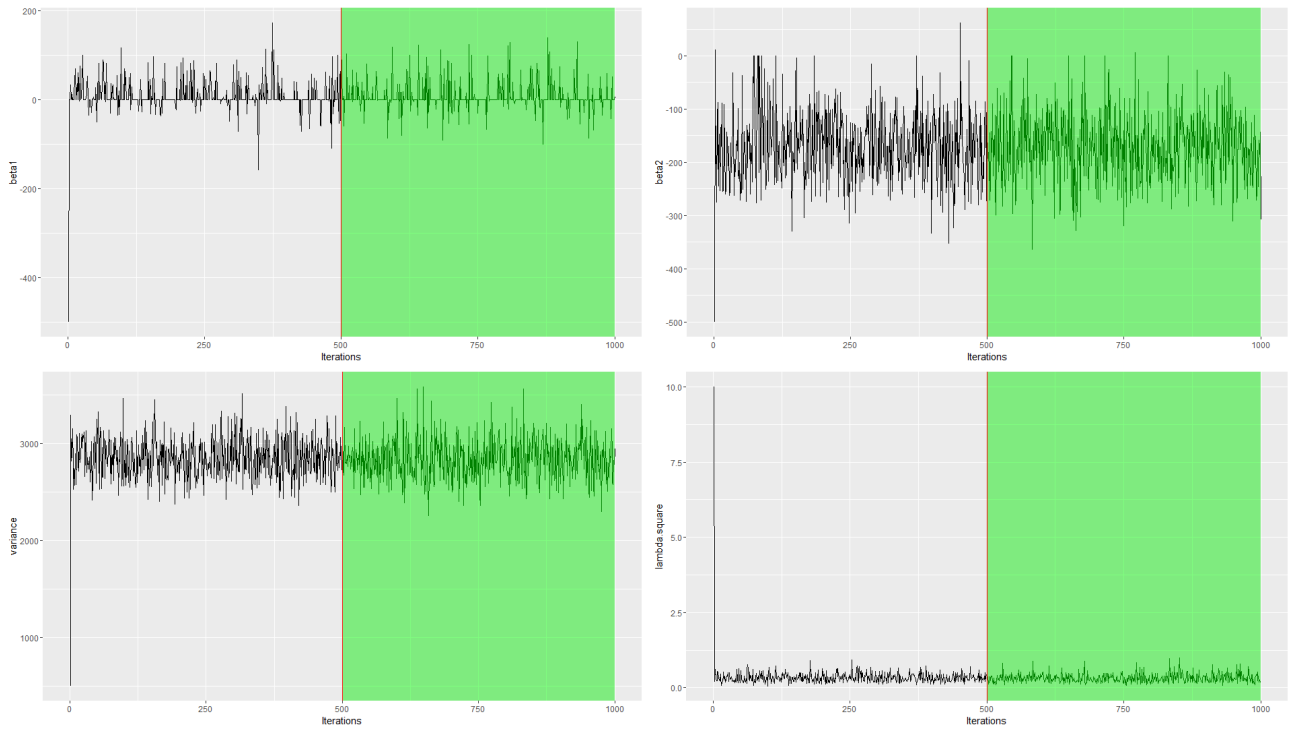
> Should I give initial values to beta?

Given enough iterations, initial values shouldn't have any impact on any parameter (e.g. regression coefficients, error variance and penalty parameter). Please consider the R code and traceplots below:

```
data(diabetes); attach(diabetes)

# define the burn-in period, number of mcmc samples to be drawn and initial
values
burnin <- 500
iter <- 1000
initial.beta <- rep(-500, dim(x2)[2]) # assigning an extreme initial value for
all betas
initial.lambda2 <- 10 # assigning an extreme initial value for lambda (penalty
parameter)
initial.variance <- 500 # assigning an extreme initial value for variance
parameter

# starting the Gibbs sampler here
lasso <- blasso(X = x2, # covariate matrix with dimensions 442 x 64
                y = y,  # response vector with length of 442
                T = iter, # number of iterations
                beta = initial.beta,
                lambda2 = initial.lambda2,
                s2 = initial.variance)

# collecting draws for some of the parameters for visualization
coef.lasso <- as.data.frame(cbind(iter = seq(iter),
                                  beta1 = lasso$beta[, "b.1"],
                                  beta2 = lasso$beta[, "b.2"],
                                  variance = lasso$s2,
                                  lambda.square = lasso$lambda2))
```

To get the parameter estimations, I would use the posterior median as Park and Casella (2008) have done.

```
> colMedians(coef.lasso[-seq(burnin), -1])
beta1       beta2        variance         lambda.square
0.0000000  -172.3840906  2841.4410472     0.3031814
```



Please consider that I have computed the coefficients after discarding first half of the draws. Since I have considered only the draws from green shaded areas, these extreme initial values I

Let's now compare lasso (glmnet package) and Bayesian lasso (monomvn package)

```
fit.glmnet <-  glmnet(as.matrix(x2), y,
                      lambda=cv.glmnet(as.matrix(x2), y)$lambda.1se)
coef.glmnet <- coef(fit.glmnet)
sum(coef.glmnet == 0)
53
```

The original lasso implementation has shrunk 53 parameters to 0. Let's now check Bayesian lasso:

```
sum(colMedians(lasso$beta[-seq(burnin), ]) == 0)
56
```

and it shrank 56 out of 64 exactly to 0.

Please also note that your estimation results might significantly differ when you specify the prior distributions. A quick example would be to change the parameters using the 'rd' argument in blasso() where 'rd' controls the gamma prior on lambda^2. (please hit ?blasso for other hyperprior specifications)

Here is an example:

```
lasso2 <- blasso(X = x2, # covariate matrix with dimensions 442 x 64
                 y = y,  # response vector with length of 442
                 T = iter, # number of iterations
                 beta = initial.beta,
                 lambda2 = initial.lambda2,
                 s2 = initial.variance,
                 rd = c(1, 1.78)) # hyperparameters suggested by Park & Casella
(2008)

coef.lasso2 <- as.data.frame(cbind(iter = seq(iter),
                                   beta1 = lasso2$beta[, "b.1"],
                                   beta2 = lasso2$beta[, "b.2"],
                                   variance = lasso2$s2, lambda.square =
                                   lasso$lambda2))

 colMedians(coef.lasso2[-seq(burnin), -1]) # new posterior median estimations
 beta1         beta2        variance         lambda.square
 0.0000000    -183.7851178  2817.3811240     0.2313924
```

I hope it is now clear now that giving initial values doesn't really help. Have you tried estimating the parameters using glmnet? If the results differ a lot, then you might consider tuning the hyperpriors on parameters in blasso(). If you still get the same results, maybe the parameters are all indeed 0 :-)

Hope that helps!

edited Apr 5 '17 at 15:59

answered Apr 5 '17 at 15:45

yahsin

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