Regularization and Variable Selection for Parametric Models (3)

February 8, 2012

```
> library(lqa)

> library(catdata)
> data(heart, package="catdata")
> X<-heart[,-1]
> y<-heart[,1]
> X.std<-scale(X)
> p<-ncol(X)
> n<-length(y)
> family <- binomial()
> n.fold<-10
> ylab.text<-""
> xlab.text<-""
> Width = 6
> Height = 6
> oma.vec<-c(1,1,1,3)
> size.axis=1.4
> size.lab=1.4
> size.main=1.4
> size.right=1.2
> size.width=2.0
> colour=1
```

LASSO IMPROVED CORRELATION BASED (with L_1 term)
Fixed Tuning parameter

```
> lambda2 <- 0.05
> ### COEF BUILD-UPS
>
> main.text<-"Lasso Improved Correlation Based"
> penalty.family<-licb
> Plot.mat<-plot.lqa (y = y, x = X, family=family, penalty.family=penalty.family,
+ offset.values = c (NA, lambda2),add.MLE = FALSE, ret.true=TRUE,really.plot = FALSE,
+ show.standardized=TRUE)

> par(oma=oma.vec,cex.axis=size.axis,cex.lab=size.lab,cex.main=size.main)
> matplot(Plot.mat$s1,Plot.mat$beta.mat,type="l",ylab=ylab.text,xlab=xlab.text,
+ main=main.text,lwd=size.width)
```
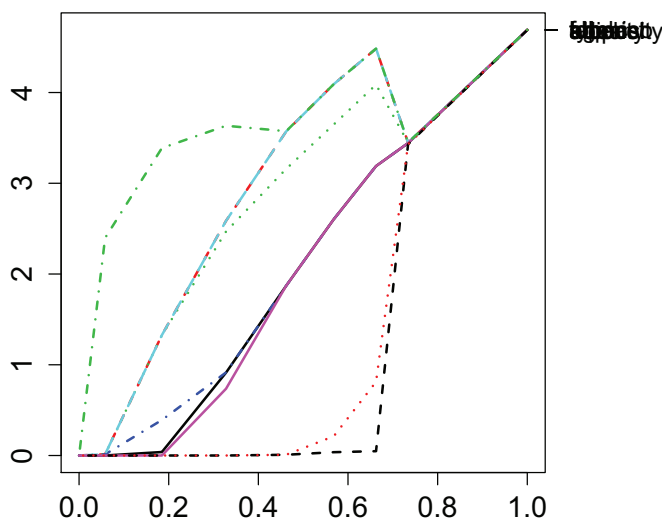
```
> axis(4, at = Plot.mat$beta.mat[1, ], labels = colnames(X), adj = 0, las = 1,
+ cex.axis=size.right)
>
```

Lasso Improved Correlation Based

CORREALTION BASED
COEF BUILD-UPS

```
> main.text<-"Correlation Based"
> penalty.family<-penalreg
> Plot.mat<-plot.lqa (y = y, x = X, family=family, penalty.family=penalty.family,
+ add.MLE = FALSE, ret.true=TRUE,really.plot = FALSE,show.standardized=TRUE,gamma=0.01)

> par(oma=oma.vec,cex.axis=size.axis,cex.lab=size.axis,cex.main=size.main)
> matplot(Plot.mat$s1,Plot.mat$beta.mat,type="l",ylab=ylab.text,xlab=xlab.text,
+ main=main.text,lwd=size.width)
> axis(4, at = Plot.mat$beta.mat[1, ], labels = colnames(X), adj = 0, las = 1,
+ cex.axis=size.right)
>
```

Correlation Based
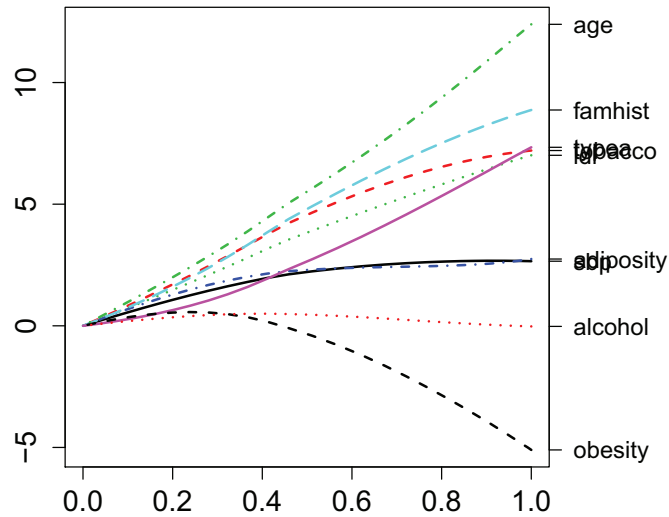
Forward Boost mit correlation based

```
> parcorr=10.5
> max.steps=20
> Path<- ForwardBoost (X.std, y,family = binomial(), penalty = penalreg(parcorr),
+ intercept =  TRUE,   nu = 1, monotonic = TRUE,control=lqa.control(max.steps=20,
+ conv.stop = FALSE))

> par(oma=oma.vec,cex.axis=size.axis,cex.lab=size.axis,cex.main=size.main)
> matplot(rowSums(abs(Path$beta.mat[,-1]))/max(rowSums(abs(Path$beta.mat[,-1]))),
+ Path$beta.mat[,-1]*sqrt(n),type="l",ylab=ylab.text,xlab=xlab.text,main=
+   "ForwardBoost",lwd=2.0)
> axis(4, at = Path$beta.mat[max.steps, -1]*sqrt(n), labels = colnames(X),
+ adj = 0, las = 1,cex.axis=size.right)
```

ForwardBoost

age
tobacco
famhist
ldl
adiposity
sbp
typea
obesity
alcohol