Package 'newSGL'

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Type Package

Title Fit a GLM with sparse group lasso methods

Version 1.0

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Maintainer Shikun Wang <shikunw@umich.edu>

Description This is a final project of BIOSTAT615 class.

License NA

LazyLoad yes

R topics documented:

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newSGL-package   *This package is a final project of BIOSTAT615.*

Description

We reimplement the algorithm combining R and C++ to improve the efficiency.

Details

Package:	newSGL
Type:	Package
Version:	1.0
Date:	2016-12-15
License:	NA
LazyLoad:	yes

2 functions: SGL predictSGL

Author(s)

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References

Simon, N. and Tibshirani, R. (2011) *A Sparse-Group Lasso*,
<http://www-stat.stanford.edu/~nsimon/SGL.pdf>

See Also

SGL

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predict.SGL   *Outputs predicted responses from an SGL model for new observations*

Description

Outputs predicted response values for new user input observations at a specified `lambda` value

Usage

```
## S3 method for class 'SGL'
predict(x, newX, lam,y)
```

Arguments

x	fitted "SGL" object
newX	covariate matrix for new observations whose responses we wish to predict
lam	the index of the lambda value for the model with which we desire to predict
y	responses

Details

A plot is produced

Author(s)

Noah Simon and Rob Tibshirani
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References

Simon, N. and Tibshirani, R. (2011) *A Sparse-Group Lasso*,
<http://www-stat.stanford.edu/~nsimon/SGL.pdf>

See Also

SGL

Examples

```
n = 100; p = 300; size.groups = 5
index <- ceiling(1:p / size.groups)
X = matrix(rnorm(n * p), ncol = p, nrow = n)
beta = (-2:2)
y = X[,1:5] %*% beta + 2*rnorm(n)
data = list(x = X, y = y)
Fit = SGL(data, index, type = "linear")
X.new = matrix(rnorm(n * p), ncol = p, nrow = n)
y.new = X.new[,1:5] %*% beta + 2*rnorm(n)
predict(Fit, X.new, 5, y.new)
```

SGL	*Fit a GLM with a combination of lasso and group lasso regularization*

Description

Fit a regularized generalized linear model via penalized maximum likelihood. The model is fit for a path of values of the penalty parameter. Fits linear, logistic and Cox models.

Usage

```
SGL(data, index, type = "linear", maxit = 1000, thresh = 0.001, min.frac = 0.1,
nlam = 20, gamma = 0.8, standardize = TRUE, verbose = FALSE, step = 1, reset = 10, alpha = 0.95)
```

Arguments

data	For `family="linear"` should be a list with x an input matrix of dimension n-obs by p-vars, and y a length n response vector. For `family="logit"` should be a list with x, an input matrix, as before, and y a length n binary response vector. For `family="cox"` should be a list with x as before, `time`, an n-vector corresponding to failure/censor times, and `status`, an n-vector indicating failure (1) or censoring (0).
index	A p-vector indicating group membership of each covariate
type	model type: one of ("linear","logit", "cox")
maxit	Maximum number of iterations to convergence
thresh	Convergence threshold for change in beta
min.frac	The minimum value of the penalty parameter, as a fraction of the maximum value
nlam	Number of lambda to use in the regularization path
gamma	Fitting parameter used for tuning backtracking (between 0 and 1)
standardize	Logical flag for variable standardization prior to fitting the model.
verbose	Logical flag for whether or not step number will be output
step	Fitting parameter used for inital backtracking step size (between 0 and 1)
reset	Fitting parameter used for taking advantage of local strong convexity in nesterov momentum (number of iterations before momentum term is reset)
alpha	The mixing parameter. `alpha` = 1 is the lasso penalty.

Details

The sequence of models along the regularization path is fit by accelerated generalized gradient descent.

Value

An object with S3 class "SGL"

beta	A p by nlam matrix, giving the penalized MLEs for the nlam different models, where the index corresponds to the penalty parameter lambda
lambdas	The actual sequence of lambda values used (penalty parameter)
type	Response type (linear/logic/cox)
intercept	For some model types, an intercept is fit
X.transform	A list used in predict which gives the empirical mean and variance of the x matrix used to build the model

Author(s)

Shikun Wang

References

Simon, N. and Tibshirani, R. (2011) *A Sparse-Group Lasso*,
<http://www-stat.stanford.edu/~nsimon/SGL.pdf>

Examples

```
n = 100; p = 300; size.groups = 5
index <- ceiling(1:p / size.groups)
X = matrix(rnorm(n * p), ncol = p, nrow = n)
beta = (-2:2)
y = X[,1:5] %*% beta + 2*rnorm(n)
data = list(x = X, y = y)
fit = SGL(data, index, type = "linear")
```

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