Package 'FTRLProximal'

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Title FTRL Proximal Implementation for Elastic Net Regression

Version 0.3.0

Description Implementation of Follow The Regularized Leader (FTRL) Proximal algorithm, proposed by McMahan et al. (2013) <doi:10.1145/2487575.2488200>, used for online training of large scale regression models using a mixture of L1 and L2 regularization.

URL https://github.com/while/FTRLProximal

BugReports https://github.com/while/FTRLProximal/issues

Depends R (>= 3.2.3)

Imports Matrix, methods

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Encoding UTF-8

LazyData true

RoxygenNote 5.0.1

Suggests testthat, covr, mlbench

NeedsCompilation yes

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R topics documented:

coef.ftrlprox 2
ftrlprox 2
ftrlprox.default 3
ftrlprox.formula 4
initialize.ftrlprox 5
predict.ftrlprox 6
print.ftrlprox 6
update.ftrlprox 7

Index **8**

coef.ftrlprox *coef.ftrlprox*

Description

Extract model coefficients.

Usage

```
## S3 method for class 'ftrlprox'
coef(object, ...)
```

Arguments

object	The model object
...	additional arguments are not used.

Details

This function can be used to extract the coefficients of a model trained using the ftrlprox package.

Value

an array with the regression coefficients

Author(s)

Vilhelm von Ehrenheim

ftrlprox *FTRL Proximal*

Description

Online elastic net regression using the FTRL Proximal algorithm for training.

Usage

```
ftrlprox(x, ...)
```

Arguments

x	the model matrix containing features
...	the rest of the model parameters

Details

This is the generic method. Please look at ftrlprox.matrix and ftrlprox.formula for the model matrix and formula versions respectively.

Value

ftrlprox model object

Author(s)

Vilhelm von Ehrenheim

`ftrlprox.default` *FTRL Proximal for matrix class*

Description

Online elastic net regression using the FTRL Proximal algorithm for training.

Usage

```
## Default S3 method:
ftrlprox(x, y, lambda, alpha, a, b = 1, num_epochs = 1,
  save_loss = F, ...)
```

Arguments

`x`	the model matrix containing features
`y`	the response variable
`lambda`	regularization term
`alpha`	mixing parameter, alpha=0 corresponds to L2 regularization and alpha=1 to L1.
`a`	learning rate parameter.
`b`	learning rate parameter controlling decay, defaults to 1.
`num_epochs`	number of times we should traverse over the traiing set, defaults to 1.
`save_loss`	is to save the loss function during training.
`...`	additional args

Details

This method is intended for matrix input.

Value

ftrlprox model object

Author(s)

Vilhelm von Ehrenheim

`ftrlprox.formula` *FTRL Proximal formula*

Description

Online elastic net regression using the FTRL Proximal algorithm for training.

Usage

```
## S3 method for class 'formula'
ftrlprox(formula, data, lambda, alpha, a, b = 1,
  num_epochs = 1, save_loss = F, ...)
```

Arguments

`formula`	modeling formula
`data`	data.frame containing features and dependent variable
`lambda`	regularization term
`alpha`	mixing parameter, alpha=0 corresponds to L2 regularization and alpha=1 to L1.
`a`	learning rate parameter
`b`	learning rate parameter controlling decay, defaults to 1.
`num_epochs`	number of times we should traverse over the traiing set, defaults to 1.
`save_loss`	is to save the loss function during training.
`...`	additional args

Details

Test text

Value

ftrlprox model object

Author(s)

Vilhelm von Ehrenheim

Examples

```
require(mlbench)

p <- mlbench.circle(100,2)
dat <- as.data.frame(p)

mdl <- ftrlprox(classes ~ x.1 + x.2 + I(x.1^2) + I(x.2^2), dat,
                a = 0.3, lambda = 5.0, alpha = 1.0)
print(mdl)
```

`initialize.ftrlprox` *Initialize empty FTRL Proximal class*

Description

Online elastic net regression using the FTRL Proximal algorithm for training.

Usage

```
initialize.ftrlprox(theta, levels, lambda, alpha, a, b = 1, save_loss = F,
  ...)
```

Arguments

`theta`	named numeric containing initial coefficients
`levels`	character vector containing class labels of target label
`lambda`	regularization term
`alpha`	mixing parameter, alpha=0 corresponds to L2 regularization and alpha=1 to L1.
`a`	learning rate parameter
`b`	learning rate parameter controlling decay, defaults to 1.
`save_loss`	is to save the loss function during training.
`...`	additional args

Details

This method is intended for setting up a ftrlprox model object before training it using update.

Value

ftrlprox model object

Author(s)

Vilhelm von Ehrenheim

predict.ftrlprox *Predict function for FTRLProx models*

Description

Predict outcome or probability of outcome using a regression model trained using the FTRL PRoximal algorithm.

Usage

```
## S3 method for class 'ftrlprox'
predict(object, newdata = NULL, type = c("response",
  "class"), ...)
```

Arguments

object	The model object to use for prediction.
newdata	the new dataset to predict the outcome of.
type	the type of response. Can be 'class' for class perdictions or 'response' for probabilities. Default option is 'response'.
...	additional args

Value

an array containing the predictions

Author(s)

Vilhelm von Ehrenheim

print.ftrlprox *Print a ftrlprox model*

Description

Print a text represenation of the ftrlprox model.

Usage

```
## S3 method for class 'ftrlprox'
print(x, digits = getOption("digits"), zero.print = ".",
  ...)
```

Arguments

x	The model object to print
digits	the number of digits display in printout.
zero.print	the symbol to use in place of zeros
...	additional args

Author(s)

Vilhelm von Ehrenheim

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update.ftrlprox *Update FTRL Proximal model*

Description

Continue training model on new data

Usage

```
## S3 method for class 'ftrlprox'
update(object, newX, newY, num_epochs = 1, save_loss = F,
  ...)
```

Arguments

object	the model object
newX	new feature vectors. This needs to be the same features as used in previous training rounds for this object.
newY	new observations
num_epochs	number of times we should traverse over the training data, defaults to 1.
save_loss	is to save the loss function during training. This will be appended to previous loss vector.
...	additional args

Details

As FTRL PRoximal is an online algorithm it is possible to continue training the model on new data. This can be good if for for example the size of the dataset is too large to keep in memory or new data is getting available after some time.

Value

ftrlprox model object

Author(s)

Vilhelm von Ehrenheim

Index

coef.ftrlprox, 2

ftrlprox, 2
ftrlprox.default, 3
ftrlprox.formula, 4

initialize.ftrlprox, 5

predict.ftrlprox, 6
print.ftrlprox, 6

update.ftrlprox, 7