Package ‘MWRidge’

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Type Package

Title Two Stage Moving-Window Ridge Method for Prediction and Estimation

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Author Minli Bao

Maintainer Minli Bao <minli-bao@uiowa.edu>

Description A two stage moving-window Ridge method for coefficients estimation and model prediction. In the first stage, moving-window penalty and L1 penalty are applied. In the second stage, ridge regression is applied.

Imports glmnet

License GPL

NeedsCompilation no

Repository CRAN

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Description

Find coefficients for a penalized regression model. Moving-window penalty is applied in the first stage and ridge regression is applied in the second stage.
Usage

```r
MWRidge(X, Y, lambda, eta, phi, d, method='linear', epson = 1e-10, M = 100)
predict(X.test, X.train, Y.train, lambda, eta, phi, d, method='linear',
         epson = 1e-10, M = 100)
```

Arguments

- **X**: The design matrix.
- **Y**: The response variable.
- **lambda**: The L1 penalty tuning parameter.
- **eta**: The moving-window penalty tuning parameter.
- **phi**: The L2 penalty tuning parameter.
- **d**: The size of the moving-window penalty.
- **method**: The regression method. Method can be linear or logistic.
- **X.test**: The design matrix for the test data.
- **X.train**: The design matrix for the training data.
- **Y.train**: The response variable for the training data.
- **epson**: Convergence criterion. The iteration will stop if the relative change is smaller than epson.
- **M**: The maximum number of iterations.

Details

There is a two-stage regularized regression method. In the first stage, the function minimizes \(1/(2n)*SSE + lambda*L1 + eta/(2(d-1))*MW\). Here SSE is the sum of squared error, L1 is the L1 penalty in Lasso and MW is the moving-window penalty. In the second stage, the function minimizes \(1/(2n)*SSE + phi/2*L2\). Here L2 is the L2 penalty in ridge regression.

Value

MWRidge returns:

- **beta**: The coefficients estimates.

predict returns:

- **y.hat**: The prediction of the test data based on the model trained on the training data.

Author(s)

Minli Bao <minli-bao@uiowa.edu>
Examples

\begin{verbatim}
n = 100
p = 200
set.seed(1)
X = matrix(rnorm(n * p, mean = 0, sd = 1), nrow = n, ncol = p)
beta = runif(p)
err = rnorm(n)
Y = X %*% beta + err
beta.hat = MWRidge(X, Y, lambda = 1, eta = 2, phi = 1, d = 2, method = 'linear')

prob = exp(X %*% beta)/(1 + exp(X %*% beta))
Y = rbinom(n, 1, as.vector(prob))
beta.hat = MWRidge(X, Y, lambda = 0.1, eta = 0.2, phi = 1, d = 2, method = 'logistic')
\end{verbatim}

X.test = matrix(rnorm(50 * p, mean = 0, sd = 1), nrow = 50, ncol = p)
Y.hat = predict(X.test, X, Y, lambda = 0.1, eta = 0.2, phi = 1, d = 2, method = 'logistic')
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