Package ‘GWLelast’

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Type Package
Title Geographically Weighted Logistic Elastic Net Regression
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Description Fit a geographically weighted logistic elastic net regression. Detailed explanations can be found in Yoneoka et al. (2016): New algorithm for constructing area-based index with geographical heterogeneities and variable selection: An application to gastric cancer screening <doi:10.1038/srep26582>.
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**Description**

This package fits the geographically weighted logistic elastic net regression model for a valuable selection and for the mitigation of the multicollinearity between coefficients due to geographical correlation. Detailed explanations can be found in Yoneoka et al. (2016): New algorithm for constructing area-based index with geographical heterogeneities and variable selection: An application to gastric cancer screening.

**Usage**

```r
GWLelast.cv.bw(x = x, y = y, D = D, coords = coords, alpha = 1,
lambda = lambda, nlambda = nlambda, gweight = gweight,
longlat = longlat, bw = bw)
```

**Arguments**

- `x`: Covariates.
- `y`: Outcome binary variable.
- `D`: Distance matrix.
- `coords`: 2 columns matrix including "longitude" and "latitude".
- `alpha`: The elasticnet mixing parameter [0,1] in glmnet package.
- `lambda`: Optional user-supplied lambda sequence in glmnet package.
- `nlambda`: The number of lambda values in glmnet package.
- `gweight`: geographical kernel function in spgwr package.
- `longlat`: Indicate if the coords parameter are spherically calculated.
- `bw`: bandwidth of geographical kernel function.

**Value**

- `error`: Cross validation error.
Description

Fitting geographically weighted logistic elastic net regression

Usage

```
GWLelast.est(x, y, coords, D = NULL, alpha = 1, lambda = NULL,
          nlambda = NULL, gweight = c("gwr.Gauss", "gwr.bisquare"),
          longlat = TRUE, bw = bw)
```

Arguments

- `x`: Covariates.
- `y`: Outcome binary variable.
- `coords`: 2 columns matrix including "longitude" and "latitude".
- `D`: Distance matrix.
- `alpha`: The elasticnet mixing parameter [0,1] in glmnet package.
- `lambda`: Optional user-supplied lambda sequence in glmnet package.
- `nlambda`: The number of lambda values in glmnet package.
- `gweight`: geographical kernel function in spgwr package.
- `longlat`: Indicate if the coords parameter are spherically calculated.
- `bw`: bandwidth of geographical kernel function.

Value

- `model`: Fitted model at location i.
- `error`: Cross validation error.

\[GWLeLast.inner\]

Description

Inner part of fitting GWLest without parallel cores

Usage

```
GWLelast.inner(x = x, y = y, coords = coords, W = W, lambda = lambda,
               alpha = 1, nlambda = nlambda)
```
Arguments

- **x**: Covariates.
- **y**: Outcome binary variable.
- **coords**: 2 columns matrix including "longitude" and "latitude".
- **w**: Weight matrix.
- **lambda**: Optional user-supplied lambda sequence in glmnet package.
- **alpha**: The elasticnet mixing parameter [0,1] in glmnet package.
- **nlambda**: The number of lambda values in glmnet package.

Value

- **model**: Fitted model at location i.
- **error**: Cross validation error.

Description

Bandwidth selection for geographically weighted logistic elastic net regression

Usage

```r
GWLelast.sel.bw(x, y, coords, D = NULL, alpha = 1, lambda = NULL, nlambda = NULL, gweight = gweight, longlat = TRUE, lower.bw = NULL, upper.bw = NULL)
```

Arguments

- **x**: Covariates.
- **y**: Outcome binary variable.
- **coords**: 2 columns matrix including "longitude" and "latitude".
- **D**: Distance matrix.
- **alpha**: The elasticnet mixing parameter [0,1] in glmnet package.
- **lambda**: Optional user-supplied lambda sequence in glmnet package.
- **nlambda**: The number of lambda values in glmnet package.
- **gweight**: geographical kernel function in spgwr package.
- **longlat**: Indicate if the coords parameter are spherically calculated.
- **lower.bw**: Lower limit of bandwidth in geographical kernel.
- **upper.bw**: Upper limit of bandwidth in geographical kernel.
**Value**

optimal.bw Optimal bandwidth.

**Examples**

#########################
# Need to add
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