

Package ‘Spaloess’

April 6, 2016

Type Package

Title Spatially Local Polynomial Regression

Version 1.0

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Description In the original loess, the weights for local fit is calculated based on distance between observations, which is defined as Euclid distance. However, in the Spatial Statistics, the distance between two locations is more reasonable to be defined in Great-circle distance. In this package, all functions of original loess are rewrote to include a distance feature to specify which distance calculation wants to be carried out.

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Suggests roxygen2 (>= 5.0.0)

Roxygen list(wrap = FALSE)

RoxygenNote 5.0.1

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predloess	<i>Spatially Local Polynomial Regression Prediction</i>
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Description

The first layer of the prediction of Spatial locally weighted regression. Mainly used as prediction function for the NAs in the original data set.

Usage

```
predloess(object, newdata = NULL, se = FALSE, na.action = na.pass, ...)
```

Arguments

object	an object fitted by 'spaloess'.
newdata	an optional data frame in which to look for variables with which to predict, or a matrix or vector containing exactly the variables needs for prediction. If missing, the original data points are used.
se	should standard errors be computed? Default is FALSE
na.action	function determining what should be done with missing values in data frame 'newdata'. The default is to predict 'NA'.
...	arguments passed to or from other methods.

Details

This is the first layer of prediction function of spatial locally weighted regression. In the spaloess function, NA will be removed from the fitting. By passing the spaloess object and NA observations to predloess, prediction at the locations of NA is carried out.

When the fit was made using 'surface = "interpolate"' (the default), 'predloess' will not extrapolate - so points outside an axis-aligned hypercube enclosing the original data will have missing ('NA') predictions and standard errors.

Author(s)

Xiaosu Tong, based on 'loess' function of B. D. Ripley, and 'cloess' package of Cleveland, Grosse and Shyu.

Examples

```
set.seed(66)
x1 <- rnorm(100, mean=-100, sd=10)
x2 <- rnorm(100, mean=38, sd=4)
y <- 0.1*x1 + 1*x2 - 10 + rnorm(100, 0, 1.3); y[1:2] <- NA
testdata <- data.frame(LON = x1, LAT = x2, tmax = y)
cars.lo <- spaloess(tmax ~ LON + LAT, testdata, distance = "Latlong")
```

spaloess

Spatially Local Polynomial Regression Fitting

Description

The first layer of the Spatial locally weighted regression, using local fitting with different type of distance calculation.

Usage

```
spaloess(formula, data, weights, subset, na.action, model = FALSE,
  napred = TRUE, span = 0.75, enp.target, degree = 2L,
  parametric = FALSE, distance = "Latlong", alltree = FALSE,
  drop.square = FALSE, normalize = FALSE, family = c("gaussian",
  "symmetric"), method = c("loess", "model.frame"),
  control = loess.control(...), ...)
```

Arguments

formula	a formula specifying the numeric response and one to four numeric predictors.
data	an optional data from, list or environment containing the variables in the model. If not found in 'data', the variables are taken from 'environment', typically the environment from which 'loess' is called.
weights	optional weights for each case
subset	an optional specification of a subset of the data to be used
na.action	the action to be taken with missing values in the response or predictors. The default is given by 'getOption("na.action")'.
model	Should the model frame be returned?
napred	Should missing observations in the dataset be predicted. Default is TRUE.
span	The parameter alpha which controls the portion of data points used in the local fit.
enp.target	An alternative way to specify 'span', as the approximate equivalent number of parameters to be used.
degree	The degree of the polynomials to be used, normally 1 or 2. (Degree 0 is also allowed, but see the 'Note'.)
parametric	should any terms be fitted globally rather than locally? Terms can be specified by name, number or as a logical vector of the same length as the number of predictors.
distance	Options: "Euclid", or "Latlong" which is for great circle distance
alltree	Should the kd-tree built based on all observations or only non-NA observations.
drop.square	For fits with more than one predictor and 'degree = 2', should the quadratic term be dropped for particular predictors? Terms are specified in the same way as for 'parametric'.
normalize	Should the predictors be normalized to a common scale if there is more than one? The normalization used is to set the 10 "Latlong" distance.
family	If 'gaussian' fitting is by least-squares, and if 'symmetric' a re-descending M estimator is used with Tukey's bi-weight function.
method	Fit the model or just extract the model frame.
control	control parameters: see 'loess.control'.
...	arguments passed to or from other methods.

Details

This spaloess function is the first wrapper of the spatial loess fitting procedure. It checks all the validity of all input arguments, and formats arguments like drop,square, parametric. Also generate other important arguments, like iteration, and pass all arguments into the second wrapper function: newsimpleLoess

Author(s)

Xiaosu Tong, based on 'loess' function of B. D. Ripley, and 'cloess' package of Cleveland, Grosse and Shyu.

Examples

```
set.seed(66)
x1 <- rnorm(100, mean=-100, sd=10)
x2 <- rnorm(100, mean=38, sd=4)
y <- 0.1*x1 + 1*x2 - 10 + rnorm(100, 0, 1.3)
testdata <- data.frame(LON = x1, LAT = x2, tmax = y)
cars.lo <- spaloess(tmax ~ LON + LAT, testdata, distance = "Latlong")
```

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