Package 'gam.hp'

Type Package

Title Hierarchical Partitioning of Adjusted R2 and Explained Deviance
for Generalized Additive Models

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Depends R (>= 3.4.0),mgcv,ggplot2

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Description Conducts hierarchical partitioning to calculate individual contributions of each predictor towards adjusted R2 and explained deviance for generalized additive models based on output of gam()in 'mgcv' package, applying the algorithm in this paper: Lai(2024) <doi:10.1016/j.pld.2024.06.002>.

License GPL

Encoding UTF-8

URL https://github.com/laijiangshan/gam.hp

RoxygenNote 7.1.1

NeedsCompilation no

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gam.hp   *Hierarchical Partitioning of Adjusted R2 and Explained Deviance for*
                                Generalized Additive Models

Description

Hierarchical Partitioning of Adjusted R2 and Explained Deviance for Generalized Additive Models

Usage

```
gam.hp(mod, type = "dev", commonality = FALSE)
```

Arguments

mod	Fitted "gam" model objects.
type	The type of R-square of gam, either "dev" or "adjR2", in which "dev" is explained deviance and "adjR2" is adjusted R-square, the default is "dev".
commonality	Logical; If TRUE, the result of commonality analysis (2^N-1 fractions for N predictors) is shown, the default is FALSE.

Details

This function conducts hierarchical partitioning to calculate the individual contributions of each predictor towards total adjusted R2 and explained deviance for Generalized Additive Models. The adjusted R2 and explained deviance are is the output of summary.gam()in mgcv package.

Value

dev	The R2 for the full model.
hierarchical.partitioning	
	A matrix containing individual effects and percentage of individual effects towards total adjusted R2 and explained deviance for each predictor.

Author(s)

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References

• Lai J.,Tang J., Li T., Zhang A.,Mao L.(2024)Evaluating the relative importance of predictors in Generalized Additive Models using the gam.hp R package.Plant Diversity,46(4):542-546<DOI:10.1016/j.pld.2024.06.002>

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• Lai J.,Zou Y., Zhang S.,Zhang X.,Mao L.(2022)glmm.hp: an R package for computing individual effect of predictors in generalized linear mixed models.Journal of Plant Ecology,15(6):1302-1307<DOI:10.1093/jpe/rtac096>

- Lai J.,Zou Y., Zhang J.,Peres-Neto P.(2022) Generalizing hierarchical and variation partitioning in multiple regression and canonical analyses using the rdacca.hp R package.Methods in Ecology and Evolution,13(4):782-788<DOI:10.1111/2041-210X.13800>
- Chevan, A. & Sutherland, M. (1991). Hierarchical partitioning. American Statistician, 45, 90-96. doi:10.1080/00031305.1991.10475776
- Nimon, K., Oswald, F.L. & Roberts, J.K. (2013). Yhat: Interpreting regression effects. R package version 2.0.0.

Examples

```
library(mgcv)
mod1 <- gam(Sepal.Length ~ s(Petal.Length) + s(Petal.Width) + Sepal.Width,data = iris)
summary(mod1)
gam.hp(mod1)
gam.hp(mod1,type="adjR2")
gam.hp(mod1,commonality=TRUE)
```

---

permu.gamhp   *Permutation Test of Hierarchical Partitioning for GAM Analysis*

Description

Permutation Test of Hierarchical Partitioning for GAM Analysis

Usage

```
permu.gamhp(mod = NULL, type = "dev", permutations = 10)
```

Arguments

mod	gam model generated by mgcv::gam()
type	The type of total explained variation, either "dev" or "adjR2", in which "dev" is deviance explained and "adjR2" is adjusted R-square, the default is "adjR2".
permutations	An integer; Number of permutations for computing p value of individual contribution for the randomized dataset.

Details

This function is a permutation test of hierarchical partitioning for gam analysis. It returns a matrix of I values (the individual contribution towards total explained variation) for all values from permutations randomizations. For each permutation, the values in each variable (i.e each column of iv) are randomized independently, and gam.hp is run on the randomized iv. As well as the randomized I matrix, the function returns a summary table listing the observed I values, the p value of I for the randomized dataset.

Value

a data.frame containing a summary table listing the observed individual contribution, the p value of individual contribution for the randomized dataset

Author(s)

Jiangshan Lai <lai@njfu.edu.cn>

Examples

```
library(mgcv)
mod1 <- gam(Sepal.Length ~ s(Petal.Length) + s(Petal.Width) + Sepal.Width,data = iris)
permu.gamhp(mod1,type="dev",permutations=10)
```

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plot.gamhp   *Plot for a* `gam.hp` *object*

Description

Plot for a `gam.hp` object

Usage

```
## S3 method for class 'gamhp'
plot(x, plot.perc = FALSE, ...)
```

Arguments

x	A `gam.hp` object.
plot.perc	Logical;if TRUE, the bar plot (based on ggplot2 package) of the percentage to individual effects of variables towards total explained variation, the default is FALSE to show plot with original individual effects.
...	unused

Value

a ggplot object

Author(s)

Jiangshan Lai <lai@njfu.edu.cn>

Examples

```
library(mgcv)
mod1 <- gam(Sepal.Length ~ s(Petal.Length) + s(Petal.Width) + Sepal.Width,data = iris)
plot(gam.hp(mod1))
```

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