

Package ‘visova’

August 22, 2014

Type Package

Title Visualization of Analysis of Variance(VISOVA)

Version 1.1

Date 2014-08-06

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Description VISOVA(VISualization Of VAriance) is a novel method for exploratory data analysis. It is basically an extension of the trellis graphics and developing their grid concept with parallel coordinates, permitting visualization of many dimensions at once. This package includes functions allowing users to perform VISOVA analysis and compare different column/variable ordering methods for making the high-dimensional structures easier to perceive even when the data is complicated.

License GPL (>= 2)

LazyData yes

Depends R (>= 2.11.0)

Imports methods, RJSONIO, utils, tools

SystemRequirements A Javascript enabled web browser with internet connection

NeedsCompilation no

Repository CRAN

Date/Publication 2014-08-22 16:34:02

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auto

Statistics of 1979 automobile models

Description

The data give the following statistics for 74 automobiles in the 1979 model year as sold in the US.

Usage

```
data(auto)
```

Format

A data frame with 74 observations on the following 14 variables.

Model Make and model of car.

Origin a factor with levels A E J

Price Price in dollars.

MPG Miles per gallon.

Rep78 Repair record for 1978 on 1 (worst) to 5 (best) scale.

Rep77 Repair record for 1978 on 1 to 5 scale.

Hroom Headroom in inches.

Rseat Rear seat clearance in inches.

Trunk Trunk volume in cubic feet.

Weight Weight in pounds.

Length Length in inches.

Turn Turning diameter in feet.

Displa Engine displacement in cubic inches.

Gratio Gear ratio for high gear.

Source

This data frame was created from <http://euclid.psych.yorku.ca/ftp/sas/sssg/data/auto.sas>.

References

Originally published in Chambers, Cleveland, Kleiner, and Tukey, *Graphical Methods for Data Analysis*, 1983, pages 352-355.

The data is from various sources, primarily *Consumer Reports*, April, 1979, and the United States government EPA statistics on fuel consumption.

Examples

```

plot(visovaParallelCord(auto[,2:14],"Origin",order="AOE"))
plot(visovaParallelCord(auto[,2:14],"Origin",order="ANOVA"))
plot(visovaParallelCord(auto[,2:14],"Origin",order="original"))
plot(visovaParallelCord(auto[,2:14],"Origin",order="FPC"))
plot(visovaParallelCord(auto[,2:14],"Origin",order="alphabetic"))
plot(visovaParallelCord(auto[,2:14],"Origin",order="hclust", hclust.method="complete"))
plot(visovaParallelCord(auto[,2:14],"Origin",order="hclust", hclust.method="average"))
plot(visovaParallelCord(auto[,2:14],"Origin",order="hclust", hclust.method="median"))
plot(visovaParallelCord(auto[,2:14],"Origin",order="hclust", hclust.method="ward"))
plot(visovaParallelCord(auto[,2:14],"Origin",order="hclust", hclust.method="single"))
plot(visovaParallelCord(auto[,2:14],"Origin",order="hclust", hclust.method="mcquitty"))
plot(visovaParallelCord(auto[,2:14],"Origin",order="hclust", hclust.method="centroid"))

```

ELIZA_Additional_Measures

LA2K ELIZA additional measures dataset according to the different age/gender/weight/BMI/Hispanic origin/Darkroom preference groups

Description

LA2K ELIZA additional measures dataset, UCLA research about gaining understanding about the space of human variation.

Usage

```
data(ELIZA_Additional_Measures)
```

Format

A data frame with 984 observations on the following 17 variables.

PTID a numeric vector,

Patient ID

COLORDEFICIENCY a numeric vector,

The indicator of Color Deficiency based on number of plates that the subject couldn't complete

ETOTAL a numeric vector

HT a numeric vector,

The subject's height value

BMI a numeric vector,

The subject's Body Mass Index value

WT a numeric vector,

The subject's weight value

VISUALACUITY a numeric vector,

Visual Acuity both eyes

SCHOOL_BACK a categorical variable,
Ever held back in school? (0,1)

E a numeric vector

LA2KHEALTH_SCORE a numeric vector,
LA2K Total Health Score

CIGS a categorical variable,
Have you ever smoked cigarettes on a daily basis? (0..2)

AGE_GroupName a numeric vector, Indicates six different age groups
Age 21-25
Age 26-30
Age 31-35
Age 36-40
Age 41-45
Age 46-50

BMI_GroupID a character vector, Indicates five different BMI groups
Morbid
Normal
Obese
Overweight
Underweight

DARKROOM_GroupID a character vector, Indicates sleeping in a dark room preference
No_Dark_Room_Preference
Prefer_Dark_Room_Sleep

GENDER_GroupID a character vector, Indicates subject's gender
Female
Male

HISPANIC_GroupID a character vector, Indicates whether subject's origin is hispanic or not
Hispanic_origin
not_Hispanic_origin

WEIGHT_GroupName a character vector, Indicates ten different weight groups
WT 100 or less
WT 101-120
WT 121-140
WT 141-160
WT 161-180
WT 181-200
WT 201-220
WT 221-240
WT 241-260
WT 261 or more

References

UCLA Consortium for Neuropsychiatric Phenomics (CNP) Research about 2000 healthy volunteers in Los Angeles area. http://www.phenomics.ucla.edu/LA2K%20Flier_121609.pdf

Examples

```
plot(visovaParallelCord(ELIZA_Additional_Measures[,c(2:11,15)],
"GENDER_GroupID",order="original", colors=c("red","navy")))

plot(visovaParallelCord(ELIZA_Additional_Measures[,c(2:11,16)],
"HISPANIC_GroupID",order="original", colors=c("orange","turquoise")))

plot(visovaParallelCord(ELIZA_Additional_Measures[,c(2:11,14)],
"DARKROOM_GroupID",order="original", colors=c("green","blue")))

plot(visovaParallelCord(ELIZA_Additional_Measures[,c(2:11,13)],
"BMI_GroupID",order="original", colors=c("turquoise","green","orange","red","purple")))

plot(visovaParallelCord(ELIZA_Additional_Measures[,c(2:11,17)],
"WEIGHT_GroupName",order="original"))
```

LA2K_ReactionTime	<i>LA2K Reaction Time Dataset according to the different age/gender groups</i>
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Description

LA2K Reaction Time Dataset, UCLA research about gaining understanding about the space of human variation.

Usage

```
data(LA2K_ReactionTime)
```

Format

A data frame with 950 observations on the following 27 variables.

PTID a numeric vector,
Patient ID

ANT_MEAN_RTCON a numeric vector,
Mean Reaction Time for Congruent Trials

ANT_MEAN_RTINC a numeric vector,
Mean Reaction Time for Incongruent Trials

ANT_MEAN_RTNEU a numeric vector,
 Mean Reaction Time for Neutral Trials

ANT_CC_MN_RT a numeric vector,
 Mean Reaction Time for the Second Trial of Congruent Congruent Trial Pairs

ANT_CI_MN_RT a numeric vector,
 Mean Reaction Time for the Second Trial of Congruent Incongruent Trial Pairs

ANT_CN_MN_RT a numeric vector,
 Mean Reaction Time for the Second Trial of Congruent Neutral Trial Pairs

ANT_IC_MN_RT a numeric vector,
 Mean Reaction Time for the Second Trial of Incongruent Congruent Trial Pairs

ANT_II_MN_RT a numeric vector,
 Mean Reaction Time for the Second Trial of Incongruent Incongruent Trial Pairs

ANT_IN_MN_RT a numeric vector,
 Mean Reaction Time for the Second Trial of Incongruent Neutral Trial Pairs

ANT_NC_MN_RT a numeric vector,
 Mean Reaction Time for the Second Trial of Neutral.Congruent Trial Pairs

ANT_NI_MN_RT a numeric vector,
 Mean Reaction Time for the Second Trial of Neutral Incongruent Trial Pairs

ANT_NN_MN_RT a numeric vector,
 Mean Reaction Time for the Second Trial of Neutral Neutral Trial Pairs

SMNM_MANIP_MNRT a numeric vector,
 Mean Reaction Time for Manipulation Task

SMNM_MAIN_MNRT a numeric vector,
 Mean Reaction Time for Maintenance Task

TS_SHORTCONGNOSWRT a numeric vector,
 Short Cue interval congruent no switch trial mean reaction time

TS_LONGCONGNOSWRT a numeric vector,
 Long Cue interval congruent no switch trial mean reaction time

TS_SHORTINCONGNOSWRT a numeric vector,
 Short Cue interval incongruent no switch trial mean reaction time.

TS_LONGINCONGNOSWRT a numeric vector,
 Long Cue interval incongruent no switch trial mean reaction time

TS_SHORTCONGSWRT a numeric vector,
 Short Cue interval congruent switch trial mean reaction time

TS_LONGCONGSWRT a numeric vector,
 Long Cue interval congruent switch trial mean reaction time

TS_SHORTINCONGSWRT a numeric vector,
 Short Cue interval incongruent switch trial mean reaction time

TS_LONGINCONGSWRT a numeric vector,
 Long Cue interval incongruent switch trial mean reaction time

VMNM_MANIP_MNRT a numeric vector,
 Mean Reaction Time for Manipulation task

VMNM_MAIN_MNRT a numeric vector,
 Mean Reaction Time for Maintenance task

AGE_GENDER_GroupName a numeric vector, Indicates six different age and gender groups
 Male and (20_or_less or 21_25 or 26_30)
 Male and (31_35 or 36_40 or 41_45)
 Male and (46_50 or 51_55 or 56_60 or 61_or_more)
 Female and (20_or_less or 21_25 or 26_30)
 Female and (31_35 or 36_40 or 41_45)
 Female and (46_50 or 51_55 or 56_60 or 61_or_more)

AGE_GroupName a numeric vector, Indicates six different age and gender groups
 Age 21-25
 Age 26-30
 Age 31-35
 Age 36-40
 Age 41-45
 Age 46-50

References

UCLA Consortium for Neuropsychiatric Phenomics (CNP) Research about 2000 healthy volunteers in Los Angeles area. http://www.phenomics.ucla.edu/LA2K%20Flier_121609.pdf

Examples

```
plot(visovaParallelCord(LA2K_ReactionTime[,2:26],"AGE_GroupName",
order="original", colors=c("turquoise","red","orange","lime","purple","navy")))

plot(visovaParallelCord(LA2K_ReactionTime[,2:26],"AGE_GroupName",
order="alphabetic", colors=c("red","green","orange","teal","purple","navy")))

plot(visovaParallelCord(LA2K_ReactionTime[,2:26],"AGE_GroupName",
order="ANOVA", colors=c("olive","green","orange","red","purple","navy")))

plot(visovaParallelCord(LA2K_ReactionTime[,2:26],"AGE_GroupName",
order="AOE", colors=c("turquoise","red","orange","lime","purple","navy")))

plot(visovaParallelCord(LA2K_ReactionTime[,2:26],"AGE_GroupName",
order="FPC", colors=c("yellow","green","orange","red","purple","navy")))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="complete"))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="average"))
```

```

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="median"))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="ward"))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="single"))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="mcquitty"))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="centroid"))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="alphabetic"))

```

visovaParallelCord *A visualization of Analysis of Variance (VISOVA) with Parallel Coordinates Plot*

Description

The visovaParallelCord function reads a data.frame and plot the Parallel Coordinate Plot of VISOVA.

Usage

```
visovaParallelCord(data, groupCol, order, hclust.method, colors)
```

Arguments

data	a data.frame to be displayed as a parallel coordinates plot
groupCol	Character, the name of the column which contains the category levels of data
order	Character, the ordering method of the columns/variables in the parallel coordinates plot.. <ul style="list-style-type: none"> • "original" for original order (default). • "ANOVA" for the column order that uses group-wise ANOVA results. • "AOE" for the angular order of the eigenvectors. • "FPC" for the first principal component order. • "hclust" for the hierarchical clustering order. • "alphabetic" for alphabetical order. Look at the reference paper for further details.
hclust.method	Character, the agglomeration method to be used when order is hclust. This should be one of the <ul style="list-style-type: none"> • "ward" for the Ward's Hierarchical Linkage Method .

- "single" for the Single Hierarchical Linkage Method.
 - "complete" for the Complete Hierarchical Linkage Method.
 - "average" for the Average Hierarchical Linkage Method.
 - "mcquitty" for the Mcquitty's Hierarchical Linkage Method.
 - "median" for the Median Hierarchical Linkage Method
 - "centroid" for the Centroid Hierarchical Linkage Method.
- Look at the reference paper for further details.

colors Character vector, the individual group colors may be specified by using this field. Otherwise default colors are used. The name of the colors that are indicated in this field should not less than the number of groups. Below colors must be used:

- "turquoise": rgb(0,206,209)
- "red": rgb(255,0,0)
- "lime": rgb(0,255,0)
- "purple": rgb(128,0,128)
- "orange": rgb(255,140,0)
- "blue": rgb(0,0,255)
- "yellow": rgb(255,255,0)
- "magenta": rgb(255,0,255)
- "gray": rgb(128,128,128)
- "olive": rgb(128,128,0)
- "green": rgb(0,128,0)
- "teal": rgb(0,128,128)
- "navy": rgb(0,0,128)

Warning

All of the charts are rendered by the browser and some of the libraries like "google jsapi", "qtip2", "jquery" need to be imported, therefore, a modern browser with an Internet connection is required to display charts. Data frame should not include any character values other than group column which has to be indicated when this function is called.

Author(s)

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References

VISOVA: an integration of Visualization and ANOVA; A.V. Barbaros, D.S. Parker; The UCLA VISOVA Elite(2014)

Examples

```
plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="complete"))
```

```
plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="average"))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="median"))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="ward"))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="single"))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="mcquitty"))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],
"AGE_GENDER_GroupName",order="hclust", hclust.method="centroid"))

plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],"AGE_GENDER_GroupName",order="alphabetic"))
plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],"AGE_GENDER_GroupName",order="AOE"))
plot(visovaParallelCord(LA2K_ReactionTime[,c(2:13, 27)],"AGE_GENDER_GroupName",order="ANOVA"))
```

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