

Package ‘hglm.data’

April 4, 2019

Type Package

Title Data for the 'hglm' Package

Version 1.0-1

Date 2019-03-03

Author Xia Shen, Moudud Alam, Lars Ronnegard

Maintainer Xia Shen <xia.shen@ki.se>

Description This data-only package was created for distributing data used in the examples of the 'hglm' package.

BugReports https://r-forge.r-project.org/tracker/?group_id=558

License GPL (>= 2)

LazyLoad yes

Depends R (>= 3.0), utils, Matrix, MASS, sp

NeedsCompilation no

Repository CRAN

Date/Publication 2019-04-04 09:20:03 UTC

R topics documented:

hglm.data-package	2
cancer	3
ohio	3
pump	6
QTLMAS	6
salamander	7
seeds	8
semiconductor	9

Index	10
--------------	-----------

hglm.data-package *Data for The hglm Package*

Description

This data-only package was created for distributing data used in the examples of the hglm package.

Details

Package: hglm.data
Type: Package
Version: 1.0-0
Date: 2014-07-23
Discussion: https://r-forge.r-project.org/forum/?group_id=558
BugReports: https://r-forge.r-project.org/tracker/?group_id=558
License: GPL (>= 2)
LazyLoad: yes
Depends: R (>= 2.10)

Author(s)

Xia Shen

Maintainer: Xia Shen <xia.shen@slu.se>

References

Lars Ronnegard, Xia Shen and Moudud Alam (2010). **hglm: A Package for Fitting Hierarchical Generalized Linear Models**. *The R Journal*, **2**(2), 20-28.

Youngjo Lee, John A Nelder and Yudi Pawitan (2006) *Generalized Linear Models with Random Effect: a unified analysis via h-likelihood*. Chapman and Hall/CRC.

Xia Shen, Moudud Alam, Freddy Fikse and Lars Ronnegard (2013). **A novel generalized ridge regression method for quantitative genetics**. *Genetics*.

Moudud Alam, Lars Ronnegard, Xia Shen (2014). **Spatial modeling in hglm**. *Submitted*.

col 5: district irn
 col 6: # of teachers (FTE 2001-02)
 col 7: teacher attendance rate
 col 8: avg years of teaching experience
 col 9: avg teacher salary
 col 10: Per Pupil Spending on Instruction
 col 11: Per Pupil Spending on Building Operations
 col 12: Per Pupil Spending on Administration
 col 13: Per Pupil Spending on Pupil Support
 col 14: Per Pupil Spending on Staff Support
 col 15: Total Expenditures Per Pupil
 col 16: Per Pupil Spending on Instruction % of Total Spending Per Pupil
 col 17: Per Pupil Spending on Building Operations % of Total Spending Per Pupil
 col 18: Per Pupil Spending on Administration % of Total Spending Per Pupil
 col 19: Per Pupil Spending on Pupil Support % of Total Spending Per Pupil
 col 20: Per Pupil Spending on Staff Support % of Total Spending Per Pupil
 col 21: irn number
 col 22: avg of all 4th grade proficiency scores
 col 23: median of 4th grade prof scores
 col 24: building enrollment
 col 25: short-term students < 6 months
 col 26: 4th Grade (or 9th grade) Citizenship % Passed 2001-2002
 col 27: 4th Grade (or 9th grade) math % Passed 2001-2002
 col 28: 4th Grade (or 9th grade) reading % Passed 2001-2002
 col 29: 4th Grade (or 9th grade) writing % Passed 2001-2002
 col 30: 4th Grade (or 9th grade) science % Passed 2001-2002
 col 31: pincome per capita income in the zip code area
 col 32: nonwhite percent of population that is non-white
 col 33: poverty percent of population in poverty
 col 34: samehouse % percent of population living in same house 5 years ago
 col 35: public % of population attending public schools
 col 36: highschool graduates, educ attainment for 25 years plus
 col 37: associate degrees, educ attainment for 25 years plus
 col 38: college, educ attainment for 25 years plus
 col 39: graduate, educ attainment for 25 years plus
 col 40: professional, educ attainment for 25 years plus

ohioGrades The derived dataset for analyzing the percentage passed based on Zip codes. The variables are:

y: the percentage passed (4th or 9th grade) in each school
 TchExp: average Teacher's experience
 Subjects: for five study subjects of Citizenship, Maths, Reading, Writing and Science
 Stu.Tch: student by teacher ratio
 School: school index
 Zip: Zip code

ohioMedian The derived dataset for analyzing the median of 4th grade scores based on school districts. The variables are:

MedianScore: the median of 4th grade prof scores
 district: school districts

ohioShape A SpatialPolygonsDataFrame object (see package **sp**) containing the map information of ohio school districts.

ohioZipDistMat The spatial distance matrix based on Zip codes. The codes generated this matrix are:

```
Zsp <- model.matrix(~ factor(Zip) - 1, data = ohioGrades)
uzipC <- matrix(0, nrow = ncol(Zsp), ncol = 2)
Zip <- as.numeric(substr(colnames(Zsp), start = 12, stop = 16))
for (i in 1: ncol(Zsp)) {
  Cord <- as.matrix(ohioSchools[(ohioSchools$V1 == Zip[i]), 2:3])
  uzipC[i,] <- Cord[1,]
}
Dst <- as.matrix(dist(uzipC))
for(i in 1:nrow(Dst)) {
  x <- Dst[i,]
  x <- ifelse(x == 0, 0, 1/x)
  Dst[i,] <- ifelse(x > 4, 4, x)
}
ohioZipDistMat <- Dst/4
```

ohioDistrictDistMat The spatial distance matrix based on school districts. The codes generated this matrix are:

```
ccNb <- poly2nb(ccShape)
W <- matrix(0, 616, 616)
for (i in 1:nrow(W)) {
  tmp <- as.numeric(ccNb[[i]])
  for (k in tmp) W[i,k] <- 1
}
W[353,] <- W[,353] <- 0
districtShape <- as.numeric(substr(as.character(ohioShape@data$UNSDIDFP), 3, 7))
dimnames(W) <- list(districtShape, districtShape)
districtSchool <- floor(ohioSchools[,5]/10)
districtSchool <- factor(districtSchool[districtSchool %in% districtShape])
levelsShape <- levels(factor(districtShape))
levelsSchool <- levels(districtSchool)
levels(districtSchool) <- c(levelsSchool, levelsShape[!(levelsShape %in% levelsSchool)])
ohioDistrictDistMat <- W[levels(districtSchool),levels(districtSchool)]
```

Source

J. LeSage and R. Pace (2009). *Introduction to Spatial Econometrics*. Chapman & Hall/CRC, Boca Raton.

References

J. LeSage and R. Pace (2009). *Introduction to Spatial Econometrics*. Chapman & Hall/CRC, Boca Raton.

M. Alam, L. Ronnegard, X. Shen (2014). **Fitting spatial models in hglm**. *Submitted*.

pump

Pump reliability data set from Gaver and O’Muircheartaigh (1987)

Description

The ‘pump’ data set presents the failures of pumps in several systems of the water reactor nuclear plant Farley 1.

Format

The ‘pump’ data set contains 4 columns and 10 rows. A short description of the data columns are given below.

System The system number.

S Number of pumps failures.

t Time (in thousand hours) of operation.

Gr Pump groups; two levels: 1 = operated continuously, 0 = operated intermittently.

Source

Gaver, D P. and O’Muircheartaigh, I. G. 1987. Robust Empirical Bayes Analyses of Event Rates, *Technometrics* 29(1),1–15

References

Lee, Y. and Nelder, J. A. 1996. Hierarchical generalized linear models, *Journal of the Royal Statistical Association (B, Theory and Methods)* 58(4), 619–678.

QTLMAS

Simulated Data Set for the QTLMAS 2009 Workshop

Description

The data was simulated for the QTLMAS 2009 workshop in Wageningen, The Netherlands. The data was made available at <http://www.qtlmas2009.wur.nl/UK/Dataset/> and consists of markers, trait values and pedigree information. The original data set consisted of several traits and markers from several chromosomes, whereas the current data set included in this package consists of one trait ("P265"), pedigree information and data from 90 markers on chromosome number 1. There are 2025 individuals in the pedigree where 1000 individuals have trait values.

Format

A matrix containing 1000 rows and 2116 columns. The first column contains the trait values. Columns 2 to 2026 contains matrix Z, i.e. the pedigree information (as the Colesky factorization of the additive relationship matrix). Columns 2027 to 2116 contains matrix Z.marker, i.e. the marker information for the 90 markers on chromosome 1.

Source

QTLMAS 2009 Workshop <http://www.qtlmas2009.wur.nl/UK/Dataset/>

References

Coster, A., Bastiaansen J., Calus M., Maliepaard C. and Bink M. 2009. QTLMAS 2009: Simulated dataset. (submitted)

salamander

Salamander mating data set from McCullagh and Nelder (1989)

Description

'salamander' data set presents the outcome of an experiment which was conducted at the University of Chicago in 1986 to study the extent at which mountain dusky salamanders from different populations would interbreed. More detailed description of the data is given in its original source, McCullagh and Nelder (1989).

Format

'salamander' data set contains 6 columns and 360 rows. A brief description of the data columns is given below.

Season The seasons, Spring and Summer of 1986, when the experiment was carried out.

Experiment Experiment number; 1,2,3.

TypeM Type of the male salamander; Rough Butt=R and White Side=W

TypeF Type of the female salamander; Rough Butt=R and White Side=W

Cross Cross between female and male type e.g. Cross=WR mean a White Side female was crossed with a Rough Butt male.

Male Identification number of the male salamander.

Female Identification number of the female salamander.

Mate Whether a mating was observed, Yes=1 and No=0.

Source

McCullagh P. and Nelder, J. A. 1989. *Generalized Linear Models*, Section 14.5, Chapman and Hall/CRC.

seeds

*Seeds germination data set from Crowder (1978)***Description**

The data set was initially presented in Crowder (1978) to demonstrate the problem of over dispersion with binomial response and its solution via beta-binomial ANOVA. Later, the data set is used by many others including Breslow and Clayton (1993) and Lee and Nelder (1996) to demonstrate the usefulness of the Generalized Linear Mixed (and hierarchical) model. The seeds data set was originally obtained from a 2 by 2 factorial layout. The experiment was conducted on two types of seeds, *O. aegyptiaca* 75 and *O. aegyptiaca* 73, and two root extracts, bean and cucumber with an equal dilution, 1/125. Experimental units (plates) were prepared with the specific roots extracts and a batch of certain seeds was brushed into the plates. The outcome is the count of germinated seed out of the total number of seeds applied in each plate.

Format

The seeds data set contains 5 columns and 21 rows. A short description of the data columns are given below.

plate Plate number.

seed Seed type; 2 levels: O75 (*O. aegyptiaca* 75) and O73 (*O. aegyptiaca* 73).

extract Type of roots extract; 2 levels: Bean and Cucumber.

r Response; number of seeds germinated in each plate.

n Total number of seeds applied in each plate.

Source

Crowder, M. J. 1978. Beta-binomial Anova for proportions, *Journal of the Royal Statistical Society (C, Applied Statistics)* 27(1), 34–37.

References

Breslow, N. E. and Clayton, D. G. 1993. Approximate inference in generalized linear mixed models, *Journal of the American Statistical Association* 88, 9–25.
 Lee, Y. and Nelder, J. A. 1996. Hierarchical generalized linear models, *Journal of the Royal Statistical Association (B, Theory and Methods)* 58(4), 619–678.

semiconductor

Semiconductor data set from GenStat.

Description

The semiconductor data set is obtained from a $2^{(6-2)}$ factorial design conducted in a semiconductor plant. The design variables, Lamination (3 factors; Temperature, Time and Pressure) and Firing (3 factors; Temperature, Cycle Time and Dew Point), are each taken at two levels. The goal of the original data analysis was to model the curvature or camber (taken in $1e-4$ in./in.) as a function of the design variables. The data set is taken from GenStat 11.1. It is also used in Lee et al. (2006) where Mayers et al. (2002) is referred to as the the original source of the data.

Format

This data set contains 64 rows and the following columns

Device Substrate device

x1 Lamination Temperature; two levels +1 and -1.

x2 Lamination Time; two levels: +1 and -1.

x3 Lamination Pressure; two levels: +1 and -1.

x4 Firing Temperature; two levels: +1 and -1.

x5 Firing Cycle Time; two levels: +1 and -1.

x6 Firing Dew Point: two levels: +1 and -1.

y Camber measure; in $1e-4$ in./in.

Source

GenStat(R) Release 11.1. VSN International Limited.

References

Lee, Y. and Nelder J. A., and Pawitan, Y. 2006. *Generalized Linear Models with Random Effectes*, Chapman and Hall/CRC.

Mayers, P. H., Montgomery, D. C. and Vining G. G. 2002. *Generalized Linear Models with Application in Engineering and Science*, John Wiley and Sons.

Index

*Topic **datasets**

- cancer, 3
- ohio, 3
- pump, 6
- QTLMAS, 6
- salamander, 7
- seeds, 8
- semiconductor, 9

*Topic **package**

- hglm.data-package, 2

cancer, 3

E (cancer), 3

hglm.data (hglm.data-package), 2

hglm.data-package, 2

nbr (cancer), 3

O (cancer), 3

ohio, 3

ohioDistrictDistMat (ohio), 3

ohioGrades (ohio), 3

ohioMedian (ohio), 3

ohioSchools (ohio), 3

ohioShape (ohio), 3

ohioZipDistMat (ohio), 3

Paff (cancer), 3

pump, 6

QTLMAS, 6

salamander, 7

seeds, 8

semiconductor, 9