Package ‘aftgee’
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Type Package
Title Accelerated Failure Time Model with Generalized Estimating Equations
Version 0.4-2
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Author Sy Han (Steven) Chiou, Sangwook Kang, Jun Yan
Maintainer Sy Han (Steven) Chiou <schiou@d.umn.edu>
Description This package features both rank-based estimates and least square estimates to the Accelerated Failure Time (AFT) model. For rank-based estimation, it provides approaches that include the computationally efficient Gehan’s weight and the general’s weight such as the logrank weight. For the least square estimation, the estimating equation is solved with Generalized Estimating Equations (GEE). Moreover, in multivariate cases, the dependence working correlation structure can be specified in GEE’s setting.
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Description

This package features both rank-based approach and least squares approach to fit accelerated failure time model. For the rank-based approach, the package allows various weight choices and uses an induced smoothing procedure to improve computational efficiency. With the rank-based estimator as an initial value, the generalized estimating equation approach is used as an extension of the least squares approach to the multivariate case. Additional sampling weights are incorporated to handle missing data needed as in case-cohort studies.

Details

Package: aftgee Type: Package Version: 0.4-1 Date: 2014-01-26 License: GPL(>=3) LazyLoad: yes

Author(s)

Sy Han Chiou <steven.chiou@uconn.edu>, Jun Yan <jun.yan@uconn.edu>, Sangwook Kang <sangwook.kang@uconn.edu>

References


Description

A package that uses Generalized Estimating Equations (GEE) to estimate Multivariate Accelerated Failure Time Model (AFT). This package allows dependence working correlation structure for GEE. Moreover, it gives two options of initial estimator, the simple linear regression and the smooth-hegan weight estimator.
Usage

aftgee(formula, data, subset, id,
        contrasts = NULL, weights = NULL,
        margin = NULL, corstr = "independence",
        binit = "srrgehan", B = 100,
        control = aftgee.control())

Arguments

formula A formula expression as for glm, of the form response ~ predictors. Response can be in class of survival data. See the documentation of lm, coxph and formula for details.
id A vector which identifies the clusters. The length of 'id' should be the same as the number of observations.
data An optional data frame in which to interpret the variables occurring in the formula, along with the id.
subset An optional vector specifying a subset of observations to be used in the fitting process.
corstr a character string specifying the correlation structure. The following are permitted: 'independence', 'exchangeable', 'ar1', 'unstructured', 'userdefined', and 'fixed'
B is the sample size for resampling estimation of the variance
contrasts an optional list.
binit can be either a vector or a character string specifying the initial slope estimator. When binit is a vector, its length should be the same as the number of covariates. When binit is a character string, the following are permitted: "lm" for simple linear regression, "srrgehan" for smoothed gehan weight estimator.
weights is a weight vector for covariates; default at 1.
margin a sformula vector; default at 1.
control Controls maxiter and tolerance.

Details

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Value

An object of class "aftgee" representing the fit. An object of class "aftgee" is a list containing at least the following components:

coefficients a vector of initial value and a vector of point estimates
coef.res a vector of point estimates
auxiliary for controlling AFTGEE fitting

**Description**

Auxiliary function as user interface for ‘aftgee’ and ‘aftsrr’ fitting.

**Usage**

```r
aftgee.control(maxiter = 50,
               reltol = 0.001,
               trace = FALSE)
```
### Arguments

- **maxiter**: max number of iteration.
- **reltol**: relative error tolerance.
- **trace**: binary variable, determine whether to display output for each iteration.

### Details

When 'trace' is true, output for each iteration is printed to the screen.

### Value

A list with the arguments as components.

### Author(s)

Chiou, S. H. <steven.chiou@uconn.edu>, Kang, S. <sangwook.kang@uconn.edu>, Yan, J. <jun.yan@uconn.edu>

### See Also

'aftgee', 'aftgee.fit' and 'aftgee.est'.

### Description

Fit semiparametric accelerated failure time (AFT) model with rank-based approach. Fast sandwich variance estimation, general weight functions and additional sampling weights are also incorporated.

### Usage

```r
aftsrr(formula, data, id, subset, contrasts = NULL, 
strata = NULL, weights = NULL, rankWeights = "gehan", 
method = "sm", variance = "ISMB", B = 100, SigmaInit = NULL, 
control = aftgee.control())
```

### Arguments

- **formula**: A formula expression, of the form response ~ predictors. Response can be in class of survival data. See the documentation of `lm`, `coxph` and `formula` for details.
- **data**: An optional data frame in which to interpret the variables occurring in the `formula`, along with the `id`. 
id A vector which identifies the clusters. The length of 'id' should be the same as the number of observation.

subset An optional vector specifying a subset of observations to be used in the fitting process.

contrasts an optional list.

strata A vector which identifies the strata. This can also be used to distinct case-cohort sampling and stratified sampling.

weights A weight vector for covariates; default at 1.

rankWeights A character vector specifying the type of general weights. The following are permitted: 'logrank': logrank weight, 'gehan': Gehan's weight, 'PW': Prentice-Wilcoxon weight, 'GP': GP class weight.

method A character string specifying the methods to estimate the regression parameter. The following are permitted: 'nonsm': Regression parameters are estimated by directly solving the nonsmooth estimating equations. 'sm': Regression parameters are estimated by directly solving the smooth estimating equations. 'monosm': Regression parameters are estimated by iterating the monotonic smooth estimating equations. This is typical when rankWeights = "PW" and rankWeights = "GP".

variance A character string specifying the covariance estimating method. The following are permitted: 'MB': multiplier resampling, 'ZLCF': Zeng and Lin’s approach with closed form Si, 'ZLMB': Zeng and Lin’s approach with empirical Si, 'SHCF': Huang’s approach with closed form Si, 'SHMB': Huang’s approach with empirical Si, 'ISC': Johnson and Strwderman’s sandwich variance estimates with closed form Si, 'IJMB': Johnson and Strwderman’s sandwich variance estimates with empirical Si, 'J': Johnson and Strwderman’s iterating approach.

B Resampling size. When M = 0, only the beta estimate will be displayed.

SigmaInit The initial covariance matrix; default at identity matrix.

control Controls maxiter and tolerance.

Value

aftsrr returns an object of class "aftsrr" representing the fit. An object of class "aftsrr" is a list containing at least the following components:

beta A vector of beta estimates

covmat A list of covariance estimates

convergence An integer code indicating type of convergence. 0 indicates successful convergence. Error codes are 1 indicates that the iteration limit maxit has been reached; 2 is failure due to stagnation; 3 indicates error in function evaluation; 4 is failure due to exceeding 100 step length reductions in line-search; and 5 indicates lack of improvement in objective function.

bhist When variance = "MB", bhist gives the bootstrap samples.

Author(s)

Steven Chiou <steven.chiou@uconn.edu>
References


Examples

```r
### kidney data
library(survival)
data(kidney)
foo <- aftssr(Surv(time, status) ~ age + sex - 1, id = id,
              data = kidney, variance = c("MB", "ISMB"), B = 10)
foo

### nwtco data
library(survival)
data(nwtco)
subinx <- sample(1:nrow(nwtco), 668, replace = FALSE)
nwtco$subcohort <- 0
nwtco$subcohort[subinx] <- 1
pn <- table(nwtco$subcohort)[[2]] / sum(table(nwtco$subcohort))
nwtco$hi <- nwtco$rel + (1 - nwtco$rel) * nwtco$subcohort / pn
nwtco$age12 <- nwtco$age / 12
nwtco$edrel <- nwtco$edrel / 12
nwtco$study <- nwtco$study - 3
nwtco$stage2 = ifelse(nwtco$stage == 2, 1, 0)
nwtco$stage3 = ifelse(nwtco$stage == 3, 1, 0)
nwtco$stage4 = ifelse(nwtco$stage == 4, 1, 0)
nwtco$histol = nwtco$histol - 1
sub <- nwtco[subinx,]
fit <- aftssr(Surv(edrel, rel) ~ histol + age12 + study - 1, id = seqno,
              weights = hi, data = sub, B = 7, variance = c("MB", "ISMB"),
              subset = stage4 == 1)
summary(fit)
```
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