Package 'dsSurvivalClient'

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Title DataSHIELD Client Functions

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Description DataSHIELD client functions for survival models for the client side.

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Depends R (¿= 3.5.0),
DSI (¿= 1.1.0)

Imports fields,
metafor,
ggplot2,
gridExtra,
data.table,
dsBaseClient

RoxygenNote 7.1.1

Encoding UTF-8

R topics documented:

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ds.cox.zphSLMA	*Tests the proportional hazards assumption for a Cox proportional hazards model*

Description

This function tests the proportional hazards assumption for a Cox proportional hazards model.

Usage

```
ds.cox.zphSLMA(
  fit = NULL,
  transform = "km",
  terms = TRUE,
  singledf = FALSE,
  global = TRUE,
  datasources = NULL
)
```

Arguments

fit	character string (potentially including * symbol without spaces) specifying the name of the fitted server-side Cox proportioanl hazards model that has been created using ds.coxphSLMAassign()
transform	character string specifying how the survival times should be transformed before the test is performed. Possible values are "km", "rank", "identity" or a function of one argument.
terms	logical if TRUE, do a test for each term in the model rather than for each separate covariate. For a factor variable with k levels, for instance, this would lead to a k-1 degree of freedom test. The plot for such variables will be a single curve evaluating the linear predictor over time.
singledf	logical use a single degree of freedom test for terms that have multiple coefficients, i.e., the test that corresponds most closely to the plot. If terms=FALSE this argument has no effect.
global	logical should a global chi-square test be done, in addition to the per-variable or per-term tests tests.
datasources	a list of DSConnection-class objects obtained after login. If the datasources argument is not specified the default set of connections will be used: see datashield.connections_default. For more information see **Details**.

Details

This is a function that performs diagnostics on a fitted Cox proportional hazards model.

Server function called: cox.zphSLMADS.

Value

`cox.zphSLMADS` returns to the client-side the diagnostics of the Cox proportional hazards model

Author(s)

Soumya Banerjee and Tom Bishop, 2020

Examples

```
## Not run:

  ## Version 6

  # connecting to the Opal servers

  require('DSI')
  require('DSOpal')
  require('dsBaseClient')

  builder <- DSI::newDSLoginBuilder()
  builder$append(server = "study1",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING1", driver = "OpalDriver")
  builder$append(server = "study2",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING2", driver = "OpalDriver")
  builder$append(server = "study3",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING3", driver = "OpalDriver")
  logindata <- builder$build()

  connections <- DSI::datashield.login(logins = logindata, assign = TRUE, symbol = "D")

  # make sure that the outcome is numeric
  ds.asNumeric(x.name = "D$cens",
            newobj = "EVENT",
            datasources = connections)

  ds.asNumeric(x.name = "D$survtime",
            newobj = "SURVTIME",
            datasources = connections)

  dsBaseClient::ds.Surv(time='SURVTIME', event='EVENT', objectname='surv_object')

  dsBaseClient::ds.coxph.SLMA(formula = 'surv_object ~ D$female',
            dataName = 'D', datasources = connections)

  # clear the Datashield R sessions and logout
```

```
    datashield.logout(connections)

## End(Not run)
```

---

ds.coxph.SLMA   *Performs survival analysis using Cox proportional hazards model*

Description

Passes a formula to a server side environment and returns the summary of Cox proportional hazards model from the server.

Usage

```
ds.coxph.SLMA(
  formula = NULL,
  dataName = NULL,
  weights = NULL,
  init = NULL,
  ties = "efron",
  singular.ok = TRUE,
  model = FALSE,
  x = FALSE,
  y = TRUE,
  control = NULL,
  combine_with_metafor = FALSE,
  datasources = NULL
)
```

Arguments

formula	character string (potentially including * symbol without spaces) specifying the formula that you want to pass to the server-side. For more information see **Details**.
dataName	character string of name of data frame
weights	vector of case weights
init	vector of initial values of the iteration.
ties	character string specifying the method for tie handling. The Efron approximation is used as the default. Other options are 'breslow' and 'exact'.
singular.ok	logical value indicating how to handle collinearity in the model matrix. Default is TRUE. If TRUE, the program will automatically skip over columns of the X matrix that are linear combinations of earlier columns. In this case the coefficients of such columns will be NA and the variance matrix will contain zeros.
model	logical value. If TRUE, the model frame is returned in component model.

x	logical value. If TRUE, the x matrix is returned in component x.
y	logical value. If TRUE, the response vector is returned in component y.
control	object of class survival::coxph.control() specifying iteration limit and other control options. Default is survival::coxph.control()
combine_with_metafor	
	logical If TRUE the estimates and standard errors for each regression coefficient are pooled across studies using random-effects meta-analysis under maximum likelihood (ML), restricted maximum likelihood (REML) or fixed-effects meta-analysis (FE). Default is FALSE.
datasources	a list of `DSConnection-class` objects obtained after login. If the `datasources` argument is not specified the default set of connections will be used: see `datashield.connections_default`.

Details

This is a function that performs survival analysis using the Cox proportional hazards model.

Server function called: `coxphSLMADS`.

Value

`coxphSLMADS` returns to the client-side a summary of the Cox proportional hazards model

Author(s)

Soumya Banerjee and Tom Bishop, 2020

Examples

```
## Not run:

  ## Version 6

  # connecting to the Opal servers

  require('DSI')
  require('DSOpal')
  require('dsBaseClient')

  builder <- DSI::newDSLoginBuilder()
  builder$append(server = "study1",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING1", driver = "OpalDriver")
  builder$append(server = "study2",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING2", driver = "OpalDriver")
  builder$append(server = "study3",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
```

```
                   table = "SURVIVAL.EXPAND_NO_MISSING3", driver = "OpalDriver")
   logindata <- builder$build()

   connections <- DSI::datashield.login(logins = logindata, assign = TRUE, symbol = "D")

   # make sure that the outcome is numeric
   ds.asNumeric(x.name = "D$cens",
            newobj = "EVENT",
            datasources = connections)

   ds.asNumeric(x.name = "D$survtime",
            newobj = "SURVTIME",
            datasources = connections)

   dsBaseClient::ds.Surv(time='SURVTIME', event='EVENT', objectname='surv_object')

   dsBaseClient::ds.coxph.SLMA(formula = 'surv_object ~  D$female',
            dataName = 'D', datasources = connections)

   # clear the Datashield R sessions and logout
   datashield.logout(connections)

 ## End(Not run)
```

---

ds.coxphSLMAassign   *Performs survival analysis using Cox proportional hazards model*

Description

Passes a formula to a server side environment and stores the Cox proportional hazards model from the server.

Usage

```
ds.coxphSLMAassign(
  formula = NULL,
  dataName = NULL,
  weights = NULL,
  init = NULL,
  ties = "efron",
  singular.ok = TRUE,
  model = FALSE,
  x = FALSE,
  y = TRUE,
  control = NULL,
  datasources = NULL,
  objectname = NULL
)
```

Arguments

`formula`	character string (potentially including * symbol without spaces) specifying the formula that you want to pass to the server-side. For more information see **Details**.
`dataName`	character string of name of data frame
`weights`	vector of case weights
`init`	vector of initial values of the iteration.
`ties`	character string specifying the method for tie handling. The Efron approximation is used as the default. Other options are 'breslow' and 'exact'.
`singular.ok`	logical value indicating how to handle collinearity in the model matrix. Default is TRUE. If TRUE, the program will automatically skip over columns of the X matrix that are linear combinations of earlier columns. In this case the coefficients of such columns will be NA and the variance matrix will contain zeros.
`model`	logical value. If TRUE, the model frame is returned in component model.
`x`	logical value. If TRUE, the x matrix is returned in component x.
`y`	logical value. If TRUE, the response vector is returned in component y.
`control`	object of class survival::coxph.control() specifying iteration limit and other control options. Default is survival::coxph.control()
`datasources`	a list of DSConnection-class objects obtained after login. If the `datasources` argument is not specified the default set of connections will be used: see datashield.connections_default.
`objectname`	character name of server-side variable to store the Cox model

Details

This is a function that performs survival analysis using the Cox proportional hazards model.

Server function called: `coxphSLMAassignDS`.

Author(s)

Soumya Banerjee and Tom Bishop, 2020

Examples

```
## Not run:

  ## Version 6

  # connecting to the Opal servers

  require('DSI')
  require('DSOpal')
  require('dsBaseClient')

  builder <- DSI::newDSLoginBuilder()
```

```
  builder$append(server = "study1",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING1", driver = "OpalDriver")
  builder$append(server = "study2",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING2", driver = "OpalDriver")
  builder$append(server = "study3",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING3", driver = "OpalDriver")
  logindata <- builder$build()

  connections <- DSI::datashield.login(logins = logindata, assign = TRUE, symbol = "D")

  # make sure that the outcome is numeric
  ds.asNumeric(x.name = "D$cens",
               newobj = "EVENT",
               datasources = connections)

  ds.asNumeric(x.name = "D$survtime",
               newobj = "SURVTIME",
               datasources = connections)

  dsBaseClient::ds.Surv(time='SURVTIME', event='EVENT', objectname='surv_object')

  dsBaseClient::ds.coxph.SLMA(formula = 'surv_object ~ D$female',
               dataName = 'D', datasources = connections)

  dsBaseClient::ds.coxphSLMAassign(formula = 'surv_object ~  D$female',
                  dataName = 'D', datasources = connections,
                  objectname = 'coxph_serverside')

  # clear the Datashield R sessions and logout
  datashield.logout(connections)

## End(Not run)
```

---

ds.coxphSummary	*Returns a summary of a server-side Cox proportional hazards model*

Description

This function returns a summary of server-side for a Cox proportional hazards model.

Usage

```
ds.coxphSummary(x = NULL, datasources = NULL)
```

Arguments

x	character string (potentially including * symbol without spaces) specifying the name of the fitted server-side Cox proportioanl hazards model that has been created using ds.coxphSLMAassign()
datasources	a list of DSConnection-class objects obtained after login. If the datasources argument is not specified the default set of connections will be used: see datashield.connections_default. For more information see **Details**.

Details

This is a function that returns a summary of a fitted Cox proportional hazards model.

Server function called: `coxphSummaryDS`.

Value

`coxphSummaryDS` returns to the client-side the summary of the Cox proportional hazards model

Author(s)

Soumya Banerjee and Tom Bishop, 2020

Examples

```
## Not run:

  ## Version 6

  # connecting to the Opal servers

  require('DSI')
  require('DSOpal')
  require('dsBaseClient')

  builder <- DSI::newDSLoginBuilder()
  builder$append(server = "study1",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING1", driver = "OpalDriver")
  builder$append(server = "study2",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING2", driver = "OpalDriver")
  builder$append(server = "study3",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING3", driver = "OpalDriver")
  logindata <- builder$build()

  connections <- DSI::datashield.login(logins = logindata, assign = TRUE, symbol = "D")
```

```
  # make sure that the outcome is numeric
  ds.asNumeric(x.name = "D$cens",
            newobj = "EVENT",
            datasources = connections)

  ds.asNumeric(x.name = "D$survtime",
            newobj = "SURVTIME",
            datasources = connections)

  dsBaseClient::ds.Surv(time='SURVTIME', event='EVENT', objectname='surv_object')

  dsBaseClient::ds.coxphSLMAassign(formula = 'surv_object ~  D$female',
            dataName = 'D', datasources = connections,
objectname = 'coxph_serverside')

  dsBaseClient::ds.coxphSummary(x = 'coxph_serverside')

  # clear the Datashield R sessions and logout
  datashield.logout(connections)

## End(Not run)
```

`ds.Surv`	*Creates a server-side Survival object. This is used as a response variable in in survival models and Cox proportional hazards models.*

Description

Creates a server side Survival object of type survival::Surv()

Usage

```
ds.Surv(
  time = NULL,
  event = NULL,
  time2 = NULL,
  type = NULL,
  origin = 0,
  objectname = NULL,
  datasources = NULL
)
```

Arguments

time   character string specifying the server-side start time or follow up timeparameter that has the start time element or follow-up time for survival analysis.

event	character string of name of server side event parameter for use in survival analysis
time2	character string specifying the server-side stop time parameter that has the stop time element for survival analysis. For more information see **Details**.
type	character string specifying the type of censoring. Possible values are "right", "left", "counting", "interval", "interval2", or "mstate"
origin	numeric, used for counting process data and is the hazard function origin. The origin parameter is used with time-dependent strata in order to align the subjects properly when they cross over from one strata to another. This parameter has rarely proven useful.
objectname	character string of name of new server-side object which will store object of class survival::Surv()
datasources	a list of DSConnection-class objects obtained after login. If the datasources argument is not specified the default set of connections will be used: see datashield.connections_default.

Details

This is a function that Creates a server side Survival object of type survival::Surv(). This can be used to perform survival analysis using the Cox proportional hazards model.

Server function called: `SurvDS`.

Value

`SurvDS` returns to the client-side a Surv() obejct for use in the Cox proportional hazards model

Author(s)

Soumya Banerjee and Tom Bishop, 2020

Examples

```
## Not run:

  ## Version 6

  # connecting to the Opal servers

  require('DSI')
  require('DSOpal')
  require('dsBaseClient')

  builder <- DSI::newDSLoginBuilder()
  builder$append(server = "study1",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING1", driver = "OpalDriver")
```

```
    builder$append(server = "study2",
                   url = "http://192.168.56.100:8080/",
                   user = "administrator", password = "datashield_test&",
                   table = "SURVIVAL.EXPAND_NO_MISSING2", driver = "OpalDriver")
    builder$append(server = "study3",
                   url = "http://192.168.56.100:8080/",
                   user = "administrator", password = "datashield_test&",
                   table = "SURVIVAL.EXPAND_NO_MISSING3", driver = "OpalDriver")
    logindata <- builder$build()

    connections <- DSI::datashield.login(logins = logindata, assign = TRUE, symbol = "D")

    # make sure that the outcome is numeric
    ds.asNumeric(x.name = "D$cens",
                 newobj = "EVENT",
                 datasources = connections)

    ds.asNumeric(x.name = "D$survtime",
                 newobj = "SURVTIME",
                 datasources = connections)

    # create start time variable
    ds.asNumeric(x.name = "D$starttime",
                 newobj = "STARTTIME",
                 datasources = connections)

    # create end time variable
    ds.asNumeric(x.name = "D$endtime",
                 newobj = "ENDTIME",
                 datasources = connections)

    # create a server-side survival object
    dsBaseClient::ds.Surv(time='STARTTIME', time2='ENDTIME',
     event = 'EVENT', objectname='surv_object')

    # create a Cox proportional hazards model using the created survival object
    dsBaseClient::ds.coxph.SLMA(formula = 'surv_object~D$age+D$female')

    # clear the Datashield R sessions and logout
    datashield.logout(connections)

  ## End(Not run)
```

---

ds.survfit   *Creates a server-side Survival fit (survfit) object for use in Cox proportional hazards model.*

Description

Creates a server side Survival fit (survfit) object,

Usage

```
ds.survfit(formula = NULL, objectname = NULL, datasources = NULL)
```

Arguments

formula	character string specifying the formula to be used in survival::survfit() on the server-side. For more information see **Details**.
objectname	character string of name of new server-side object which will store object of class survival::Surv()
datasources	a list of `DSConnection-class` objects obtained after login. If the `datasources` argument is not specified the default set of connections will be used: see `datashield.connections_default`.

Details

This is a function that creates a server side survfit object. This is to be used in plotting results from survival analysis using the Cox proportional hazards model.

Server function called: `survfitDS`.

Value

`SurvDS` returns to the client-side a Surv() obejct for use in the Cox proportional hazards model

Author(s)

Soumya Banerjee and Tom Bishop, 2020

Examples

```
## Not run:

  ## Version 6

  # connecting to the Opal servers

  require('DSI')
  require('DSOpal')
  require('dsBaseClient')

  builder <- DSI::newDSLoginBuilder()
  builder$append(server = "study1",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING1", driver = "OpalDriver")
  builder$append(server = "study2",
                 url = "http://192.168.56.100:8080/",
                 user = "administrator", password = "datashield_test&",
                 table = "SURVIVAL.EXPAND_NO_MISSING2", driver = "OpalDriver")
  builder$append(server = "study3",
```

```
                    url = "http://192.168.56.100:8080/",
                    user = "administrator", password = "datashield_test&",
                    table = "SURVIVAL.EXPAND_NO_MISSING3", driver = "OpalDriver")
    logindata <- builder$build()

    connections <- DSI::datashield.login(logins = logindata, assign = TRUE, symbol = "D")

    # make sure that the outcome is numeric
    ds.asNumeric(x.name = "D$cens",
              newobj = "EVENT",
              datasources = connections)

    ds.asNumeric(x.name = "D$survtime",
              newobj = "SURVTIME",
              datasources = connections)

    dsBaseClient::ds.Surv('SURVTIME', 'EVENT', 'surv_object')
    dsBaseClient::ds.coxph.SLMA(formula = 'surv_object~D$age+D$female')
    dsBaseClient::ds.survfit(formula='surv_object',object='survfit_object')

    # clear the Datashield R sessions and logout
    datashield.logout(connections)

## End(Not run)
```