Package ‘DynNom’

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Type Package

Title Visualising Statistical Models using Dynamic Nomograms

Version 5.0.2

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Description Demonstrate the results of a statistical model object as a dynamic nomogram in an RStudio panel or web browser. The package provides two generics functions: DynNom, which display statistical model objects as a dynamic nomogram; DNbuilder, which builds required scripts to publish a dynamic nomogram on a web server such as the <https://www.shinyapps.io/>. Current version of ‘DynNom’ supports stats::lm, stats::glm, survival::coxph, rms::ols, rms::Glm, rms::lrm, rms::cph, mgcv::gam and gam::gam model objects.

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Depends magrittr

Imports survival (>= 2.38-3), shiny, ggplot2 (> 2.1.0), plotly, stargazer, prediction, rms, dplyr, compare, BBmisc

Suggests gam, mgcv

NeedsCompilation no

Repository CRAN

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R topics documented:

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DNbuilder

Publishing a dynamic nomogram

Description

DNbuilder is a generic function which builds required scripts to publish a dynamic nomogram on a web server such as the https://www.shinyapps.io/. This application can then access through a URL and be used independent of R. DNbuilder supports a large number of model objects from a variety of packages.

Usage

DNbuilder(model, data = NULL, clevel = 0.95, m.summary = c("raw", "formatted"),
covariate = c("slider", "numeric"), ptype = c("st", "1-st"),
DNtitle = NULL, DNxlab = NULL, DNylab = NULL, DNlimits = NULL,
KMtitle = NULL, KMxlab = NULL, KMylab = NULL)

DNbuilder.core(model, data, clevel, m.summary, covariate,
DNtitle, DNxlab, DNylab, DNlimits)

DNbuilder.surv(model, data, clevel, m.summary, covariate,
ptype, DNtitle, DNxlab, DNylab, KMtitle, KMxlab, KMylab)

Arguments

model an lm, glm, coxph, ols, Glm, lrm, cph, mgcv::gam or gam::gam model objects.
data a dataframe of the accompanying dataset for the model (if required).
clevel a confidence level for constructing the confidence interval. If not specified, a 95% level will be used.
m.summary an option to choose the type of the model output represented in the 'Summary Model' tab. "raw" (the default) returns an unformatted summary of the model; "formatted" returns a formatted table of the model summary using stargazer package.
covariate an option to choose the type of input control widgets used for numeric values. "slider" (the default) picks out sliderInput; "numeric" picks out numericInput.
ptype an option for coxph or cph model objects to choose the type of plot which displays in "Survival plot" tab. "st" (the default) returns plot of estimated survivor probability (S(t)). "1-st" returns plot of estimated failure probability (1-S(t)).
DNtitle a character vector used as the app's title. If not specified, "Dynamic Nomogram" will be used.
DNxlab a character vector used as the title for the x-axis in "Graphical Summary" tab. If not specified, "Probability" will be used for logistic model and Cox proportional model objects; or "Response variable" for other model objects.
DNylab a character vector used as the title for the y-axis in "Graphical Summary" tab (default is NULL).
DNbuilder

DNlimits a vector of 2 numeric values used to set x-axis limits in "Graphical Summary" tab. Note: This also removes the 'Set x-axis ranges' widget in the sidebar panel.

KMtitle a character vector used as KM plot's title in "Survival plot" tab. If not specified, "Estimated Survival Probability" for ptype = "st" and "Estimated Probability" for ptype = "1-st" will be used.

KMxlab a character vector used as the title for the x-axis in "Survival plot" tab. If not specified, "Follow Up Time" will be used.

KMylab a character vector used as the title for the y-axis in "Survival plot" tab. If not specified, "S(t)" for ptype = "st" and "F(t)" for ptype = "1-st" will be used.

Value

A new folder called 'DynNomapp' will be created in the current working directory which contains all the required scripts to deploy this dynamic nomogram on a host server such as the https://www.shinyapps.io/. This folder includes ui.R, server.R, global.R and data.RData which needs to publish the app. A user guide text file (README.txt) will be also added to explain how to deploy the app using these files.

Please cite as:


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References

Easy web applications in R. https://shiny.rstudio.com/

See Also

DynNom, getpred.DN

Examples

## Not run:
# Simple linear regression models
fit1 <- lm(uptake ~ Plant + conc + Plant * conc, data = CO2)
DNbuilder(fit1)

t.data <- datadist(swiss)
options(datadist = 't.data')
ols(Fertility ~ Agriculture + Education + rcs(Catholic, 4), data = swiss) %>%
DynNom

Dynamic nomogram to visualise statistical models
**DynNom**

**Description**

DynNom is a generic function to display the results of statistical model objects as a dynamic nomogram in an 'RStudio' panel or web browser. DynNom supports a large number of model objects from a variety of packages.

**Usage**

```r
DynNom(model, data = NULL, clevel = 0.95, m.summary = c("raw", "formatted"),
       covariate = c("slider", "numeric"), ptype = c("st", "1-st"),
       DNtitle = NULL, DNxlab = NULL, DNylab = NULL, DNlimits = NULL,
       KMtitle = NULL, KMxlab = NULL, KMylab = NULL)
```

```r
DynNom.core(model, data, clevel, m.summary, covariate, DNtitle, DNxlab, DNylab, DNlimits)
```

```r
DynNom.surv(model, data, clevel, m.summary, covariate,
            ptype, DNtitle, DNxlab, DNylab, KMtitle, KMxlab, KMylab)
```

**Arguments**

- **model** an `lm`, `glm`, `coxph`, `ols`, `Glm`, `lrm`, `cph`, `mgcv::gam` or `gam::gam` model objects.
- **data** a dataframe of the accompanying dataset for the model (if required).
- **clevel** a confidence level for constructing the confidence interval. If not specified, a 95% level will be used.
- **m.summary** an option to choose the type of the model output represented in the 'Summary Model' tab. "raw" (the default) returns an unformatted summary of the model; "formatted" returns a formatted table of the model summary using stargazer package.
- **covariate** an option to choose the type of input control widgets used for numeric values. "slider" (the default) picks out `sliderInput`; "numeric" picks out `numericInput`.
- **ptype** an option for `coxph` or `cph` model objects to choose the type of plot which displays in "Survival plot" tab. "st" (the default) returns plot of estimated survivor probability (S(t)); "1-st" returns plot of estimated failure probability (1-S(t)).
- **DNtitle** a character vector used as the app's title. If not specified, "Dynamic Nomogram" will be used.
- **DNxlab** a character vector used as the title for the x-axis in "Graphical Summary" tab. If not specified, "Probability" will be used for logistic model and Cox proportional model objects; or "Response variable" for other model objects.
- **DNylab** a character vector used as the title for the y-axis in "Graphical Summary" tab (default is NULL).
- **DNlimits** a vector of 2 numeric values used to set x-axis limits in "Graphical Summary" tab. Note: This also removes the 'Set x-axis ranges' widget in the sidebar panel.
- **KMtitle** a character vector used as KM plot's title in "Survival plot" tab. If not specified, "Estimated Survival Probability" for ptype = "st" and "Estimated Probability" for ptype = "1-st" will be used.
a character vector used as the title for the x-axis in "Survival plot" tab. If not specified, "Follow Up Time" will be used.

a character vector used as the title for the y-axis in "Survival plot" tab. If not specified, "S(t)" for ptype = "st" and "F(t)" for ptype = "1-st" will be used.

Value

A dynamic nomogram in a shiny application providing individual predictions which can be used as a model visualisation or decision-making tools.

The individual predictions with a relative confidence interval are calculated using the predict function, displaying either graphically as an interactive plot in the Graphical Summary tab or a table in the Numerical Summary tab. A table of model output is also available in the Model Summary tab. In the case of the Cox proportional hazards model, an estimated survivor/failure function will be additionally displayed in a new tab.

Please cite as:

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References
Easy web applications in R. https://shiny.rstudio.com/

See Also
DNbuilder, getpred.DN

Examples
## Not run:
# Simple linear regression models
fit1 <- lm(uptake ~ Plant + conc + Plant * conc, data = CO2)
DynNom(fit1)

t.data <- datadist(swiss)
options(datadist = 't.data')
ols(Fertility ~ Agriculture + Education + rcs(Catholic, 4), data = swiss) %>%
  DynNom(clevel = 0.9, m.summary="formatted")

# Generalized regression models
fit2 <- glm(Survived ~ Age + Class + Sex,
getclass.DN

Extract class and family of a model object

Description

getclass.DN extracts class and family of a model object (supported in DynNom).
Usage

getclass.DN(model)

Arguments

model  an lm, glm, coxph, ols, Glm, lrm, cph, mgcv::gam or gam::gam model objects.

Value

A list including the model class and the family name of the model (if relevant).

See Also

DynNom, DNbuilder

Examples

fit1 <- glm(Survived ~ Age + Class + Sex, data = as.data.frame(Titanic),
weights = Freq, family = binomial("probit"))
getclass.DN(fit1)

library(survival)
fit2 <- coxph(Surv(time, status) ~ age + strata(sex) + ph.ecog, data = lung)
getclass.DN(fit2)

getdata.DN Extract dataset from a model object

Description

getdata.DN extracts dataset that was used to produce the model object (supported in DynNom).

Usage

getdata.DN(model)

Arguments

model  an lm, glm, coxph, ols, Glm, lrm, cph, mgcv::gam or gam::gam model objects.

Value

A data.frame containing the dataset used in the fitted model object.

See Also

DynNom, DNbuilder
**Examples**

```
fit1 <- glm(Survived ~ Age + Class + Sex, data = as.data.frame(Titanic),
weights = Freq, family = binomial("probit"))
getpred.DN(fit1)

library(survival)
fit2 <- coxph(Surv(time, status) ~ age + strata(sex) + ph.ecog, data = lung)
getdata.DN(fit2)
```

---

**getpred.DN**

Extract predictions from a Model Object

**Description**

getpred.DN extracts class, family and inverse of link function from a model object (supported in DynNom).

**Usage**

```
getpred.DN(model, newd, set.rms=F)
```

**Arguments**

- `model` an `lm`, `glm`, `coxph`, `ols`, `Glm`, `lrm`, `cph`, `mgcv::gam` or `gam::gam` model objects.
- `newd` a data frame of predictors for prediction
- `set.rms` a logical value indicating if data should be updated in the model object (required for `rms` model objects in `DNbuilder`).

**Value**

A list including the prediction (pred) and the standard error of prediction (SEpred).

**See Also**

`DynNom`, `DNbuilder`

**Examples**

```
fit1 <- glm(Survived ~ Age + Class + Sex, data = as.data.frame(Titanic),
weights = Freq, family = binomial("probit"))
getpred.DN(fit1, newd = data.frame(Class="1st", Sex="Male", Age="Child"))
```
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