

Package ‘TTU’

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Title Transfer to Utility Mapping Algorithm Toolkit

Version 0.0.0.9133

Description Tools for developping Transfer To Utility (TTU) mapping algorithms to predict health utility from other health measures. This development version of the TTU package has been made available as part of the process of testing and documenting the package. The tools contained in this development release automate a number of tasks which **MODIFY THE DIRECTORY STRUCTURE OF YOUR LOCAL MACHINE**. Therefore you should only trial this software if you feel confident that you understand what it does and have created a sandpit area in which you can safely undertake testing. If you have any questions, please contact the authors (matthew.hamilton@orygen.org.au). Some of the documentation for this package has been automatically generated by the ready4fun package and is therefore quite rudimentary. Human edits to improve the quality of documentation will follow in 2021.

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URL <https://ready4-dev.github.io/TTU/>, <https://github.com/ready4-dev/TTU>,
<https://ready4-dev.github.io/ready4/>

Encoding UTF-8

LazyData true

Roxygen list(markdown = TRUE)

RoxygenNote 7.1.1

Imports assertthat,
boot,
Boruta,
brms,
caret,
cmdstanr (>= 0.3.0.9000),
dataverse (>= 0.3.7),
dplyr,
ggalt,
ggfortify,
ggplot2,
grDevices,
Hmisc,
knitr,
knitrBootstrap,

lifecycle,
 lubridate,
 magrittr,
 MASS,
 Matrix,
 matrixcalc,
 methods,
 pacman,
 psych,
 purrr,
 randomForest,
 readr,
 ready4class ($\geq 0.0.0.9193$),
 ready4fun ($\geq 0.0.0.9289$),
 ready4show ($\geq 0.0.0.9019$),
 ready4use ($\geq 0.0.0.9122$),
 rlang,
 simstudy,
 stats,
 stringi,
 stringr,
 Surrogate,
 synthpop,
 testthat,
 tibble,
 tidyr,
 tidyselect,
 utils,
 viridis,
 youthvars ($\geq 0.0.0.9018$)

VignetteBuilder knitr

Depends R (≥ 2.10)

Remotes stan-dev/cmdstanr,
 ready4-dev/ready4show,
 ready4-dev/ready4use,
 ready4-dev/youthvars,
 iqss/dataverse-client-r,
 ready4-dev/ready4class,
 ready4-dev/ready4fun

R topics documented:

TTU-package	3
abbreviations_lup	4
add_interval_var	4
add_utility_predn_to_ds	5
fns_dmt_tb	6
fn_type_lup_tb	7
is_TTU_predictors_lup	8
make_fake_ts_data	8
make_new_TTU_predictors_lup	9

<i>TTU-package</i>	3
make_pt_TTU_predictors_lup	9
mdl_types_lup	10
plt_types_lup	11
predictors_lup	11
prototype_lup	12
rprt_lup	12
TTU_predictors_lup	13
validate_TTU_predictors_lup	14
write_all_alg_outps	14
write_mdls_with_covars_cmprsn	15
write_mdl_cmprsn	16
write_predr_and_covars_cmprsn	17
write_shareable_mdls	18
write_ts_mdls_from_alg_outp	18
Index	20

TTU-package	<i>TTU: Transfer to Utility Mapping Algorithm Toolkit</i>
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Description

Tools for developing Transfer To Utility (TTU) mapping algorithms to predict health utility from other health measures. This development version of the TTU package has been made available as part of the process of testing and documenting the package. The tools contained in this development release automate a number of tasks which **MODIFY THE DIRECTORY STRUCTURE OF YOUR LOCAL MACHINE**. Therefore you should only trial this software if you feel confident that you understand what it does and have created a sandpit area in which you can safely undertake testing. If you have any questions, please contact the authors (matthew.hamilton@orygen.org.au). Some of the documentation for this package has been automatically generated by the ready4fun package and is therefore quite rudimentary. Human edits to improve the quality of documentation will follow in 2021.

Details

To learn more about TTU, start with the vignettes: `browseVignettes(package = "TTU")`

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- Orygen [copyright holder, funder]
- Headspace [funder]
- National Health and Medical Research Council [funder]

See Also

Useful links:

- <https://ready4-dev.github.io/TTU/>
- <https://github.com/ready4-dev/TTU>
- <https://ready4-dev.github.io/ready4/>

abbreviations_lup *Common abbreviations lookup table*

Description

A lookup table for abbreviations commonly used in object names in the TTU package.

Usage

```
abbreviations_lup
```

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 455 rows and 3 columns.

Details

A tibble

short_name_chr Short name (a character vector)

long_name_chr Long name (a character vector)

plural_lgl Plural (a logical vector)

Source

<https://doi.org/10.7910/DVN/2Y9VF9>

add_interval_var *Add interval variable*

Description

`add_interval_var()` is an Add function that updates an object by adding data to that object. Specifically, this function implements an algorithm to add interval variable. Function argument `data_tb` specifies the object to be updated. The function returns Updated data (a tibble).

Usage

```
add_interval_var(
  data_tb,
  id_var_nm_1L_chr = "fkClientID",
  msrmt_date_var_nm_1L_chr = "d_interview_date",
  time_unit_1L_chr = "days",
  bl_date_var_nm_1L_chr = "bl_date_dtm",
  interval_var_nm_1L_chr = "interval_dbl",
  temp_row_nbr_var_nm_1L_chr = "temp_row_nbr_int",
  drop_bl_date_var_1L_lgl = F
)
```

Arguments

data_tb	Data (a tibble)
id_var_nm_1L_chr	Identity variable name (a character vector of length one), Default: 'fkClientID'
msrmt_date_var_nm_1L_chr	Measurement date variable name (a character vector of length one), Default: 'd_interview_date'
time_unit_1L_chr	Time unit (a character vector of length one), Default: 'days'
bl_date_var_nm_1L_chr	Baseline date variable name (a character vector of length one), Default: 'bl_date_dtm'
interval_var_nm_1L_chr	Interval variable name (a character vector of length one), Default: 'interval_dbl'
temp_row_nbr_var_nm_1L_chr	Temporary row number variable name (a character vector of length one), Default: 'temp_row_nbr_int'
drop_bl_date_var_1L_lgl	Drop baseline date variable (a logical vector of length one), Default: F

Value

Updated data (a tibble)

add_utility_predn_to_ds

Add utility prediction to dataset

Description

add_utility_predn_to_ds() is an Add function that updates an object by adding data to that object. Specifically, this function implements an algorithm to add utility prediction to dataset. Function argument data_tb specifies the object to be updated. The function returns Data (a tibble).

Usage

```
add_utility_predn_to_ds(
  data_tb,
  model_md1,
  tfmn_1L_chr,
  depnt_var_nm_1L_chr,
  predr_vars_nms_chr = NULL,
  force_min_max_1L_lgl = T,
  utl_min_val_1L_dbl = 0.03,
  impute_1L_lgl = T,
  utl_cls_fn = NULL,
  rmv_tfd_depnt_var_1L_lgl = F
)
```

Arguments

data_tb	Data (a tibble)
model_md1	Model (a model)
tfmn_1L_chr	Transformation (a character vector of length one)
depnt_var_nm_1L_chr	Dependent variable name (a character vector of length one)
predr_vars_nms_chr	Predictor variables names (a character vector), Default: NULL
force_min_max_1L_lgl	Force minimum maximum (a logical vector of length one), Default: T
utl_min_val_1L_dbl	Utility minimum value (a double vector of length one), Default: 0.03
impute_1L_lgl	Impute (a logical vector of length one), Default: T
utl_cls_fn	Utility class (a function), Default: NULL
rmv_tfd_depnt_var_1L_lgl	Remove transformed dependent variable (a logical vector of length one), Default: F

Value

Data (a tibble)

fns_dmt_tb

TTU function documentation table

Description

Meta-data on each TTU function used to create package documentation

Usage

fns_dmt_tb

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 85 rows and 10 columns.

Details

A tibble

fns_chr Functions (a character vector)

title_chr Title (a character vector)

desc_chr Description (a character vector)

details_chr Details (a character vector)

inc_for_main_user_lgl Include for main user (a logical vector)

output_chr Output (a character vector)

example_lgl Example (a logical vector)

args_ls Arguments (a list)

file_nm_chr File name (a character vector)

file_pfx_chr File prefix (a character vector)

Source

<https://ready4-dev.github.io/TTU/>

fn_type_lup_tb	<i>Function type lookup table</i>
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Description

A lookup table to find descriptions for different types of functions used within the TTU package suite.

Usage

```
fn_type_lup_tb
```

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 44 rows and 6 columns.

Details

A tibble

fn_type_nm_chr Function type name (a character vector)

fn_type_desc_chr Function type description (a character vector)

first_arg_desc_chr First argument description (a character vector)

second_arg_desc_chr Second argument description (a character vector)

is_generic_lgl Is generic (a logical vector)

is_method_lgl Is method (a logical vector)

Source

<https://doi.org/10.7910/DVN/2Y9VF9>

is_TTU_predictors_lup *Is TTU S3 class for candidate predictors lookup table*

Description

Check whether an object is a valid instance of the TTU S3 class for candidate predictors lookup table

Usage

```
is_TTU_predictors_lup(x)
```

Arguments

x An object of any type

Details

TTU S3 class for candidate predictors lookup table

Value

A logical value, TRUE if a valid instance of the TTU S3 class for candidate predictors lookup table

make_fake_ts_data *Make fake time series data*

Description

make_fake_ts_data() is a Make function that creates a new R object. Specifically, this function implements an algorithm to make fake time series data. The function returns Fk data (a tibble).

Usage

```
make_fake_ts_data(outp_smry_ls)
```

Arguments

outp_smry_ls Output summary (a list)

Value

Fk data (a tibble)

`make_new_TTU_predictors_lup`*Make new TTU S3 class for candidate predictors lookup table*

Description

Create a new unvalidated instance of the TTU S3 class for candidate predictors lookup table

Usage

```
make_new_TTU_predictors_lup(x)
```

Arguments

`x` A prototype for the TTU S3 class for candidate predictors lookup table

Details

TTU S3 class for candidate predictors lookup table

Value

An unvalidated instance of the TTU S3 class for candidate predictors lookup table

`make_pt_TTU_predictors_lup`*Make prototype TTU S3 class for candidate predictors lookup table*

Description

Create a new prototype for the TTU S3 class for candidate predictors lookup table

Usage

```
make_pt_TTU_predictors_lup(  
  short_name_chr = character(0),  
  long_name_chr = character(0),  
  min_val_dbl = numeric(0),  
  max_val_dbl = numeric(0),  
  class_chr = character(0),  
  increment_dbl = numeric(0),  
  class_fn_chr = character(0),  
  mdl_scaling_dbl = numeric(0),  
  covariate_lgl = logical(0)  
)
```

Arguments

short_name_chr Short name (a character vector), Default: character(0)
long_name_chr Long name (a character vector), Default: character(0)
min_val_dbl Minimum value (a double vector), Default: numeric(0)
max_val_dbl Maximum value (a double vector), Default: numeric(0)
class_chr Class (a character vector), Default: character(0)
increment_dbl Increment (a double vector), Default: numeric(0)
class_fn_chr Class function (a character vector), Default: character(0)
mdl_scaling_dbl Model scaling (a double vector), Default: numeric(0)
covariate_lgl Covariate (a logical vector), Default: logical(0)

Details

TTU S3 class for candidate predictors lookup table

Value

A prototype for TTU S3 class for candidate predictors lookup table

mdl_types_lup	<i>Model types lookup table</i>
---------------	---------------------------------

Description

A lookup table of abbreviations to describe the different model types supported by TTU functions

Usage

mdl_types_lup

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 12 rows and 9 columns.

Details

A tibble

short_name_chr Short name (a character vector)
long_name_chr Long name (a character vector)
control_chr Control (a character vector)
family_chr Family (a character vector)
fn_chr Function (a character vector)
start_chr Start (a character vector)
predn_type_chr Prediction type (a character vector)
tfmn_chr Transformation (a character vector)
tfmn_for_bnml_lgl Transformation for binomial (a logical vector)

plt_types_lup	<i>Model plot types lookup table</i>
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Description

A lookup table of abbreviations to describe the different model plot types supported by TTU functions

Usage

```
plt_types_lup
```

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 4 rows and 2 columns.

Details

A tibble

short_name_chr Short name (a character vector)

long_name_chr Long name (a character vector)

predictors_lup	<i>Predictors lookup table</i>
----------------	--------------------------------

Description

A lookup table of the short name and long name of each predictor used in the models included with the `youthu` package.

Usage

```
predictors_lup
```

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 7 rows and 9 columns.

Details

A tibble

short_name_chr Short name (a character vector)

long_name_chr Long name (a character vector)

min_val_dbl Minimum value (a double vector)

max_val_dbl Maximum value (a double vector)

class_chr Class (a character vector)

increment_dbl Increment (a double vector)

class_fn_chr Class function (a character vector)
mdl_scaling_dbl Model scaling (a double vector)
covariate_lgl Covariate (a logical vector)

prototype_lup *Class prototype lookup table*

Description

Metadata on classes used in readyforwhatsnext suite

Usage

prototype_lup

Format

An object of class ready4_class_pt_lup (inherits from ready4_class_pt_lup, tbl_df, tbl, data.frame) with 28 rows and 6 columns.

Details

A tibble

type_chr Type (a character vector)
val_chr Value (a character vector)
pt_ns_chr Prototype namespace (a character vector)
fn_to_call_chr Function to call (a character vector)
default_val_chr Default value (a character vector)
old_class_lgl Old class (a logical vector)

rprt_lup *Report types lookup table*

Description

A lookup table of the different report types supported by TTU functions

Usage

rprt_lup

Format

An object of class tbl_df (inherits from tbl, data.frame) with 1 rows and 7 columns.

Details

A tibble

rprrt_nms_chr Report names (a character vector)

title_chr Title (a character vector)

paths_to_rmd_dir_1L_chr Paths to Markdown directory (a character vector of length one)

pkg_dirs_chr Package directories (a character vector)

packages_chr Packages (a character vector)

nms_of_rmd_chr Names of Markdown (a character vector)

rlty_paths_to_outpt_yaml_chr Relative paths to outpt yaml (a character vector)

TTU_predictors_lup *TTU S3 class for candidate predictors lookup table*

Description

Create a new valid instance of the TTU S3 class for candidate predictors lookup table

Usage

```
TTU_predictors_lup(x = make_pt_TTU_predictors_lup())
```

Arguments

x A prototype for the TTU S3 class for candidate predictors lookup table, Default: `make_pt_TTU_predictors_lup()`

Details

TTU S3 class for candidate predictors lookup table

Value

A validated instance of the TTU S3 class for candidate predictors lookup table

 validate_TTU_predictors_lup

Validate TTU S3 class for candidate predictors lookup table

Description

Validate an instance of the TTU S3 class for candidate predictors lookup table

Usage

```
validate_TTU_predictors_lup(x)
```

Arguments

x An unvalidated instance of the TTU S3 class for candidate predictors lookup table

Details

TTU S3 class for candidate predictors lookup table

Value

A prototpe for TTU S3 class for candidate predictors lookup table

 write_all_alg_outps *Write all algorithm outputs*

Description

write_all_alg_outps() is a Write function that writes a file to a specified local directory. Specifically, this function implements an algorithm to write all algorithm outputs. The function returns Output summary (a list).

Usage

```
write_all_alg_outps(
  scored_data_tb,
  path_to_write_to_1L_chr,
  depnt_var_nm_1L_chr = "utl_total_w",
  candidate_predrs_chr,
  candidate_covar_nms_chr,
  id_var_nm_1L_chr = "fkClientID",
  round_var_nm_1L_chr = "round",
  round_bl_val_1L_chr = "Baseline",
  mdl_types_chr = NA_character_,
  prefd_mdl_types_chr = NA_character_,
  choose_from_pfx_chr = c("GLM", "OLS", "BET"),
  prefd_covars_chr = NA_character_,
  seed_1L_int = 12345,
```

```

  folds_1L_int = 10L,
  max_nbr_of_boruta_md1_runs_int = 300L,
  mdl_types_lup = NULL
)

```

Arguments

scored_data_tb Scored data (a tibble)

path_to_write_to_1L_chr
Path to write to (a character vector of length one)

depnt_var_nm_1L_chr
Dependent variable name (a character vector of length one), Default: 'utl_total_w'

candidate_predrs_chr
Candidate predictors (a character vector)

candidate_covar_nms_chr
Candidate covariate names (a character vector)

id_var_nm_1L_chr
Identity variable name (a character vector of length one), Default: 'fkClientID'

round_var_nm_1L_chr
Round variable name (a character vector of length one), Default: 'round'

round_bl_val_1L_chr
Round baseline value (a character vector of length one), Default: 'Baseline'

mdl_types_chr Model types (a character vector), Default: 'NA'

prefd_mdl_types_chr
Preferred model types (a character vector), Default: 'NA'

choose_from_pfx_chr
Choose from prefix (a character vector), Default: c("GLM", "OLS", "BET")

prefd_covars_chr
Preferred covariates (a character vector), Default: 'NA'

seed_1L_int Seed (an integer vector of length one), Default: 12345

folds_1L_int Folds (an integer vector of length one), Default: 10

max_nbr_of_boruta_md1_runs_int
Maximum number of boruta model runs (an integer vector), Default: 300

mdl_types_lup Model types (a lookup table), Default: NULL

Value

Output summary (a list)

write_mdls_with_covars_cmprsn

Write models with covariates comparison

Description

write_mdls_with_covars_cmprsn() is a Write function that writes a file to a specified local directory. Specifically, this function implements an algorithm to write models with covariates comparison. The function returns Output summary (a list).

Usage

```
write_md1s_with_covars_cmprsn(
  scored_data_tb,
  bl_tb,
  ds_smry_ls,
  mdl_smry_ls,
  output_data_dir_1L_chr,
  seed_1L_int = 1234,
  session_data_ls
)
```

Arguments

scored_data_tb Scored data (a tibble)
 bl_tb Baseline (a tibble)
 ds_smry_ls Dataset summary (a list)
 mdl_smry_ls Model summary (a list)
 output_data_dir_1L_chr
 Output data directory (a character vector of length one)
 seed_1L_int Seed (an integer vector of length one), Default: 1234
 session_data_ls
 Session data (a list)

Value

Output summary (a list)

write_md1_cmprsn	<i>Write model comparison</i>
------------------	-------------------------------

Description

write_md1_cmprsn() is a Write function that writes a file to a specified local directory. Specifically, this function implements an algorithm to write model comparison. The function returns Model comparison (a list).

Usage

```
write_md1_cmprsn(
  scored_data_tb,
  ds_smry_ls,
  mdl_smry_ls,
  output_data_dir_1L_chr,
  seed_1L_int = 1234
)
```


Arguments

scored_data_tb Scored data (a tibble)
 ds_smry_ls Dataset summary (a list)
 mdl_smry_ls Model summary (a list)
 output_data_dir_1L_chr
 Output data directory (a character vector of length one)
 seed_1L_int Seed (an integer vector of length one), Default: 1234

Value

Model comparison (a list)

write_predr_and_covars_cmprsn
Write predictor and covariates comparison

Description

write_predr_and_covars_cmprsn() is a Write function that writes a file to a specified local directory. Specifically, this function implements an algorithm to write predictor and covariates comparison. The function returns Predictor and covariates comparison (a list).

Usage

```
write_predr_and_covars_cmprsn(
  scored_data_tb,
  bl_tb,
  ds_smry_ls,
  mdl_smry_ls,
  output_data_dir_1L_chr,
  seed_1L_int = 1234
)
```

Arguments

scored_data_tb Scored data (a tibble)
 bl_tb Baseline (a tibble)
 ds_smry_ls Dataset summary (a list)
 mdl_smry_ls Model summary (a list)
 output_data_dir_1L_chr
 Output data directory (a character vector of length one)
 seed_1L_int Seed (an integer vector of length one), Default: 1234

Value

Predictor and covariates comparison (a list)

write_shareable_mdls *Write shareable models*

Description

write_shareable_mdls() is a Write function that writes a file to a specified local directory. Specifically, this function implements an algorithm to write shareable models. The function returns Output summary (a list).

Usage

```
write_shareable_mdls(
  outp_smry_ls,
  new_dir_nm_1L_chr = "G_Shareable",
  shareable_title_detail_1L_chr = ""
)
```

Arguments

outp_smry_ls Output summary (a list)
 new_dir_nm_1L_chr
 New directory name (a character vector of length one), Default: 'G_Shareable'
 shareable_title_detail_1L_chr
 Shareable title detail (a character vector of length one), Default: ""

Value

Output summary (a list)

write_ts_mdls_from_alg_outp
 Write time series models from algorithm output

Description

write_ts_mdls_from_alg_outp() is a Write function that writes a file to a specified local directory. Specifically, this function implements an algorithm to write time series models from algorithm output. The function returns Output summary (a list).

Usage

```
write_ts_mdls_from_alg_outp(
  outp_smry_ls,
  fn_ls,
  new_dir_nm_1L_chr = "F_TS_Mdls",
  predictors_lup,
  backend_1L_chr = getOption("brms.backend", "rstan"),
  iters_1L_int = 4000L
)
```

Arguments

- `outp_smry_ls` Output summary (a list)
- `fn_ls` Function list (a list of functions)
- `new_dir_nm_1L_chr` New directory name (a character vector of length one), Default: 'F_TS_Mdls'
- `predictors_lup` Predictors (a lookup table)
- `backend_1L_chr` Backend (a character vector of length one), Default: `getOption("brms.backend", "rstan")`
- `iters_1L_int` Iterations (an integer vector of length one), Default: 4000

Value

Output summary (a list)

Index

* datasets

- abbreviations_lup, [4](#)
- fn_type_lup_tb, [7](#)
- fns_dmt_tb, [6](#)
- mdl_types_lup, [10](#)
- plt_types_lup, [11](#)
- predictors_lup, [11](#)
- prototype_lup, [12](#)
- rprrt_lup, [12](#)

- abbreviations_lup, [4](#)
- add_interval_var, [4](#)
- add_utility_predn_to_ds, [5](#)

- fn_type_lup_tb, [7](#)
- fns_dmt_tb, [6](#)

- is_TTU_predictors_lup, [8](#)

- make_fake_ts_data, [8](#)
- make_new_TTU_predictors_lup, [9](#)
- make_pt_TTU_predictors_lup, [9](#)
- mdl_types_lup, [10](#)

- plt_types_lup, [11](#)
- predictors_lup, [11](#)
- prototype_lup, [12](#)

- rprrt_lup, [12](#)

- TTU (TTU-package), [3](#)
- TTU-package, [3](#)
- TTU_predictors_lup, [13](#)

- validate_TTU_predictors_lup, [14](#)

- write_all_alg_outps, [14](#)
- write_mdl_cmprsn, [16](#)
- write_mdls_with_covars_cmprsn, [15](#)
- write_predr_and_covars_cmprsn, [17](#)
- write_shareable_mdls, [18](#)
- write_ts_mdls_from_alg_outp, [18](#)