

Package ‘gmoTree’

October 25, 2023

Title Get and Modify 'oTree' Data

Version 1.0.1

Date 2023-10-24

Description Manage data from 'oTree' experiments. Import 'oTree' data and clean them up by using functions to deal with messy data, dropouts, and other problematic cases. Create IDs, calculate the time, transfer variables between app data frames, and delete sensitive information. You can also check your experimental data before running the experiment. Information on 'oTree' is found in Chen, D. L., Schonger, M., & Wickens, C. (2016) <[doi:10.1016/j.jbef.2015.12.001](https://doi.org/10.1016/j.jbef.2015.12.001)>.

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URL <https://zauchnerp.github.io/gmoTree/>,
<https://github.com/ZauchnerP/gmoTree/>

BugReports <https://github.com/ZauchnerP/gmoTree/issues/>

Depends R (>= 4.3.0)

Imports data.table (>= 1.14.8), dplyr (>= 1.1.2), openxlsx (>= 4.2.5.2), plyr (>= 1.8.8), rlang (>= 1.1.1), rlist (>= 0.4.6.2), stats (>= 4.3.0), stringr (>= 1.5.0)

Suggests knitr (>= 1.43), rmarkdown (>= 2.22), testthat (>= 3.1.9), withr (>= 2.5.0)

VignetteBuilder knitr

BuildVignettes true

Config/testthat/edition 3

Encoding UTF-8

LazyData true

RoxygenNote 7.2.3

NeedsCompilation no

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Repository CRAN

Date/Publication 2023-10-25 17:50:06 UTC

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apptime	<i>Calculate the time that was spent on an app</i>
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Description

Calculate the time spent on one app or several apps.

Usage

```
apptime(
  oTree,
  apps = NULL,
  pcode = NULL,
  plabel = NULL,
  group_id = NULL,
  seconds = FALSE,
  rounded = TRUE,
  digits = 2,
  sinfo = "session_code",
  combine = FALSE
)
```

Arguments

oTree	A list of data frames that were created by <code>import_otree()</code> .
apps	Character. Name(s) of the app(s) for which the time should be calculated.
pcode	Character. The value of the <code>participant.code</code> variable if the time should only be calculated for one specified participant.
plabel	Character. The value of the <code>participant.label</code> variable if the time should only be calculated for one specified participant.
group_id	Integer. The value of the <code>group_id</code> variable if the time should only be calculated for one specified group. The <code>group_id</code> variable can be created with <code>make_ids()</code> .
seconds	Logical. TRUE if the output should be in seconds instead of minutes.
rounded	Logical. TRUE if the output should be rounded.
digits	Integer. The number of digits to which the output should be rounded. This parameter has no effect unless <code>rounded = TRUE</code> .
sinfo	Character. "session_id" to use session ID for additional information in the data frame of single durations, "session_code" to use session codes, or NULL if no session column should be shown.
combine	Logical. TRUE if all variables relating to epoch time should be merged, and all variables relating to participant code should be merged when data from multiple versions of oTree are used.

Value

This function returns a list for each app containing information on the mean, the minimum, and maximum time the participants spent on the app, a data frame with information on the time each participant spent on the app, and eventually, vectors of relevant background information on these numbers.

If the experiment's duration is only calculated for one participant, the output returns an NA (per app) if the person did not make it to the app(s).

Examples

```
# Use package-internal list of oTree data frames
oTree <- gmoTree::oTree

# Show how much time all participants spent on app "survey"
apptime(oTree, apps = "survey")

# Show how much time the participant "y8rbzcju" spent on
# the app "survey"
apptime(oTree, pcode = "y8rbzcju", apps = "survey")

# Show how much time the participants in group 4 spent on
# the app "survey"
oTree <- make_ids(oTree, gmake = TRUE,
                  from_var = "dictator.1.group.id_in_subsession")
apptime(oTree, group_id = 4, apps = "survey")
```

 assignv

Assign a variable from all_apps_wide

Description

Assign a variable from all_apps_wide to the other app data frames.

Usage

```
assignv(oTree, variable, newvar)
```

Arguments

oTree	A list of data frames that were created by import_otree().
variable	Character. The variable in the all_apps_wide data frame that should be assigned to all other apps.
newvar	Character. The name of the newly created variable.

Value

This function returns a duplicate of the original oTree list of data frames but with an additional column in all data frames. The additional column contains data from the specified variable found in all_apps_wide.

Examples

```
# Use package-internal list of oTree data frames
oTree <- gmoTree::oTree

# Assign variable "survey.1.player.gender" and name it "gender"
oTree <- assignv(oTree = oTree,
                variable = "survey.1.player.gender",
                newvar = "gender")

# Show the new variable in some of the other app data frames
oTree$dictator$gender
oTree$chatapp$gender

# The variable is now duplicated in app "survey" because it is obtained from
# there (This can be avoided by naming the new variable the same as the old
# variable)
oTree$survey$gender
oTree$survey$player.gender

# In app "all_apps_wide," the variable is also there twice (This can be
# avoided by naming the new variable the same as the old variable)
oTree$all_apps_wide$gender
oTree$all_apps_wide$survey.1.player.gender
```

assignv_to_aaw	<i>Assign a variable to all_apps_wide</i>
----------------	---

Description

Assign a variable from one of the app data frames to all_apps_wide.

Usage

```
assignv_to_aaw(oTree, app, variable, newvar, resafter = NULL)
```

Arguments

oTree	A list of data frames that were created by import_otree().
app	Character. The data frame from which the variable is taken.
variable	Character. The name of the variable that should be assigned to all_apps_wide.
newvar	Character. The name of the newly created variable in the all_apps_wide data frame.
resafter	Character. The name of the variable that precedes the new variable. If NULL, the new variable will be placed at the end of the data frame.

Value

This function returns a duplicate of the original oTree list of data frames but with an additional column in the all_apps_wide data frame that contains the variable in question.

Examples

```
# Use package-internal list of oTree data frames
oTree <- gmoTree::oTree

# Create a new variable
oTree$survey$younger30 <- ifelse(oTree$survey$player.age < 30, 0, 1)

# Assign the variable younger30 to all_apps_wide
oTree2 <- assignv_to_aaw(
  oTree = oTree,
  app = "survey",
  variable = "younger30",
  newvar = "younger30")

# Show the new variable in the all_apps_wide data frame
oTree2$all_apps_wide$younger30

# Check the position of the new variable
match("younger30", names(oTree2$all_apps_wide))

# Place the new variable immediately after the "survey.1.player.age" variable
```

```
oTree2 <- assignv_to_aaw(oTree,
                        app = "survey",
                        variable = "younger30",
                        newvar = "younger30",
                        resafter = "survey.1.player.age")

# Show the new variable in the all_apps_wide data frame
oTree2$all_apps_wide$younger30

# Show the position of the new variable
match("younger30", names(oTree2$all_apps_wide))
```

delete_cases

Delete specific cases

Description

Delete specific cases from all data frames in the oTree list.

Caution 1: This function does not delete cases from the original CSV and Excel files!

Caution 2: This function does not delete cases from custom exports and custom data frames if these data frames do not have a variable named participant.code!

Caution 3: This function does not delete any data from the Chats data frame! (As the interpretation of chat data depends on how participants engage with each other, the data must be deleted with more care than deleting data in other apps. Hence, this function does not delete data in this data frame. Please do this manually if necessary!)

Usage

```
delete_cases(
  oTree,
  pcodes = NULL,
  plabels = NULL,
  saved_vars = NULL,
  reason,
  omit = FALSE,
  info = FALSE
)
```

Arguments

oTree	A list of data frames that were created by import_otree().
pcodes	Character. The value(s) of the participant.code variable of the participants whose data should be removed.
plabels	Character. The value(s) of the participant.label variable of the participants whose data should be removed.

saved_vars	Character. The name(s) of variable(s) that need(s) to be stored in the list of information on deleted cases in \$info\$deleted_cases.
reason	Character. The reason for deletion that should be stored in the list of information on deleted cases in \$info\$deleted_cases.
omit	Logical. TRUE if the deleted cases should not be added to the information on deleted cases in \$info\$deleted_cases.
info	Logical. TRUE if a brief information on the case deletion process should be printed.

Value

This function returns a duplicate of the original oTree list of data frames that do not include the deleted cases.

It adds information on the deleted cases to \$info\$deleted_cases. (This list is also filled by other functions.)

In this list, you can find the following information:

\$codes = A vector with the participant codes of all deleted cases.

\$count = The number of participants in \$codes.

\$full and \$unique = The data frames \$full and \$unique contain information on each deleted participant and the reason why they were deleted. The entries to the \$full and the \$unique data frames are the same. Columns "end_app" and "end_page" are left empty intentionally because they are only filled by the delete_dropouts() function.

Examples

```
# Use package-internal list of oTree data frames
oTree <- gmoTree::oTree

# First, show some row numbers
print(paste(nrow(oTree$all_apps_wide), nrow(oTree$survey),
nrow(oTree$Time), nrow(oTree$Chats)))

# Delete only one case
oTree2 <- delete_cases(oTree,
                      pcodes = "xml146rm",
                      reason = "requested")

# Show row numbers again
print(paste(nrow(oTree2$all_apps_wide), nrow(oTree2$survey),
nrow(oTree2$Time), nrow(oTree2$Chats)))

# Delete several cases
deletionlist <- c("4zhzdmzo", "xml146rm")
oTree2 <- delete_cases(oTree,
                      pcodes = deletionlist,
                      reason = "requested")

# Show row numbers again
```

```

print(paste(nrow(oTree2$all_apps_wide), nrow(oTree2$survey),
nrow(oTree2$Time), nrow(oTree2$Chats)))

# Show information on all deleted cases (also dropouts):
oTree2$info$deleted_cases$full

# Save one variable
oTree2 <- delete_cases(oTree,
  pcodes = deletionlist,
  reason = "requested",
  saved_vars = "participant._index_in_pages")

# Show row numbers again
print(paste(nrow(oTree2$all_apps_wide), nrow(oTree2$survey),
nrow(oTree2$Time), nrow(oTree2$Chats)))

# Save some variables
oTree2 <- delete_cases(oTree,
  pcodes = deletionlist,
  reason = "requested",
  saved_vars = c(
    "participant._index_in_pages",
    "participant._max_page_index"))

# Show row numbers again
print(paste(nrow(oTree2$all_apps_wide), nrow(oTree2$survey),
nrow(oTree2$Time), nrow(oTree2$Chats)))

# Get a list of all deleted cases
# (If there is already a list, the new list is added to it)
oTree2$info$deleted_cases$codes

# Show number of all deleted cases
length(oTree2$info$deleted_cases$codes)
oTree2$info$deleted_cases$count

```

delete_dropouts

Delete dropouts

Description

Delete the data of all participants who did not end the experiment at (a) certain page(s) and/or app(s).

Caution 1: This function does not delete cases from the original CSV and Excel files!

Caution 2: This function does not delete cases from custom exports if the custom exports do not have a variable named participant.code and a variable named session.code!

Caution 3: This function does not delete any data from the Chats data frame! (As the interpretation of chat data depends on how participants engage with each other, the data must be deleted with more care than deleting data in other apps. Hence, this function does not delete data in this data frame. Please do this manually if necessary!)

Usage

```
delete_dropouts(
  oTree,
  final_apps = NULL,
  final_pages = NULL,
  saved_vars = NULL,
  inconsistent = NULL,
  reason = "ENC",
  info = FALSE
)
```

Arguments

<code>oTree</code>	A list of data frames that were created by <code>import_otree()</code> .
<code>final_apps</code>	Character. The name(s) of the app(s) at which the participants have to finish the experiment.
<code>final_pages</code>	Character. The name(s) of the page(s) at which the participants have to finish the experiment.
<code>saved_vars</code>	Character. The name(s) of variable(s) that need(s) to be stored in the list of information on deleted cases in <code>\$info\$deleted_cases</code> .
<code>inconsistent</code>	Character. Should the function continue or be stopped if at least one participant has inconsistent <code>end_pages</code> , <code>end_apps</code> , or both? To continue, type "yes," to stop the function, type "no."
<code>reason</code>	Character. The reason for deletion that should be stored in the list of information on deleted cases in <code>\$info\$deleted_cases</code> .
<code>info</code>	Logical. TRUE if a brief information on the dropout deletion process should be printed.

Value

This function returns a duplicate of the original `oTree` list of data frames but without the deleted cases.

It adds information on the deleted cases to `$info$deleted_cases`. (This list is also filled by other functions.)

In this list, you can find the following information:

`$full` = A data frame that contains information on all participants who did not finish the study; it shows their participant codes, the names of the apps in which they left the experiment, the names of the pages in which they left the experiment, the names of the app data frames in which this information was found, and the dropout reason ("ENC," experiment not completed, combined with the name of the data frame in which the dropout was observed). Because participants usually appear in multiple app data frames, the `$info$deleted_cases$full` data frame may contain several entries for each person.

`$unique` = A data frame that contains similar information as the `$full` data frame but with only one row per participant and no information on the data frame in which the dropout was observed.

\$all_end = A table that provides information on the app and page combinations where participants ended the experiment. This table also includes information for participants who did not drop out of the experiment. The \$all_end table is only shown if an all_apps_wide data frame exists.

\$codes = A vector containing the participant codes of all deleted participants.

\$count = The number of all deleted participants.

It is important to note that if only the argument final_pages is set, this function does not distinguish between page names that reoccur in different apps.

If the columns end_app and end_page in the output are empty, these variables were not saved by oTree for the specific participants. This could be because empty rows were not deleted. This can be done by using the argument "del_empty = TRUE" when using import_otree().

Examples

```
# Use package-internal list of oTree data frames
oTree <- gmoTree::oTree

# First, show some row numbers
print(paste(nrow(oTree$all_apps_wide), nrow(oTree$survey),
nrow(oTree$Time), nrow(oTree$Chats)))

# Delete all cases that didn't end the experiment on the page "Demographics"
# within the app "survey"
oTree2 <- delete_dropouts(oTree,
                          final_apps = c("survey"),
                          final_pages = c("Demographics"))

# Show row numbers again
print(paste(nrow(oTree2$all_apps_wide), nrow(oTree2$survey),
nrow(oTree2$Time), nrow(oTree2$Chats)))

# Delete all cases that didn't end the experiment on the page "Demographics"
# This page can be in any app
oTree2 <- delete_dropouts(oTree, final_pages = "Demographics")

# Show row numbers again
print(paste(nrow(oTree2$all_apps_wide), nrow(oTree2$survey),
nrow(oTree2$Time), nrow(oTree2$Chats)))

# Delete all cases that didn't end the experiment on
# any page in the app "survey"
oTree <- delete_dropouts(oTree, final_apps = "survey")

# Show row numbers again
print(paste(nrow(oTree2$all_apps_wide), nrow(oTree2$survey),
nrow(oTree2$Time), nrow(oTree2$Chats)))

# Get list of information on all deleted cases
# (If there is already a list, the new list is added to it!)
oTree2$info$deleted_cases
```

delete_duplicate	<i>Delete duplicate data</i>
------------------	------------------------------

Description

Delete duplicate rows from all oTree app data frames and all_apps_wide.

Usage

```
delete_duplicate(oTree)
```

Arguments

oTree A list of data frames that were created by import_otree().

Value

This function returns a duplicate of the original oTree list of data frames but without duplicate rows in all app data frames and all_apps_wide. This function has no effect on the data frames Time and Chats.

This function does NOT add information to \$info\$deleted_cases, because it does not delete any important information but only cleans up a messy data import.

However, the function adjusts info\$initial_n, if an all_apps_wide data frame exists.

Examples

```
# Set data folder first
withr::with_dir(system.file("extdata", package = "gmoTree"), {

# Import all oTree files in this folder and its subfolders
oTree <- import_otree()
})

# First, show some row numbers
print(paste(nrow(oTree$all_apps_wide), nrow(oTree$survey),
nrow(oTree$Time), nrow(oTree$Chats)))

# Delete duplicate rows
oTree <- delete_duplicate(oTree)

# Show row numbers again
print(paste(nrow(oTree$all_apps_wide), nrow(oTree$survey),
nrow(oTree$Time), nrow(oTree$Chats)))
```

delete_plabels	<i>Delete participant labels in all apps</i>
----------------	--

Description

If you work with MTurk, the MTurk IDs will be stored in the participant labels variable. This function deletes this variable in all_apps_wide and every app data frame in the list of data frames that was created by import_otree() and/or all variables referring to MTurk, such as participant.mturk_worker_id.

Usage

```
delete_plabels(oTree, del_plabel = TRUE, del_mturk = TRUE)
```

Arguments

oTree	A list of data frames that were created by import_otree().
del_plabel	Logical. TRUE if all participant labels should be deleted.
del_mturk	Logical. TRUE if all MTurk variables should be deleted.

Value

This function returns a duplicate of the original oTree list of data frames that do not include the participant labels and/or the MTurk variables.

Examples

```
# Use package-internal list of oTree data frames
oTree <- gmoTree::oTree

# Show participant labels
oTree$all_apps_wide$participant.label
oTree$survey$participant.label

# Delete all participant labels
oTree2 <- delete_plabels(oTree)

# Show participant labels again
oTree2$all_apps_wide$participant.label
oTree2$survey$participant.label
```

delete_sessions	<i>Delete all cases of one session</i>
-----------------	--

Description

Delete cases from specific sessions in all data frames in the oTree list of data frames.

Caution 1: This function does not delete cases from the original CSV and Excel files!

Caution 2: This function does not delete cases from custom exports if the custom exports do not have a variable named participant.code and a variable named session.code!

Usage

```
delete_sessions(oTree, scodes, saved_vars = NULL, reason, info = FALSE)
```

Arguments

oTree	A list of data frames that were created by import_otree().
scodes	Character. The session.code(s) of the session(s) whose data should be removed.
saved_vars	Character. The name(s) of variable(s) that need(s) to be stored in the list of information on deleted cases in \$info\$deleted_cases.
reason	Character. The reason for deletion that should be stored in the list of information on deleted cases in \$info\$deleted_cases.
info	Logical. TRUE if a brief information on the session deletion process should be printed.

Value

This function returns a duplicate of the original oTree list of data frames that do not include the deleted sessions.

It adds information on the deleted cases to \$info\$deleted_cases. (This list is also filled by other functions.)

In this list, you can find the following information:

\$full and \$unique = The data frames \$full and \$unique contain information on all participants whose data were deleted. The entries to the \$full and the \$unique data frames in this list are the same. Columns "end_app" and "end_page" are left empty intentionally because they are only filled by the delete_dropouts() function. Columns "participant.code" and "reason" are filled.

\$codes = A vector containing the participant codes of all deleted participants.

\$count = The number of all deleted participants.

Examples

```

# Use package-internal list of oTree data frames
oTree <- gmoTree::oTree

# First, show some row numbers
print(paste(nrow(oTree$all_apps_wide), nrow(oTree$survey),
nrow(oTree$Time), nrow(oTree$Chats)))

# Delete one session
oTree2 <- delete_sessions(oTree,
  scodes = "7bfqtokx",
  reason = "Only tests")

# Show row numbers
print(paste(nrow(oTree2$all_apps_wide), nrow(oTree2$survey),
nrow(oTree2$Time), nrow(oTree2$Chats)))

# Delete two sessions
oTree2 <- delete_sessions(oTree,
  scodes = c("7bfqtokx", "vd1h01iv"),
  reason = "Only tests")

# Show row numbers again
print(paste(nrow(oTree2$all_apps_wide), nrow(oTree2$survey),
nrow(oTree2$Time), nrow(oTree2$Chats)))

```

extime

Calculate the time that was spent on the whole experiment

Description

Calculate the time spent on the experiment. If not stated otherwise, the calculation only starts at the end of the first page!

Usage

```

extime(
  oTree,
  pcode = NULL,
  plabel = NULL,
  group_id = NULL,
  seconds = FALSE,
  rounded = TRUE,
  digits = 2,
  startat = 1,
  tz = "UTC",
  sinfo = "session_code",
  combine = TRUE
)

```

Arguments

oTree	A list of data frames that were created by import_otree().
pcode	Character. The value of the participant.code variable if the time should only be calculated for one specified participant.
plabel	Character. The value of the participant.label variable if the time should only be calculated for one specified participant.
group_id	Integer. The value of the group_id variable if the time should only be calculated for one specified group. The group_id variable can be created with make_ids().
seconds	Logical. TRUE if the output should be in seconds instead of minutes.
rounded	Logical. TRUE if the output should be rounded.
digits	Integer. The number of digits to which the output should be rounded. This parameter has no effect unless rounded = TRUE.
startat	Integer or character string "real". Whether the start of the experiment should be taken from the time at a certain index of each person's vector of page_indexes in the Time data frame or from the "time_started" variable in all_apps_wide ("real"). Important: If integer, it represents the position within the page index sequence, not the numeric value of the page_index variable.
tz	Character. Time zone.
sinfo	Character. "session_id" to use session ID for additional information in the data frame of single durations, "session_code" to use session codes, or NULL if no session column should be shown.
combine	Logical. TRUE if all variables referring to epoch time should be merged, and all variables referring to participant code should be merged in case data of several versions of oTree are used. If FALSE, the function returns an error if several oTree versions' data are present.

Value

This function returns either a single value if only the data of one person is calculated or a list of information on the time several participants spent on the experiment.

In this list, you can find the following information:

\$mean_duration = The experiment's average duration.

\$min_duration = The experiment's minimum duration.

\$max_duration = The experiment's maximum duration.

\$single_durations = A data frame of all durations that are used for calculating the min, max, and mean duration.

\$messages = All important notes to the calculations.

\$only_one_page = A vector of all individuals who only have one time stamp.

Examples

```
# Use package-internal list of oTree data frames
oTree <- gmoTree::oTree

# Show time for one participant
extime(oTree, pcode = "wk247s9w")

# Make a data frame of durations
extime(oTree)

# Make a data frame of durations (beginning from the end of the second page)
extime(oTree, startat = 2)
```

import_otree

Import oTree data

Description

Import data files that were created by oTree. All files containing the pattern YYYY-MM-DD at the end of their file names are considered oTree files. Bot outputs are saved by oTree without the date included. Hence, to import bot data, you must either rename the original bot files using the YYYY-MM-DD format or use the argument "onlybots = TRUE." By using the second option, only data of bot files are imported.

Caution! Data can be downloaded from within the session and globally at the same time. If both files are downloaded, this can lead to the all_apps_wide data being there twice! You can remove duplicate data by using delete_duplicate().

Caution! When importing Excel files, this function does not check for erroneous data structures and will combine all data frames with the same file name patterns. Before using the "CSV = FALSE" argument, clean up your data appropriately.

Usage

```
import_otree(
  path = ".",
  file_names = NULL,
  final_apps = NULL,
  final_pages = NULL,
  recursive = TRUE,
  csv = TRUE,
  onlybots = FALSE,
  del_empty = TRUE,
  info = FALSE,
  encoding = "UTF-8"
)
```


Arguments

path	Character. The path to the files (default is the working directory).
file_names	Character. The name(s) of the file(s) to be imported. If not specified, all files in the path and subfolders are imported.
final_apps	Character. The name(s) of the app(s) at which the participants have to finish the experiment. If the argument final_apps is left empty, you can still call for deleting the participants who did not finish the experiment with delete_dropouts().
final_pages	Character. The name(s) of the page(s) at which the participants have to finish the experiment. If the argument final_pages is left empty, you can still call for deleting the participants who did not finish the experiment with delete_dropouts().
recursive	Logical. TRUE if the files in the path's subfolders should also be imported.
csv	Logical. TRUE if only CSV files should be imported. FALSE if only Excel files should be imported.
onlybots	Logical. TRUE if only bot-created files should be imported.
del_empty	Logical. TRUE if all empty cases should be deleted from the all_apps_wide or normal app data frames (not Time or Chats).
info	Logical. TRUE if a brief information on the data import should be printed.
encoding	Character. Encoding of the CSV files that are imported. Default is "UTF-8".

Value

Returns a list of data frames (one data frame for each app and all_apps_wide) and a list of information on this list of data frames in \$info.

See detailed information on the imported files in \$info\$imported_files.

If all_apps_wide is imported, see the number of imported cases in \$info\$initial_n. In this number, empty rows are already considered. So, if empty rows are deleted with del_empty=TRUE, initial_n counts all rows that are not empty. Cases that are deleted because the participants did not make it to the last page and/or app are not subtracted from this number.

Information: Empty rows are rows without the "participant._current_app_name" variable set. Empty rows are deleted from all app data frames and all_apps_wide when using del_empty=TRUE. Empty rows in the Chats and Time data frames are not deleted.

If old and new oTree versions are combined, the Time data frame contains variables called "participant_code" and "participant__code" (the difference is in the underscores). Caution! If there is an unusual amount of NAs, check if everything got imported correctly. Sometimes, the CSV or Excel file may be corrupted, and all information is only found in one column.

Examples

```
# Set data folder first
withr::with_dir(system.file("extdata", package = "gmoTree"), {

# Import all oTree files in this folder and its subfolders
oTree <- import_otree()
```

```
# Show the structure of the import
str(oTree, max.level = 1)

# Show the names of all imported files
oTree$info$imported_files

# Delete empty cases and delete every case of a person
# who didn't end the experiment in the app "survey"
oTree <- import_otree(
  del_empty = TRUE,
  final_apps = "survey",
  info = TRUE)

# Show the structure of the import
str(oTree, max.level = 1)

# Import bot files
import_otree(
  path = "./bot_data",
  onlybots = TRUE,
  csv = TRUE,
  info = TRUE)

# Show the structure of the import
str(oTree, max.level = 1)

# Import with file names (path separately)
oTree2 <- import_otree(
  del_empty = TRUE,
  path = "./exp_data",
  file_names = c("all_apps_wide-2023-03-27.csv",
                "ChatMessages-2023-03-27.csv",
                "PageTimes-2023-03-27.csv"),
  onlybots = FALSE,
  csv = TRUE,
  info = TRUE)

# Show the structure of the import
str(oTree, max.level = 1)

# Import with file names (without path separately)
oTree2 <- import_otree(
  del_empty = TRUE,
  file_names = c("exp_data/all_apps_wide-2023-03-27.csv",
                "exp_data/ChatMessages-2023-03-27.csv",
                "exp_data/PageTimes-2023-03-27.csv"),
  onlybots = FALSE,
  csv = TRUE,
  info = TRUE)

# Show the structure of the import
str(oTree, max.level = 1)
})
```

 make_ids

Make IDs

Description

Make session IDs and, optionally, group IDs and participant IDs that span across all data frames created by `import_otree()`. Information for these IDs is taken from `all_apps_wide` but can be defined otherwise.

Note: Older versions of oTree may already contain a variable called `session_id` in their Time data frames. This variable is overwritten by this function!

Important: Combine duplicate data before running this function!

Usage

```
make_ids(
  oTree,
  gmake = FALSE,
  pmake = TRUE,
  from_app = "all_apps_wide",
  from_var = NULL,
  sstart = 1,
  gstart = 1,
  pstart = 1,
  emptyrows = NULL,
  icw = FALSE
)
```

Arguments

<code>oTree</code>	A list of data frames that were created by <code>import_otree()</code> .
<code>gmake</code>	Logical. TRUE if a variable called <code>group_id</code> should be made. If <code>from_var</code> is not NULL, <code>gmake</code> is automatically set to TRUE.
<code>pmake</code>	Logical. TRUE if a variable called <code>participant_id</code> should be made.
<code>from_app</code>	Character. Name of the data frame from which the session, group, and participant information should be taken. All normal app data frames and <code>all_apps_wide</code> are allowed.
<code>from_var</code>	Character. Name of the variable from which the group information should be taken. This argument is only relevant when <code>all_apps_wide</code> is used as <code>from_app</code> and has group information that contradicts each other.
<code>sstart</code>	Integer. The number that serves as a starting point for session IDs.
<code>gstart</code>	Integer. The number that serves as a starting point for group IDs.
<code>pstart</code>	Integer. The number that serves as a starting point for participant IDs.

emptyrows	Character. "no" if the function should stop if there are empty rows in from_app. "yes" if the function should continue to make IDs.
icw	Logical. TRUE if the warning message should be ignored that states that IDs cannot be made because of an oTree bug.

Value

ID variables are made in all_apps_wide, all app data frames, the Time data frame, and the Chats data frame. See list of the additional ID variables in \$info\$additional_variables.

Examples

```
# Use package-internal list of oTree data frames
oTree <- gmoTree::oTree

# Make session IDs only
oTree2 <- make_ids(oTree)

# Show new variables
oTree2$all_apps_wide$session_id

# Make session IDs and group IDs
# Not working with this data set because group ID is not the same in all apps
## Not run:
oTree2 <- make_ids(oTree, gmake = TRUE)

# Show new variables
oTree2$all_apps_wide$session_id
oTree2$all_apps_wide$group_id

## End(Not run)

# Get IDs from variable "dictator.1.group.id_in_subsession"
# in the data frame "all_apps_wide"
oTree2 <- make_ids(oTree,
                  gmake = TRUE,
                  from_var = "dictator.1.group.id_in_subsession")

# Show new variables
oTree2$all_apps_wide$session_id
oTree2$all_apps_wide$group_id

# Get IDs from another app than all_apps_wide
oTree2 <- make_ids(oTree, gmake = TRUE, from_app = "dictator")

# Show new variables
oTree2$all_apps_wide$session_id
oTree2$all_apps_wide$group_id
```

`messy_chat`*Check if the Chats data frame is messy*

Description

Check if the Chats data frame includes both session-related variables and participant-related variables that appear multiple times. This may occur when data from different oTree versions, which use different variable names, are combined.

If desired, the function can merge these variables, storing the data using the newer oTree version's variable names and removing the outdated variables.

Usage

```
messy_chat(  
  oTree,  
  combine = FALSE,  
  session = TRUE,  
  participant = TRUE,  
  info = FALSE  
)
```

Arguments

<code>oTree</code>	A list of data frames that were created by <code>import_otree()</code> .
<code>combine</code>	Logical. TRUE if all variables referring to the session code should be merged and/or all variables referring to participant code should be merged in case data of several versions of oTree are used.
<code>session</code>	Logical. TRUE if all variables referring to the session code should be checked and merged. Merging only works if <code>combine = TRUE</code> .
<code>participant</code>	Logical. TRUE if all variables referring to the participant code should be checked and merged. Merging only works if <code>combine = TRUE</code> .
<code>info</code>	Logical. TRUE if a brief information on the process should be printed.

Value

This function returns an oTree list of data frames that is an exact copy of the original oTree list of data frames but - if the user wishes to do so - combines the participant code and session code variables in the Chats data frame if several variables are referring to those because of the combination of different oTree versions. The final variables are called `participant_code` and `session_code`.

If `combine = FALSE`, the function only checks for the existence of several variables referring to the participant code and session code and throws an error if yes.

Examples

```
# Set data folder first
withr::with_dir(system.file("extdata", package = "gmoTree"), {

# Import all oTree files in this folder and its subfolders
oTree <- import_otree()
})

# Show all Chats column names
print(colnames(oTree$Chats))

# Run function
oTree <- messy_chat(oTree, combine = TRUE)

# Show all Chats column names again
print(colnames(oTree$Chats))
```

messy_time

Check if the Time data frame is messy

Description

Check if the Time data frame includes both participant-related variables and time stamp variables that appear multiple times. This may occur when data from different oTree versions, which use different variable names, are combined.

If desired, the function can merge these variables, storing the data using the newer oTree version's variable names and removing the outdated variables.

Usage

```
messy_time(
  oTree,
  combine = FALSE,
  epoch_time = TRUE,
  participant = TRUE,
  info = FALSE
)
```

Arguments

oTree	A list of data frames that were created by <code>import_otree()</code> .
combine	Logical. TRUE if all variables referring to epoch time should be merged and/or all variables referring to participant code should be merged in case data of several versions of oTree are used.

epoch_time	Logical. TRUE if all variables referring to the time stamp should be checked and merged. Only works if combine = TRUE.
participant	Logical. TRUE if all variables referring to the participant code should be checked and merged. Only works if combine = TRUE.
info	Logical. TRUE if a brief information on the process should be printed.

Value

This function returns an oTree list of data frames that is an exact copy of the original oTree list of data frames but - if the user wishes to do so - combines the time tamps and participant codes in the Time data frame if several variables are referring to those because of the combination of different oTree versions. The final variables are called epoch_time_completed and participant_code.

If combine = FALSE, the function only checks for the existence of several variables referring to the time stamp or the participant code and throws an error if yes.

Examples

```
# Set data folder first
withr::with_dir(system.file("extdata", package = "gmoTree"), {

# Import all oTree files in this folder and its subfolders
oTree <- import_otree()
})

# Show all Time column names
print(colnames(oTree$Time))

# Run function
oTree <- messy_time(oTree, combine = TRUE)

# Show all Time column names again
print(colnames(oTree$Time))
```

oTree

Sample experiment data

Description

Sample experiment data

Usage

oTree

Format

A list of data frames created by import_otree().

Source

The data set was created by using modified versions of the official oTree sample experiments that can be downloaded when installing oTree. In detail, the following apps were used: "dictator," "chatapp," "survey."

pagesec

Calculate the seconds spent on each page

Description

Create a new variable in the Time data frame that contains the time spent on each page.

Usage

```
pagesec(oTree, rounded = TRUE, digits = 2, minutes = FALSE, combine = FALSE)
```

Arguments

oTree	A list of data frames that were created by <code>import_otree()</code> .
rounded	Logical. TRUE if the output should be rounded.
digits	Integer. The number of digits to which the output should be rounded. This parameter has no effect unless <code>rounded = TRUE</code> .
minutes	Logical. TRUE if the output should be minutes instead of seconds.
combine	Logical. TRUE if all variables referring to epoch time should be merged, and all variables referring to participant code should be merged in case data of several versions of oTree are used.

Value

This function returns a duplicate of the original oTree list of data frames that also contains a column in the Time data frame named `seconds_on_page2` or `minutes_on_page`.

Examples

```
# Use package-internal list of oTree data frames
oTree <- gmoTree::oTree

# Create two new columns: seconds_on_page2 and minutes_on_page
oTree <- pagesec(oTree, rounded = TRUE, minutes = TRUE)

# Show the Time data frame
head(oTree$Time, n = 30)
```

show_constant	<i>Show constant columns</i>
---------------	------------------------------

Description

Show all columns with no variation in their values for each data frame in the oTree list of data frames (except the ones in the info list). This function is helpful before running an experiment to check if there are unnecessary variables. You can check for columns that have any unchanging possible value or for columns containing only a specific value.

Usage

```
show_constant(oTree, value = "any")
```

Arguments

oTree	A list of data frames that were created by import_otree().
value	The value that is controlled to be the same within a column. The default is NA. If the value is set to "any," the function checks for columns where any possible values are identical.

Value

This function returns a list of vectors, one for each app, all_apps_wide, the Time and/or the Chats data frame. Each vector contains the names of all variables with constant values. If there are no variables with constant values, the vector is empty.

Examples

```
# Use package-internal list of oTree data frames
oTree <- gmoTree::oTree

# Show all columns that contain only NAs
show_constant(oTree = oTree)
show_constant(oTree = oTree, value = NA)

# Show all columns that contain only -99
show_constant(oTree = oTree, value = -99)
```

show_dropouts	<i>Show participants who did not finish the experiment</i>
---------------	--

Description

Show information on the people who did not finish the experiment at (a) certain page(s) and/or app(s).

Usage

```
show_dropouts(oTree, final_apps = NULL, final_pages = NULL, saved_vars = NULL)
```

Arguments

<code>oTree</code>	A list of data frames that were created by <code>import_otree()</code> .
<code>final_apps</code>	Character. The name(s) of the app(s) at which the participants have to finish the experiment.
<code>final_pages</code>	Character. The name(s) of the page(s) at which the participants have to finish the experiment.
<code>saved_vars</code>	The name(s) of variable(s) that need(s) to be shown in the list of information on dropout cases.

Value

This function returns a list of information on participants who did not finish the experiment.

In this list, you can find the following information:

`$full` = A data frame that contains information on all participants who did not finish the study; it shows their participant codes, the names of the apps in which they left the experiment, the names of the pages in which they left the experiment, the names of the app data frames in which this information was found, and the dropout reason ("ENC," experiment not completed, combined with the name of the data frame in which the dropout was observed). Because participants usually appear in multiple app data frames, the `$full` data frame may contain several entries for each person.

`$unique` = A data frame that contains similar information as the `$full` data frame but with only one row per participant and no information on the data frame in which the dropout was observed.

`$all_end` = A table that provides information on the app and page combinations where participants ended the experiment. This table also includes information on participants who did not drop out of the experiment. The `$all_end` table is only shown if an `all_apps_wide` data frame exists.

`$codes` = A vector containing the participant codes of all participants who did not finish the experiment.

`$count` = The number of all participants who did not finish the experiment.

It is important to note that if only the argument `final_pages` is set, this function does not distinguish between page names that reoccur in different apps.

If the columns `end_app` and `end_page` in the output are empty, these variables were not saved by `oTree` for the specific participants. This could be because empty rows were not deleted. This can be done by using the argument `"del_empty = TRUE"` when using `import_otree()`.

Examples

```
# Use package-internal list of oTree data frames
oTree <- gmoTree::oTree

# Show everyone who did not finish with the app "survey"
show_dropouts(oTree, final_apps = "survey")

# Show everyone who did not finish with the page "Demographics"
show_dropouts(oTree, final_pages = "Demographics")

# Show everyone who finished with the following apps: "survey," "dictator"
final_apps <- unique(oTree$all_apps_wide$participant._current_app_name)
final_apps <- final_apps[final_apps != "survey"]
final_apps <- final_apps[final_apps != "dictator"]
show_dropouts(oTree, final_apps = final_apps)
```

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