Package 'uwinr'

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Type Package

Title An R package to query and summarize camera trap data from the Urban Wildlife Information Network (UWIN) database

Version 0.1.0

Author Mason Fidino

Maintainer Mason Fidino <mfidino@lpzoo.org>

Description An R package to query and summarize camera trap data from the Urban Wildlife Information Network (UWIN) database. Furthermore, uwinr provides a number of quality assurance / quality control checks to ensure that data has been entered correctly.

License GPL-2

Encoding UTF-8

LazyData true

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GithubRef master

GithubSHA1 12d06e472e9c0ba1e94dc338d4c2b9af9e44d352

R topics documented:

`censor_photos` *Remove UWIN Images With Faulty Timestamps*

Description

`censor_photos` removes photos from the `'Photos'` table and associated detections from the `'Detections'` table if the time stamp on the photo is > 7 days before a camera was set at a site or > 7 days after a camera was pulled at a site. These latter values are stored in the `'Visits'` table.

Usage

```
censor_photos(uwin_data = NULL)
```

Arguments

`uwin_data`	The list object returned from `collect_tables`.

Details

This function requires the following tables in the list object to work : `'Photos'`, `'Detections'`, and `'Visits'`.

Furthermore, `do_qaqc` must be applied to the uwin list object before photos can be summarised.

@importFrom magrittr @importFrom dplyr left_join select one_of

Value

Returns the list object, but with offending photos and detections removed from their respective tables. This also will update the active dates within the 'Visits' table

Examples

```
# check for errors
uwin_list <- do_qaqc(uwin_test)

# censor the photos
uwin_list <- censor_photos(uwin_data = uwin_list)
```

`collect_tables` *Collect tables from UWIN database*

Description

`collect_tables` uses the RODBC package to connect to the UWIN database and collect the requested tables.

Note: For this function to work the Microsoft Access Database Engine must be installed. It can be found here.

Usage

```
collect_tables(database = NULL, tables = NULL)
```

Arguments

`database`	File name of the UWIN Access database as a character vector. If `database` does contain an absolute path, the file name is relative to the current working directory.
`tables`	A character vector of the table names to be pulled from the UWIN database. If this argument is left blank than `tables` is set to `c("CameraLocations", "Detections", "Photos",`

Value

A named list of tables from the UWIN database. Each table will be returned as a `data.table` instead of a `data.frame`, as this considerably speeds up summarizing these data.

Author(s)

Mason Fidino

Examples

```
# not run: dat <- collect_tables("UWIN_DB_CHIL.accdb")
# not run: dat <- collect_tables("UWIN_DB_CHIL.accdb", tables = c("Photos", "Visits"))
```

`create_detection_matrix`
Create species detection non-detection matrix

Description

Create species detection non-detection matrix

Usage

```
create_detection_matrix(uwin_data = NULL, observation_matrix = NULL,
  binomial_detections = FALSE, select_species = TRUE, species = NULL)
```

Arguments

uwin_data	The list object returned from collect_tables and after it has been through do_qaqc and reduced to the seasons of interest via reduce_seasons.
observation_matrix	The list object returned by create_observation_matrix.
binomial_detections	If TRUE, create_detection_matrix will return the total number of days a species was observed at a site. If FALSE, create_detection_matrix will return a vector of binary elements that take the value of 1 if a species was observed on a given day, 0 if it was not, or NA if the camera was not operable.
select_species	If TRUE, a pop-up list will open up that you can use to select the species you would like to make a detection matrix for. You can hold Ctrl to select multiple species that are seperated by other species you do not want to make a detection matrix for. Defaults to TRUE.
species	A vector of the species names from the ShortName column of the Species table within the UWIN database. If left NULL and select_species = FALSE then a detection matrix will be made for each species in the Species table.

Value

A list with three elements. The first element, mat, contains a survey ID (i.e., site-season-year abbreviation). The second element, days_active, is a vector of the days that camera traps were active in a given season. The final element, binom_mat is the total number of days a camera trap was active on a given season.

Examples

```
# apply qaqc
dat <- do_qaqc(uwin_test)

# collect only one season of data
dat <- reduce_seasons(dat, start = "JU17")

# make observation matrix
obser_matrix <- create_observation_matrix(dat)

# make a detection matrix
detect_matrix <- create_detection_matrix(dat, obser_matrix, species = "raccoon")
```

---

create_observation_matrix

The number of days each camera trap is operable per season

Description

The number of days each camera trap is operable per season

Usage

```
create_observation_matrix(uwin_data = NULL, drop_tails = FALSE)
```

Arguments

uwin_data	The list object returned from collect_tables and after it has been through do_qaqc . If the Visits table is not within this object an error will occur.
drop_tails	This will check if the date range for a site taken from the camera trap images occurs between when the camera set date and camera pull date entered into the Visits table of the UWIN database. If the date range is > 7 days before the first recorded camera set for a sampling season or > 7 days after the last recorded camera pull for a sampling season then those days will be removed from the analysis.

Value

A list with 3 elements. The first element, mat, contains either a survey ID (i.e., site-season-year abbrevaition) by date matrix if binomial_detections = FALSE or a named vector of the number of days each survey ID was active. The second element, days_active, is a vector of the days that camera traps were active in a given season. The final element, binom_mat, is a binomial version of the mat element (i.e., the rowSums from mat).

Examples

```
# apply qaqc
dat <- do_qaqc(uwin_test)

# collect only one season of data
dat <- reduce_seasons(dat, start = "JU17")

# make observation matrix
obser_matrix <- create_observation_matrix(dat)
```

---

do_qaqc *Quality assurance / quality control for UWIN database*

Description

do_qaqc is a utility function that calls all other QA/QC functions available in uwinr for the tables that are loaded via collect_tables. Currently, the tables where QA/QC functions exist include: Visits (visits_qaqc) and Photos (photos_qaqc).

Usage

```
do_qaqc(uwin_data = NULL, show_error_file = TRUE)
```

Arguments

uwin_data	The list object returned from collect_tables.
show_error_file	If TRUE, then an error report will be opened up if there are errors in the UWIN database. This error report will direct you to a number of csv files within an errors sub-folder within your working directory.

Value

Returns the list object from collect_tables. Furthermore, this function will create a sub-folder in your working directory titlederror_reports if it does not exist and populate thatsub-folder with an error report titled error_report_DATE.txt where DATE is the current date called via Sys.Date. This error report will describe potential issues with the data in your UWIN database and point you out to a number of csv files that further describe these errors.

Author(s)

Mason Fidino

Examples

```
# do qaqc, assuming you had loaded data with collect_tables
uwin_list <- do_qaqc(uwin_test)
```

---

photos_qaqc *Check 'Photos' table for errors*

Description

photos_qaqc looks for errors in the timestamps of the photos uploaded into the UWIN database. The 'Visits' table must also be present in the list object supplied by collect_tables as the timestamps are compared to the set and pull records in this table.

Usage

```
photos_qaqc(uwin_data = NULL, file_conn = NULL)
```

Arguments

uwin_data	The list object returned from collect_tables. If the Photos and Visits table is not within this object an error will occur.
file_conn	The file path in which to write errors to supplied as a character string. This argument is managed automatically if do_qaqc is called instead. If left NULL then visits_qaqc will create a error_reports sub-folder in the working directory and populate it with an error report titled error_report_DATE.txt where DATE is the current date called via Sys.Date

Author(s)

Mason Fidino

Examples

```
uwin_list <- photos_qaqc(uwin_data = uwin_test)
```

`reduce_seasons` *Query data within two sampling periods*

Description

`reduce_seasons` queries data for a single season or between two seasons depending on how arguments are filled.

Usage

```
reduce_seasons(uwin_data = NULL, start = NULL, end = NULL)
```

Arguments

`uwin_data`	The list object returned from `collect_tables`.
`start`	A character vector that contains the first sampling period and year that you would like to query. `start` must be 4 characters long with the first two characters denoting the sampling season and the last two characters denoting the year (e.g., April 2017 would be `"AP17"`).
`end`	A character vector that contains the last sampling period and year that you would like to query. `start` must be 4 characters long with the first two characters denoting the sampling season and the last two characters denoting the year (e.g., April 2017 would be `"AP17"`). If only querying one season of data `end` should be left as `NULL`.

Value

Returns the list object from `collect_tables` with data from either a single season (if `end` is left NULL) or with data that lie between the sampling periods specified in `start` and `end`. Note that this only queries data in the Visits, Photos, and Detections table within the Access database.

Author(s)

Mason Fidino

Examples

```
dat <- do_qaqc(uwin_test)
dat <- reduce_seasons(dat, start = "JA16", end = "JU17")

# if only collecting data from one season.

dat <- do_qaqc(uwin_test)
dat <- reduce_seasons(dat, start = "JA16")
```

uwin_test *A sample of the Chicago UWIN database*

Description

A list object that is a small subset of the Chicago UWIN database. This is used so that the examples in the help files are executable.

Usage

```
uwin_test
```

Format

A list object of length 8.

Detections A data.table with 6698 rows and 6 columns. Contains info on the species observed within a photo.

Photos A data.table with 26360 rows and 3 columns. Used to link detections to a particular image, which can then be linked to a camera deployment.

Species A data.table with 30 rows and 5 columns. Links species common names to a unique numeric ID used wtihin the database.

Visits A data.table with 139 rows and 13 columns. Holds data for given camera deployment.

lkupAction A lookup table that links actions taken during a camera trap deployment to a numeric ID.

lkupDetecitonStatus A lookup that that links what happened to a camera trap during a deployment to a numeric ID

lkupSeasons A lookup table that links the season a camera was deployed to a numeric ID.

lkupVisitTypes A lookup table that links the type of deployment events (i.e., camera set, camera check, and camera pull) to a numeric ID.

@source A whole bunch of camera trapping

Details

Detections

visits_qaqc *Check 'Visits' table for errors*

Description

visits_qaqc looks for data entry errors in the 'Visits' table in the UWIN database.

Usage

```
visits_qaqc(uwin_data = NULL, file_conn = NULL)
```

Arguments

uwin_data	The list object returned from collect_tables. If the Visits table is not within this object an error will occur.
file_conn	The file path in which to write errors to supplied as a character string. This argument is managed automatically if do_qaqc is called instead. If left NULL then visits_qaqc will create a error_reports sub-folder in the working directory and populate it with an error report titled error_report_DATE.txt where DATE is the current date called via Sys.Date

Value

Returns uwin_data, will stop if data is not correctly entered and stop_on_error is TRUE.

visits_qaqc also creates a new column in the visits table titled SurveyID which concatenates the LocationID, SeasonID, and year from VisitDate, seperated by a dash (e.g., "449-4-17").

Author(s)

Mason Fidino

Examples

```
uwin_list <- visits_qaqc(uwin_data = uwin_test)
```

Index