Package 'CohortDiagnostics'

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Type Package

Title Diagnostics for OHDSI Studies

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Maintainer Gowtham Rao <gowthamrao@gmail.com>

Description
Diagnostics for studies that use the OMOP Common Data Model and the OHDSI tools.

Depends DatabaseConnector (¿= 3.0.0),
R (¿= 3.5.0)

Imports Andromeda,
checkmate,
digest,
dplyr (¿= 1.0.0),
FeatureExtraction (¿= 3.0.1),
ggplot2,
ParallelLogger (¿= 2.0.0),
readr,
rlang,
RJSONIO,
ROhdsiWebApi (¿= 1.0.0),
SqlRender (¿= 1.6.7),
stringr,
tibble (¿= 3.0.0),
tidyr (¿= 1.0.0)

Suggests DT,
Eunomia,
RSQLite (¿ 2.2.0),
htmltools,
knitr,
plotly,
RColorBrewer,
rmarkdown,
scales,
shiny,
shinydashboard,
VennDiagram,
testthat

Remotes ohdsi/Eunomia,
  ohdsi/FeatureExtraction,
  ohdsi/ROhdsiWebApi,
  ohdsi/SqlRender,
  r-dbi/RSQLite

License Apache License

VignetteBuilder knitr

URL https://ohdsi.github.io/CohortDiagnostics, https://github.com/OHDSI/CohortDiagnostics

BugReports https://github.com/OHDSI/CohortDiagnostics/issues

RoxygenNote 7.1.1

Encoding UTF-8

Language en-US

R **topics documented:**

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breakDownIndexEvents   *Break down index events*

Description

For the concepts included in the index event definition, count how often they are encountered at the cohort index date.

Usage

```
breakDownIndexEvents(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortDatabaseSchema = cdmDatabaseSchema,
  cohortTable = "cohort",
  baseUrl = NULL,
  webApiCohortId = NULL,
  cohortJson = NULL,
  cohortSql = NULL,
  cohortId = cohortId
)
```

Arguments

connectionDetails

An object of type `connectionDetails` as created using the [createConnectionDetails](#) function in the DatabaseConnector package. Can be left NULL if `connection` is provided.

connection   An object of type `connection` as created using the [connect](#) function in the DatabaseConnector package. Can be left NULL if `connectionDetails` is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cdmDatabaseSchema

Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.

oracleTempSchema

Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.

cohortDatabaseSchema

Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.

cohortTable   Name of the cohort table.

baseUrl   The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Needn't be provided if `cohortJson` and `cohortSql` are provided.

webApiCohortId   The ID of the cohort in the WebAPI instance. Needn't be provided if `cohortJson` and `cohortSql` are provided.

cohortJson	A character string containing the JSON of a cohort definition. Needn't be provided if `baseUrl` and `cohortId` are provided.
cohortSql	The OHDSI SQL representation of the same cohort definition. Needn't be provided if `baseUrl` and `cohortId` are provided.
cohortId	The cohort definition ID used to reference the cohort in the cohort table.

Value

A data frame with concepts, and per concept the count of how often the concept was encountered at the index date.

---

compareCohortCharacteristics

Compare cohort characteristics

Description

Compare the characteristics of two cohorts, computing the standardized difference of the mean.

Usage

```
compareCohortCharacteristics(characteristics1, characteristics2)
```

Arguments

characteristics1
> Characteristics of the first cohort, as created using the `getCohortCharacteristics` function.

characteristics2
> Characteristics of the second cohort, as created using the `getCohortCharacteristics` function.

Value

A data frame comparing the characteristics of the two cohorts.

---

computeCohortOverlap   *Compute overlap between two cohorts*

Description

Computes the overlap between a target and a comparator cohort.

Usage

```
computeCohortOverlap(
  connectionDetails = NULL,
  connection = NULL,
  cohortDatabaseSchema,
  cohortTable = "cohort",
  targetCohortId,
  comparatorCohortId
)
```

Arguments

connectionDetails

> An object of type connectionDetails as created using the createConnectionDetails function in the DatabaseConnector package. Can be left NULL if connection is provided.

connection   An object of type connection as created using the connect function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cohortDatabaseSchema

> Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.

cohortTable   Name of the cohort table.

targetCohortId The cohort definition ID used to reference the target cohort in the cohort table.

comparatorCohortId

> The cohort definition ID used to reference the comparator cohort in the cohort table.

Value

A data frame with overlap statistics.

---

createCohortTable   *Create cohort table(s)*

Description

This function creates an empty cohort table. Optionally, additional empty tables are created to store statistics on the various inclusion criteria.

Usage

```
createCohortTable(
  connectionDetails = NULL,
  connection = NULL,
  cohortDatabaseSchema,
  cohortTable = "cohort",
```

```
  createInclusionStatsTables = FALSE,
  resultsDatabaseSchema = cohortDatabaseSchema,
  cohortInclusionTable = paste0(cohortTable, "_inclusion"),
  cohortInclusionResultTable = paste0(cohortTable, "_inclusion_result"),
  cohortInclusionStatsTable = paste0(cohortTable, "_inclusion_stats"),
  cohortSummaryStatsTable = paste0(cohortTable, "_summary_stats")
)
```

Arguments

connectionDetails

> An object of type connectionDetails as created using the createConnectionDetails function in the DatabaseConnector package. Can be left NULL if connection is provided.

connection   An object of type connection as created using the connect function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cohortDatabaseSchema

> Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.

cohortTable   Name of the cohort table.

createInclusionStatsTables

> Create the four additional tables for storing inclusion rule statistics?

resultsDatabaseSchema

> Schema name where the statistics tables reside. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.

cohortInclusionTable

> Name of the inclusion table, one of the tables for storing inclusion rule statistics.

cohortInclusionResultTable

> Name of the inclusion result table, one of the tables for storing inclusion rule statistics.

cohortInclusionStatsTable

> Name of the inclusion stats table, one of the tables for storing inclusion rule statistics.

cohortSummaryStatsTable

> Name of the summary stats table, one of the tables for storing inclusion rule statistics.

---

createConceptCountsTable

Create concept counts table

Description

Create a table with counts of how often each concept ID occurs in the CDM.

Usage

```
createConceptCountsTable(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  conceptCountsDatabaseSchema = cdmDatabaseSchema,
  conceptCountsTable = "concept_counts",
  conceptCountsTableIsTemp = FALSE
)
```

Arguments

connectionDetails

> An object of type connectionDetails as created using the createConnectionDetails function in the DatabaseConnector package. Can be left NULL if connection is provided.

connection An object of type connection as created using the connect function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cdmDatabaseSchema

> Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.

oracleTempSchema

> Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.

conceptCountsDatabaseSchema

> Schema name where your concept counts table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'. Ignored if conceptCountsTableIsTemp = TRUE.

conceptCountsTable

> Name of the concept counts table. This table can be created using the createConceptCountsTable.

conceptCountsTableIsTemp

> Is the concept counts table a temp table?

---

extractConceptSetsJsonFromCohortJson

Extract concept set json from cohort json

Description

Extracts json that corresponds to the conceptset definition in a cohort json definition

Usage

```
extractConceptSetsJsonFromCohortJson(cohortJson)
```

Arguments

cohortJson   Complete JSON specification of cohort definition. The standard form is
                  generated by WebApi

Value

The function will return a tibble data frame object with one row per conceptSet id in cohort
definition.

Examples

```
## Not run:
conceptSetsJson <- extractConceptSetsJsonFromCohortJson(cohortJson = json)

## End(Not run)
```

---

extractConceptSetsSqlFromCohortSql

Extract concept set sql from cohort generation SQL

Description

Extracts SQL that corresponds to the conceptset (codeset) part from cohort generation
SQL used to instantiated conceptSets during cohort construction.

Usage

```
extractConceptSetsSqlFromCohortSql(cohortSql)
```

Arguments

cohortSql   Complete SQL specification of cohort definition in OHDSI SQL dialect.
                  May contain parameters designed to be replaced by SqlRender. The stan-
                  dard form SQL is generated using circe-be by WebApi and Atlas

Value

The function will return a tibble data frame object with one row per concept id and concept
set combination in cohort definition.

Examples

```
## Not run:
conceptSetSql <- extractConceptSetsSqlFromCohortSql(cohortSql = sql)

## End(Not run)
```

---

findCohortIncludedSourceConcepts

Check source codes used in a cohort definition

Description

This function first extracts all concept sets used in a cohort definition. Then, for each concept set the concept found in the CDM database the contributing source codes are identified.

Usage

```
findCohortIncludedSourceConcepts(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  baseUrl = NULL,
  webApiCohortId = NULL,
  cohortJson = NULL,
  cohortSql = NULL,
  byMonth = FALSE,
  useSourceValues = FALSE
)
```

Arguments

connectionDetails

An object of type `connectionDetails` as created using the `createConnectionDetails` function in the DatabaseConnector package. Can be left NULL if `connection` is provided.

connection
An object of type `connection` as created using the `connect` function in the DatabaseConnector package. Can be left NULL if `connectionDetails` is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cdmDatabaseSchema

Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.

oracleTempSchema

Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.

baseUrl
The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Needn't be provided if `cohortJson` and `cohortSql` are provided.

webApiCohortId The ID of the cohort in the WebAPI instance. Needn't be provided if `cohortJson` and `cohortSql` are provided.

cohortJson
A character string containing the JSON of a cohort definition. Needn't be provided if `baseUrl` and `cohortId` are provided.

cohortSql
The OHDSI SQL representation of the same cohort definition. Needn't be provided if `baseUrl` and `cohortId` are provided.

byMonth   Compute counts by month? If FALSE, only overall counts are computed.

useSourceValues

Use the source_value fields to find the codes used in the data? If not, this analysis will rely entirely on the source_concept_id fields instead. Note that, depending on the source data and ETL, it might be possible for the source_value fields to contain patient-identifiable information by accident.

Value

A data frame with source codes, with counts per domain how often the code was encountered in the CDM.

---

findCohortOrphanConcepts

Find orphan concepts for all concept sets in a cohort

Description

Searches for concepts that should belong to the concept sets in a cohort definition but don't, for example because of missing source-to-standard concept maps, or erroneous hierarchical relationships.

Usage

```
findCohortOrphanConcepts(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  baseUrl = NULL,
  webApiCohortId = NULL,
  cohortJson = NULL,
  conceptCountsDatabaseSchema = cdmDatabaseSchema,
  conceptCountsTable = "concept_counts",
  conceptCountsTableIsTemp = FALSE
)
```

Arguments

connectionDetails

An object of type connectionDetails as created using the [createConnectionDetails](#) function in the DatabaseConnector package. Can be left NULL if connection is provided.

connection   An object of type connection as created using the [connect](#) function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cdmDatabaseSchema

Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.

oracleTempSchema

>Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.

baseUrl
>The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Needn't be provided if `cohortJson` is provided.

webApiCohortId The ID of the cohort in the WebAPI instance. Needn't be provided if `cohortJson` is provided.

cohortJson
>A character string containing the JSON of a cohort definition. Needn't be provided if `baseUrl` and `webApiCohortId` are provided.

conceptCountsDatabaseSchema

>Schema name where your concept counts table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'. Ignored if `conceptCountsTableIsTemp = TRUE`.

conceptCountsTable

>Name of the concept counts table. This table can be created using the createConceptCountsTable.

conceptCountsTableIsTemp

>Is the concept counts table a temp table?

Details

Logically, this function performs the following steps for each concept set expression in the cohort definition:

- Given the concept set expression, find all included concepts.

- Find all names of the input concepts, including synonyms, and the names of source concepts that map to them.

- Search for concepts (standard and source) that contain any of those names as substring.

- Filter those concepts to those that are not in the original set of concepts (i.e. orphans).

- Restrict the set of orphan concepts to those that appear in the CDM database and across network concept prevalence (as either source concept or standard concept).

Value

A data frame with orphan concepts, with counts how often the code was encountered in the CDM.

---

findOrphanConcepts *Find (source) concepts that do not roll up to their ancestor(s)*

Description

Searches for concepts that should belong to the set of concepts but don't, for example because of missing source-to-standard concept maps, or erroneous hierarchical relationships.

Usage

```
findOrphanConcepts(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  conceptIds,
  conceptCountsDatabaseSchema = cdmDatabaseSchema,
  conceptCountsTable = "concept_counts",
  conceptCountsTableIsTemp = FALSE
)
```

Arguments

connectionDetails
> An object of type `connectionDetails` as created using the `createConnectionDetails` function in the DatabaseConnector package. Can be left NULL if `connection` is provided.

connection
> An object of type `connection` as created using the `connect` function in the DatabaseConnector package. Can be left NULL if `connectionDetails` is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cdmDatabaseSchema
> Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.

oracleTempSchema
> Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.

conceptIds   A vector of concept IDs for which we want to find orphans.

conceptCountsDatabaseSchema
> Schema name where your concept counts table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'. Ignored if `conceptCountsTableIsTemp = TRUE`.

conceptCountsTable
> Name of the concept counts table. This table can be created using the `createConceptCountsTable`.

conceptCountsTableIsTemp
> Is the concept counts table a temp table?

Details

Logically, this function performs the following steps for the input set of concept IDs:

- Find all names of the input concepts, including synonyms, and the names of source concepts that map to them.

- Search for concepts (standard and source) that contain any of those names as substring.

- Filter those concepts to those that are not in the original set of concepts (i.e. orphans).

- Restrict the set of orphan concepts to those that appear in the CDM database and across network concept prevalence (as either source concept or standard concept).

Value

A data frame with orphan concepts, with counts how often the code was encountered in the CDM.

---

getCohortCharacteristics

Create characterization of a cohort

Description

Computes features using all drugs, conditions, procedures, etc. observed on or prior to the cohort index date.

Usage

```
getCohortCharacteristics(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortDatabaseSchema = cdmDatabaseSchema,
  cohortTable = "cohort",
  cohortId,
  covariateSettings
)
```

Arguments

connectionDetails

An object of type connectionDetails as created using the createConnectionDetails function in the DatabaseConnector package. Can be left NULL if connection is provided.

connection   An object of type connection as created using the connect function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cdmDatabaseSchema

Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.

oracleTempSchema

Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.

cohortDatabaseSchema

Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.

cohortTable   Name of the cohort table.

cohortId   The cohort definition ID used to reference the cohort in the cohort table.

covariateSettings

> Either an object of type covariateSettings as created using one of the
> createCovariate functions in the FeatureExtraction package, or a list of
> such objects.

Value

A data frame with cohort characteristics.

---

getCohortCounts   *Count the cohort(s)*

Description

Computes the subject and entry count per cohort

Usage

```
getCohortCounts(
  connectionDetails = NULL,
  connection = NULL,
  cohortDatabaseSchema,
  cohortTable = "cohort",
  cohortIds = c()
)
```

Arguments

connectionDetails

> An object of type connectionDetails as created using the createConnectionDetails
> function in the DatabaseConnector package. Can be left NULL if connection
> is provided.

connection   An object of type connection as created using the connect function in the
                 DatabaseConnector package. Can be left NULL if connectionDetails is
                 provided, in which case a new connection will be opened at the start of
                 the function, and closed when the function finishes.

cohortDatabaseSchema

> Schema name where your cohort table resides. Note that for SQL Server,
> this should include both the database and schema name, for example
> 'scratch.dbo'.

cohortTable   Name of the cohort table.

cohortIds   The cohort definition ID(s0 used to reference the cohort in the cohort
                 table. If left empty, all cohorts in the table will be included.

Value

A data frame with cohort counts

getCohortsJsonAndSql   *Get cohorts JSON and parameterized OHDSI SQL*

Description

This function may be used to collect a cohorts JSON and OHDSI SQL. Based on whether a baseUrl is available, the function will collect the specifications from either from WebApi or a Package.

Usage

```
getCohortsJsonAndSql(
  packageName = NULL,
  cohortToCreateFile = "settings/CohortsToCreate.csv",
  baseUrl = NULL,
  cohortSetReference = NULL,
  cohortIds = NULL
)
```

Arguments

packageName	The name of the package containing the cohort definitions. Can be left NULL if `baseUrl` and `cohortSetReference` have been specified.
cohortToCreateFile	
	The location of the cohortToCreate file within the package. Is ignored if `baseUrl` and `cohortSetReference` have been specified. The cohortToCreateFile must be .csv file that is expected to be read into a dataframe object identical to requirements for `cohortSetReference` argument.
baseUrl	The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Can be left NULL if `packageName` and `cohortToCreateFile` have been specified.
cohortSetReference	
	A data frame with four columns, as described in the details. Can be left NULL if `packageName` and `cohortToCreateFile` have been specified.
cohortIds	Optionally, provide a subset of cohort IDs to restrict the diagnostics to.

Details

Currently two ways of executing this function are supported, either (1) [Package Mode] embedded in a study package, assuming the cohort definitions are stored in that package using the `ROhdsiWebApi::insertCohortDefinitionSetInPackage`, or (2) [WebApi Mode] By using a WebApi interface to retrieve the cohort definitions.

When using this function in Package Mode: Use the `packageName` and `cohortToCreateFile` to specify the name of the study package, and the name of the cohortToCreate file within that package, respectively

When using this function in WebApi Mode: use the `baseUrl` and `cohortSetReference` to specify how to connect to the WebApi, and which cohorts to fetch, respectively.

Note: if the parameters for both Package Mode and WebApi Mode are provided, then Package mode is preferred.

The `cohortSetReference` argument must be a data frame with the following columns:

atlasId The cohort ID in ATLAS.

atlasName The full name of the cohort. This will be shown in the Shiny app.

cohortId The cohort ID to use in the package. Usually the same as the cohort ID in ATLAS.

name A short name for the cohort, to use to create file names. do not use special characters.

Value

The function will return a R list object with cohort information including specifications such as JSON and SQL.

Examples

```
## Not run:
cohorts <- getCohortsJsonAndSql(packageName = 'cohortDiagnostics',
                                baseUrl = "http://server.org:80/WebAPI")

## End(Not run)
```

---

getIncidenceRate   *Compute incidence rate for a cohort*

Description

Returns yearly incidence rate stratified by age and gender

Usage

```
getIncidenceRate(
  connectionDetails = NULL,
  connection = NULL,
  cohortDatabaseSchema,
  cohortTable,
  cdmDatabaseSchema,
  oracleTempSchema = oracleTempSchema,
  firstOccurrenceOnly = TRUE,
  washoutPeriod = 365,
  cohortId
)
```

Arguments

connectionDetails

An object of type connectionDetails as created using the createConnectionDetails function in the DatabaseConnector package. Can be left NULL if connection is provided.

connection   An object of type connection as created using the connect function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cohortDatabaseSchema

        Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.

cohortTable   Name of the cohort table.

cdmDatabaseSchema

        Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.

oracleTempSchema

        Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.

firstOccurrenceOnly

        Use only the first occurrence of the cohort per person?

washoutPeriod   The minimum amount of observation time required before the occurrence of a cohort entry. This is also used to eliminate immortal time from the denominator.

cohortId   The cohort definition ID used to reference the cohort in the cohort table.

Value

Returns a data frame of cohort count, person year count, and incidence rate per 1000 persons years with the following stratifications: 1) no stratification, 2) gender stratification, 3) age (10-year) stratification, 4) calendar year and age (10-year) stratification, 5) calendar year and gender stratification, 6) calendar year, age (10-year), and gender stratification with option to save dataframes.

---

getInclusionStatistics

Get statistics on cohort inclusion criteria

Description

Get statistics on cohort inclusion criteria

Usage

```
getInclusionStatistics(
  connectionDetails = NULL,
  connection = NULL,
  resultsDatabaseSchema,
  cohortId,
  simplify = TRUE,
  cohortTable = "cohort",
  cohortInclusionTable = paste0(cohortTable, "_inclusion"),
  cohortInclusionResultTable = paste0(cohortTable, "_inclusion_result"),
  cohortInclusionStatsTable = paste0(cohortTable, "_inclusion_stats"),
  cohortSummaryStatsTable = paste0(cohortTable, "_summary_stats")
)
```

Arguments

connectionDetails	An object of type connectionDetails as created using the createConnectionDetails function in the DatabaseConnector package. Can be left NULL if connection is provided.
connection	An object of type connection as created using the connect function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
resultsDatabaseSchema	Schema name where the statistics tables reside. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortId	The cohort definition ID used to reference the cohort in the cohort table.
simplify	Simply output the attrition table?
cohortTable	Name of the cohort table. Used only to conveniently derive names of the four rule statistics tables.
cohortInclusionTable	Name of the inclusion table, one of the tables for storing inclusion rule statistics.
cohortInclusionResultTable	Name of the inclusion result table, one of the tables for storing inclusion rule statistics.
cohortInclusionStatsTable	Name of the inclusion stats table, one of the tables for storing inclusion rule statistics.
cohortSummaryStatsTable	Name of the summary stats table, one of the tables for storing inclusion rule statistics.

Value

If 'simplify = TRUE', this function returns a single data frame. Else a list of data frames is returned.

---

getInclusionStatisticsFromFiles

Get inclusion criteria statistics from files

Description

Gets inclusion criteria statistics from files, as stored when using the ROhdsiWebApi::insertCohortDefinitionSe function with generateStats = TRUE.

Usage

```
getInclusionStatisticsFromFiles(
  cohortId,
  folder,
  cohortInclusionFile = file.path(folder, "cohortInclusion.csv"),
  cohortInclusionResultFile = file.path(folder, "cohortIncResult.csv"),
  cohortInclusionStatsFile = file.path(folder, "cohortIncStats.csv"),
  cohortSummaryStatsFile = file.path(folder, "cohortSummaryStats.csv"),
  simplify = TRUE
)
```

Arguments

cohortId	The cohort definition ID used to reference the cohort in the cohort table.
folder	The path to the folder where the inclusion statistics are stored.
cohortInclusionFile	
	Name of the inclusion table, one of the tables for storing inclusion rule statistics.
cohortInclusionResultFile	
	Name of the inclusion result table, one of the tables for storing inclusion rule statistics.
cohortInclusionStatsFile	
	Name of the inclusion stats table, one of the tables for storing inclusion rule statistics.
cohortSummaryStatsFile	
	Name of the summary stats table, one of the tables for storing inclusion rule statistics.
simplify	Simply output the attrition table?

Value

If 'simplify = TRUE', this function returns a single data frame. Else a list of data frames is returned.

---

getTimeDistributions   *Get time distributions of a cohort*

Description

Computes the distribution of the observation time before and after index, and time within a cohort.

Usage

```
getTimeDistributions(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortDatabaseSchema = cdmDatabaseSchema,
```

```
  cohortTable = "cohort",
  cohortId
)
```

Arguments

connectionDetails

An object of type `connectionDetails` as created using the `createConnectionDetails` function in the DatabaseConnector package. Can be left NULL if `connection` is provided.

connection   An object of type `connection` as created using the `connect` function in the DatabaseConnector package. Can be left NULL if `connectionDetails` is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cdmDatabaseSchema

Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.

oracleTempSchema

Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.

cohortDatabaseSchema

Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.

cohortTable   Name of the cohort table.

cohortId   The cohort definition ID used to reference the cohort in the cohort table.

Value

A data frame with time distributions

---

instantiateCohort   *Instantiate a cohort*

Description

This function instantiates the cohort in the cohort table. Optionally, the inclusion rule statistics are computed and stored in the inclusion rule statistics tables described in `createCohortTable`).

Usage

```
instantiateCohort(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortDatabaseSchema = cdmDatabaseSchema,
  cohortTable = "cohort",
  baseUrl = NULL,
```

```
    webApiCohortId = NULL,
    cohortJson = NULL,
    cohortSql = NULL,
    cohortId = NULL,
    generateInclusionStats = FALSE,
    resultsDatabaseSchema = cohortDatabaseSchema,
    cohortInclusionTable = paste0(cohortTable, "_inclusion"),
    cohortInclusionResultTable = paste0(cohortTable, "_inclusion_result"),
    cohortInclusionStatsTable = paste0(cohortTable, "_inclusion_stats"),
    cohortSummaryStatsTable = paste0(cohortTable, "_summary_stats")
)
```

Arguments

connectionDetails

An object of type `connectionDetails` as created using the `createConnectionDetails` function in the DatabaseConnector package. Can be left NULL if `connection` is provided.

connection
An object of type `connection` as created using the `connect` function in the DatabaseConnector package. Can be left NULL if `connectionDetails` is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cdmDatabaseSchema

Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.

oracleTempSchema

Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.

cohortDatabaseSchema

Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.

cohortTable
Name of the cohort table.

baseUrl
The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Needn't be provided if `cohortJson` and `cohortSql` are provided.

webApiCohortId The ID of the cohort in the WebAPI instance. Needn't be provided if `cohortJson` and `cohortSql` are provided.

cohortJson
A character string containing the JSON of a cohort definition. Needn't be provided if `baseUrl` and `cohortId` are provided.

cohortSql
The OHDSI SQL representation of the same cohort definition. Needn't be provided if `baseUrl` and `cohortId` are provided.

cohortId
The cohort definition ID used to reference the cohort in the cohort table.

generateInclusionStats

Compute and store inclusion rule statistics?

resultsDatabaseSchema

Schema name where the statistics tables reside. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.

cohortInclusionTable

        Name of the inclusion table, one of the tables for storing inclusion rule
        statistics.

cohortInclusionResultTable

        Name of the inclusion result table, one of the tables for storing inclusion
        rule statistics.

cohortInclusionStatsTable

        Name of the inclusion stats table, one of the tables for storing inclusion
        rule statistics.

cohortSummaryStatsTable

        Name of the summary stats table, one of the tables for storing inclusion
        rule statistics.

---

instantiateCohortSet   *Instantiate a set of cohort*

Description

This function instantiates a set of cohort in the cohort table, using definitions that are
fetched from a WebApi interface. Optionally, the inclusion rule statistics are computed and
stored in the inclusionStatisticsFolder.

Usage

```
instantiateCohortSet(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortDatabaseSchema = cdmDatabaseSchema,
  cohortTable = "cohort",
  cohortIds = NULL,
  packageName = NULL,
  cohortToCreateFile = "settings/CohortsToCreate.csv",
  baseUrl = NULL,
  cohortSetReference = NULL,
  generateInclusionStats = FALSE,
  inclusionStatisticsFolder = NULL,
  createCohortTable = FALSE,
  incremental = FALSE,
  incrementalFolder = NULL
)
```

Arguments

connectionDetails

        An object of type connectionDetails as created using the createConnectionDetails
        function in the DatabaseConnector package. Can be left NULL if connection
        is provided.

connection	An object of type `connection` as created using the `connect` function in the DatabaseConnector package. Can be left NULL if `connectionDetails` is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
cdmDatabaseSchema	
	Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.
oracleTempSchema	
	Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.
cohortDatabaseSchema	
	Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortTable	Name of the cohort table.
cohortIds	Optionally, provide a subset of cohort IDs to restrict the construction to.
packageName	The name of the package containing the cohort definitions. Can be left NULL if `baseUrl` and `cohortSetReference` have been specified.
cohortToCreateFile	
	The location of the cohortToCreate file within the package. Is ignored if `baseUrl` and `cohortSetReference` have been specified. The cohortToCreateFile must be .csv file that is expected to be read into a dataframe object identical to requirements for `cohortSetReference` argument.
baseUrl	The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Can be left NULL if `packageName` and `cohortToCreateFile` have been specified.
cohortSetReference	
	A data frame with four columns, as described in the details. Can be left NULL if `packageName` and `cohortToCreateFile` have been specified.
generateInclusionStats	
	Compute and store inclusion rule statistics?
inclusionStatisticsFolder	
	The folder where the inclusion rule statistics are stored. Can be left NULL if `generateInclusionStats = FALSE`.
createCohortTable	
	Create the cohort table? If `incremental = TRUE` and the table already exists this will be skipped.
incremental	Create only cohorts that haven't been created before?
incrementalFolder	
	If `incremental = TRUE`, specify a folder where records are kept of which definition has been executed.

Details

Currently two ways of executing this function are supported, either (1) [Package Mode] embedded in a study package, assuming the cohort definitions are stored in that package using the `ROhdsiWebApi::insertCohortDefinitionSetInPackage`, or (2) [WebApi Mode] By using a WebApi interface to retrieve the cohort definitions.

When using this function in Package Mode: Use the `packageName` and `cohortToCreateFile` to specify the name of the study package, and the name of the cohortToCreate file within that package, respectively

When using this function in WebApi Mode: use the `baseUrl` and `cohortSetReference` to specify how to connect to the WebApi, and which cohorts to fetch, respectively.

Note: if the parameters for both Package Mode and WebApi Mode are provided, then Package mode is preferred.

The `cohortSetReference` argument must be a data frame with the following columns:

atlasId The cohort ID in ATLAS.

atlasName The full name of the cohort. This will be shown in the Shiny app.

cohortId The cohort ID to use in the package. Usually the same as the cohort ID in ATLAS.

name A short name for the cohort, to use to create file names. do not use special characters.

Value

A data frame with cohort counts

---

launchCohortExplorer   *Launch the CohortExplorer Shiny app*

Description

Launch the CohortExplorer Shiny app

Usage

```
launchCohortExplorer(
  connectionDetails,
  cdmDatabaseSchema,
  cohortDatabaseSchema,
  cohortTable,
  cohortId,
  sampleSize = 100,
  subjectIds = NULL
)
```

Arguments

connectionDetails

An object of type `connectionDetails` as created using the `createConnectionDetails` function in the DatabaseConnector package.

cdmDatabaseSchema

Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.

cohortDatabaseSchema

Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.

cohortTable	Name of the cohort table.
cohortId	The ID of the cohort.
sampleSize	Number of subjects to sample from the cohort. Ignored if subjectIds is specified.
subjectIds	A vector of subject IDs to view.

Details

Launches a Shiny app that allows the user to explore a cohort of interest.

---

launchDiagnosticsExplorer

Launch the Diagnostics Explorer Shiny app

Description

Launch the Diagnostics Explorer Shiny app

Usage

```
launchDiagnosticsExplorer(dataFolder, launch.browser = FALSE)
```

Arguments

dataFolder	A folder where the exported zip files for the diagnostics are stored. Use the runCohortDiagnostics function to generate these zip files. Zip files containing results from multiple databases can be placed in the same folder.
launch.browser	Should the app be launched in your default browser, or in a Shiny window. Note: copying to clipboard will not work in a Shiny window.

Details

Launches a Shiny app that allows the user to explore the diagnostics

---

plotincidenceRate *Plot incidence rate by year, age, and/or gender*

Description

Characterizes the incidence rate of a cohort definition.

Usage

```
plotincidenceRate(
  incidenceRate,
  minPersonYears = 1000,
  stratifyByAge = TRUE,
  stratifyByGender = TRUE,
  stratifyByCalendarYear = TRUE,
  fileName = NULL
)
```

Arguments

incidenceRate   Incidence rate time series data for plotting generated using getIncidenceRate
                function.

minPersonYears Estimates get very unstable with low background counts, so removing
                them makes for cleaner plots.

stratifyByAge   Should the plot be stratified by age?

stratifyByGender

                Should the plot be stratified by gender?

stratifyByCalendarYear

                Should the plot be stratified by calendar year?

fileName   Optional: name of the file where the plot should be saved, for example
                'plot.png'. See the function ggsave in the ggplot2 package for supported
                file formats.

Details

Generates time series plots of the incidence rate per 1000 person years of cohort entry by
year, age, and/or gender.

Value

A ggplot object. Use the ggsave function to save to file in a different format.

---

preMergeDiagnosticsFiles

                        Premerge Shiny diagnostics files

Description

If there are many diagnostics files, starting the Shiny app may take a very long time. This
function already does most of the preprocessing, increasing loading speed.

The merged data will be stored in the same folder, and will automatically be recognized by
the Shiny app.

Usage

```
preMergeDiagnosticsFiles(dataFolder, minCovariateProportion = 0)
```

Arguments

dataFolder   folder where the exported zip files for the diagnostics are stored. Use
                the runCohortDiagnostics function to generate these zip files. Zip files
                containing results from multiple databases can be placed in the same
                folder.

minCovariateProportion

                minimum value threshold for covariates to be included in premerged file
                (valid number (maybe decimal) between 0 to 1)

---

runCohortDiagnostics   *Run cohort diagnostics*

Description

Runs the cohort diagnostics on all (or a subset of) the cohorts instantiated using the `ROhdsiWebApi::insertCohortDefinitionSetInPackage` function. Assumes the cohorts have already been instantiated.

Characterization: If runTemporalCohortCharacterization argument is TRUE, then the following default covariateSettings object will be created using `RFeatureExtraction::createTemporalCovariateS`. Alternatively, a covariate setting object may be created using the above as an example.

Usage

```
runCohortDiagnostics(
  packageName = NULL,
  cohortToCreateFile = "settings/CohortsToCreate.csv",
  baseUrl = NULL,
  cohortSetReference = NULL,
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortDatabaseSchema,
  cohortTable = "cohort",
  cohortIds = NULL,
  inclusionStatisticsFolder = NULL,
  exportFolder,
  databaseId,
  databaseName = databaseId,
  databaseDescription = "",
  runInclusionStatistics = TRUE,
  runIncludedSourceConcepts = TRUE,
  runOrphanConcepts = TRUE,
  runTimeDistributions = TRUE,
  runBreakdownIndexEvents = TRUE,
  runIncidenceRate = TRUE,
  runCohortOverlap = TRUE,
  runCohortCharacterization = TRUE,
  covariateSettings = FeatureExtraction::createDefaultCovariateSettings(),
  runTemporalCohortCharacterization = TRUE,

  temporalCovariateSettings = FeatureExtraction::createTemporalCovariateSettings(useConditionOcc
  = TRUE, useDrugEraStart = TRUE, useProcedureOccurrence = TRUE, useMeasurement = TRUE,
  temporalStartDays = c(-365, -30, 0, 1, 31), temporalEndDays = c(-31, -1, 0, 30, 365)),
  minCellCount = 5,
  incremental = FALSE,
  incrementalFolder = exportFolder
)
```

Arguments

packageName	The name of the package containing the cohort definitions. Can be left NULL if `baseUrl` and `cohortSetReference` have been specified.
cohortToCreateFile	
	The location of the cohortToCreate file within the package. Is ignored if `baseUrl` and `cohortSetReference` have been specified. The cohortToCreateFile must be .csv file that is expected to be read into a dataframe object identical to requirements for `cohortSetReference` argument.
baseUrl	The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Can be left NULL if `packageName` and `cohortToCreateFile` have been specified.
cohortSetReference	
	A data frame with four columns, as described in the details. Can be left NULL if `packageName` and `cohortToCreateFile` have been specified.
connectionDetails	
	An object of type `connectionDetails` as created using the [createConnectionDetails] function in the DatabaseConnector package. Can be left NULL if `connection` is provided.
connection	An object of type `connection` as created using the [connect] function in the DatabaseConnector package. Can be left NULL if `connectionDetails` is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
cdmDatabaseSchema	
	Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.
oracleTempSchema	
	Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.
cohortDatabaseSchema	
	Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortTable	Name of the cohort table.
cohortIds	Optionally, provide a subset of cohort IDs to restrict the diagnostics to.
inclusionStatisticsFolder	
	The folder where the inclusion rule statistics are stored. Can be left NULL if `runInclusionStatistics` = FALSE.
exportFolder	The folder where the output will be exported to. If this folder does not exist it will be created.
databaseId	A short string for identifying the database (e.g. 'Synpuf').
databaseName	The full name of the database.
databaseDescription	
	A short description (several sentences) of the database.
runInclusionStatistics	
	Generate and export statistic on the cohort inclusion rules?
runIncludedSourceConcepts	
	Generate and export the source concepts included in the cohorts?

runOrphanConcepts

>   Generate and export potential orphan concepts?

runTimeDistributions

>   Generate and export cohort time distributions?

runBreakdownIndexEvents

>   Generate and export the breakdown of index events?

runIncidenceRate

>   Generate and export the cohort incidence rates?

runCohortOverlap

>   Generate and export the cohort overlap?

runCohortCharacterization

>   Generate and export the cohort characterization?

covariateSettings

>   Either an object of type `covariateSettings` as created using one of the
>   createCovariateSettings function in the FeatureExtraction package, or a
>   list of such objects.

runTemporalCohortCharacterization

>   Generate and export the temporal cohort characterization?

temporalCovariateSettings

>   Either an object of type `covariateSettings` as created using one of the
>   createTemporalCovariateSettings function in the FeatureExtraction package, or a list of such objects.

minCellCount   The minimum cell count for fields contains person counts or fractions.

incremental   Create only cohort diagnostics that haven't been created before?

incrementalFolder

>   If `incremental = TRUE`, specify a folder where records are kept of which
>   cohort diagnostics has been executed.

Details

Currently two ways of executing this function are supported, either (1) [Package Mode] embedded in a study package, assuming the cohort definitions are stored in that package using the `ROhdsiWebApi::insertCohortDefinitionSetInPackage`, or (2) [WebApi Mode] By using a WebApi interface to retrieve the cohort definitions.

When using this function in Package Mode: Use the `packageName` and `cohortToCreateFile` to specify the name of the study package, and the name of the cohortToCreate file within that package, respectively

When using this function in WebApi Mode: use the `baseUrl` and `cohortSetReference` to specify how to connect to the WebApi, and which cohorts to fetch, respectively.

Note: if the parameters for both Package Mode and WebApi Mode are provided, then Package mode is preferred.

The `cohortSetReference` argument must be a data frame with the following columns:

atlasId The cohort ID in ATLAS.

atlasName The full name of the cohort. This will be shown in the Shiny app.

cohortId The cohort ID to use in the package. Usually the same as the cohort ID in ATLAS.

name A short name for the cohort, to use to create file names. do not use special characters.

---

runCohortDiagnosticsUsingExternalCounts

Run cohort diagnostics using external concept counts

Description

Runs cohort diagnostics on all (or a subset of) the cohorts, but using external concept counts. The external counts must have the following columns:

concept_id The source or target concept ID.

concept_count The number of records having the concept.

concept_subjects The number of unique persons having the concept.

Usage

```
runCohortDiagnosticsUsingExternalCounts(
  packageName = NULL,
  cohortToCreateFile = "settings/CohortsToCreate.csv",
  baseUrl = NULL,
  cohortSetReference = NULL,
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortIds = NULL,
  conceptCountsDatabaseSchema = cdmDatabaseSchema,
  conceptCountsTable = "concept_counts",
  conceptCountsTableIsTemp = FALSE,
  exportFolder,
  databaseId,
  databaseName = databaseId,
  databaseDescription = "",
  runIncludedSourceConcepts = TRUE,
  runOrphanConcepts = TRUE,
  minCellCount = 5
)
```

Arguments

packageName	The name of the package containing the cohort definitions. Can be left NULL if `baseUrl` and `cohortSetReference` have been specified.
cohortToCreateFile	
	The location of the cohortToCreate file within the package. Is ignored if `baseUrl` and `cohortSetReference` have been specified. The cohortToCreateFile must be .csv file that is expected to be read into a dataframe object identical to requirements for `cohortSetReference` argument.
baseUrl	The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Can be left NULL if `packageName` and `cohortToCreateFile` have been specified.

cohortSetReference

A data frame with four columns, as described in the details. Can be left NULL if `packageName` and `cohortToCreateFile` have been specified.

connectionDetails

An object of type `connectionDetails` as created using the `createConnectionDetails` function in the DatabaseConnector package. Can be left NULL if `connection` is provided.

connection

An object of type `connection` as created using the `connect` function in the DatabaseConnector package. Can be left NULL if `connectionDetails` is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cdmDatabaseSchema

Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.

oracleTempSchema

Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.

cohortIds   Optionally, provide a subset of cohort IDs to restrict the diagnostics to.

conceptCountsDatabaseSchema

Schema name where your concept counts table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'. Ignored if `conceptCountsTableIsTemp = TRUE`.

conceptCountsTable

Name of the concept counts table. This table can be created using the `createConceptCountsTable`.

conceptCountsTableIsTemp

Is the concept counts table a temp table?

exportFolder   The folder where the output will be exported to. If this folder does not exist it will be created.

databaseId   A short string for identifying the database (e.g. 'Synpuf').

databaseName   The full name of the database.

databaseDescription

A short description (several sentences) of the database.

runIncludedSourceConcepts

Generate and export the source concepts included in the cohorts?

runOrphanConcepts

Generate and export potential orphan concepts?

minCellCount   The minimum cell count for fields contains person counts or fractions.

Details

Currently two ways of executing this function are supported, either (1) [Package Mode] embedded in a study package, assuming the cohort definitions are stored in that package using the `ROhdsiWebApi::insertCohortDefinitionSetInPackage`, or (2) [WebApi Mode] By using a WebApi interface to retrieve the cohort definitions.

When using this function in Package Mode: Use the `packageName` and `cohortToCreateFile` to specify the name of the study package, and the name of the cohortToCreate file within that package, respectively

When using this function in WebApi Mode: use the `baseUrl` and `cohortSetReference` to specify how to connect to the WebApi, and which cohorts to fetch, respectively.

Note: if the parameters for both Package Mode and WebApi Mode are provided, then Package mode is preferred.

The `cohortSetReference` argument must be a data frame with the following columns:

atlasId The cohort ID in ATLAS.

atlasName The full name of the cohort. This will be shown in the Shiny app.

cohortId The cohort ID to use in the package. Usually the same as the cohort ID in ATLAS.

name A short name for the cohort, to use to create file names. do not use special characters.

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