Package 'cellxgenedp'

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Title Discover and Access Single Cell Data Sets in the CELLxGENE Data Portal

Version 1.16.0

Description The cellxgene data portal (https://cellxgene.cziscience.com/) provides a graphical user interface to collections of single-cell sequence data processed in standard ways to 'count matrix' summaries. The cellxgenedp package provides an alternative, R-based inteface, allowind data discovery, viewing, and downloading.

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`collections` *Query cellxgene collections, datasets, and files*

Description

`files_download()` retrieves one or more cellxgene files to a cache on the local system.

`links()`, `authors()` and `publisher_metadata()` are helper functions to extract 'nested' information from collections.

Usage

```
collections(cellxgene_db = db())

datasets(cellxgene_db = db())

datasets_visualize(tbl)

files(cellxgene_db = db())

files_download(tbl, dry.run = TRUE, cache.path = .cellxgene_cache_path())

links(cellxgene_db = db())

authors(cellxgene_db = db())

publisher_metadata(cellxgene_db = db())
```

Arguments

cellxgene_db	an optional 'cellxgene_db' object, as returned by db().
tbl	a tibble() typically derived from datasets(db) or files(db) and containing columns dataset_id (for datasets_visualize()), or columns dataset_id, file_id, and filetype (for files_download()).
dry.run	logical(1) indicating whether the (often large) file(s) in tbl should be downloaded to a local cache. Files are not downloaded when dry.run = TRUE (default).
cache.path	character(1) directory in which to cache downloaded files. The directory must already exist. The default is tools::R_user_dir("cellxgenedp", "cache"), a package-specific path in the user home directory.

Value

Each function returns a tibble describing the corresponding component of the database.

files_download() returns a character() vector of paths to the local files.

links() returns a tibble of external links associated with each collection. Common links includ DOI, raw data / data sources, and lab websites.

authors() returns a tibble of authors associated with each collection.

publisher_metadata() returns a tibble of publisher metadata (journal, publicate date, doi) associated with each collection.

Examples

```
db <- db()

collections(db)

collections(db) |>
    dplyr::glimpse()

datasets(db) |>
    dplyr::glimpse()


if (interactive()) {
    ## visualize the first dataset
    datasets(db) |>
        dplyr::slice(1) |>
        datasets_visualize()
}

files(db) |>
    dplyr::glimpse()

## Not run:
files(db) |>
    dplyr::slice(1) |>
```

```
    files_download(dry.run = FALSE)

## End(Not run)

## common links to external data
links(db) |>
    dplyr::count(link_type)

## authors per collection
authors() |>
    dplyr::count(collection_id, sort = TRUE)

publisher_metadata() |>
    dplyr::glimpse()
```

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cxg *Shiny application for discovering, viewing, and downloading cellxgene data*

Description

Shiny application for discovering, viewing, and downloading cellxgene data

Usage

```
cxg(as = c("tibble", "sce"))
```

Arguments

as	character(1) Return value when quiting the shiny application. `"tibble"` returns a tibble describing selected datasets (including the location on disk of the downloaded file). `"sce"` returns a list of dataset files imported to R as SingleCellExperiment objects.

Value

`cxg()` returns either a tibble describing datasets selected in the shiny application, or a list of datasets imported into R as SingleCellExperiment objects.

Examples

```
if (interactive())
    cxg()
```

db *Retrieve updated cellxgene database metadata*

Description

Retrieve updated cellxgene database metadata

Usage

```
db(overwrite = .db_online() && .db_first())
```

Arguments

`overwrite`	logical(1) indicating whether the database of collections should be updated from the internet (the default, when internet is available and, in an interactive session, the user requests the update), or read from disk (assuming previous successful access to the internet). `overwrite = FALSE` might be useful for reproducibility, testing, or when working in an environment with restricted internet access.

Details

The database is retrieved from the cellxgene data portal web site. 'collections' metadata are retrieved on each call; metadata on each collection is cached locally for re-use.

Value

`db()` returns an object of class 'cellxgene_db', summarizing available collections, datasets, and files.

Examples

```
db()
```

FACETS *Facets available for querying cellxgene data*

Description

`FACETS` is a character vector of common fields used to subset cellxgene data.

`facets()` is used to query the cellxgene database for current values of one or all facets.

`facets_filter()` provides a convenient way to filter facets based on label or ontology term.

Usage

```
FACETS

facets(cellxgene_db = db(), facets = FACETS)

facets_filter(facet, key = c("label", "ontology_term_id"), value, exact = TRUE)
```

Arguments

cellxgene_db	an (optional) cellxgene_db object, as returned by db().
facets	a character() vector corersponding to one of the facets in FACETS.
facet	the column containing faceted information, e.g., sex in datasets(db).
key	character(1) identifying whether value is a label or ontology_term_id.
value	character() value of the label or ontology term to filter on. The value may be a vector with length(value) > 0 for exact matchs (exact = TRUE, default), or a character(1) regular expression.
exact	logical(1) whether values match exactly (default, TRUE) or as a regular expression (FALSE).

Format

FACETS is an object of class character of length 8.

Value

facets() returns a tibble with columns facet, label, ontology_term_id, and n, the number of times the facet label is used in the database.

facets_filter() returns a logical vector with length equal to the length (number of rows) of facet, with TRUE indicating that the value of key is present in the dataset.

Examples

```
f <- facets()

## levels of each facet
f |>
    dplyr::count(facet)

## same as facets(, facets = "organism")
f |>
    dplyr::filter(facet == "organism")

db <- db()
ds <- datasets(db)

## datasets with African American females
ds |>
    dplyr::filter(
```

```
        facets_filter(self_reported_ethnicity, "label", "African American"),
        facets_filter(sex, "label", "female")
    )

## datasets with non-European, known ethnicity
facets(db, "self_reported_ethnicity")
ds |>
    dplyr::filter(
        !facets_filter(
            self_reported_ethnicity, "label", c("European", "na", "unknown")
        )
    )
```

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