Package ‘khisr’

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Title Retrieve Data from Kenya Health Information System (KHIS)

Description Simplify data retrieval from Kenya's health system with a powerful interface for efficient data retrieval from the Kenya Health Information System (KHIS) <https://hiskenya.org>. Empower researchers, analysts, and healthcare professionals to access critical health data efficiently.

Version 1.0.2

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BugReports https://github.com/damurka/khisr/issues

Depends R (>= 3.3)

Imports cli, curl, dplyr, htr2, jsonlite, magrittr, purrr, rlang, stringr, tidyr, utils, withr

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analytics-dimension

Description

Constructs a dimensions expression for analytics queries based on specified property, operator, and values.

Usage

analytics_dimension(property, operator, values)

operator %.%d% values

operator %.%f% values

Arguments

property A character string representing whether its dimension or filter. It only accepts 'dimension', 'filter'.

operator A character string representing the property to filter on (e.g., 'dx', 'pe', 'ou').

values A vector of values or semi-colon separated string items.

Details

DHIS2 organizes data using multiple dimensions, each with a unique identifier and a set of items that represent specific data points within that dimension.

- Data elements (dx): Indicators, data set reporting rate metrics, data element operands, program indicators, program data elements, program attributes, validation rules.
- Periods (pe): ISO periods (e.g., 202401) and relative periods (e.g., LAST_WEEK).
- Organisation unit hierarchy (ou): Specific health facilities, districts, countries, and keywords for user location or its sub-units.
- Category option combinations (co): Category option combo identifiers.
- Attribute option combinations (ao): Category option combo identifiers.
get_analytics

Retrieves Analytics Table Data from KHIS

Description

get_analytics() fetches data from the KHIS analytics data tables for a given period and data element(s), without performing any aggregation.

Usage

get_analytics(  
  ...,  
  return_type = c("uid", "name"),  
  retry = 2,  
  verbosity = 0,  
  timeout = 60  
)
get_metadata

Description

get_metadata retrieves metadata for a specified endpoint of KHIS

Arguments

... One or more \texttt{analytics_dimension()} in key-value pairs.
\texttt{return\_type} The type to be return names of uid.
\texttt{retry} Number of times to retry the API call in case of failure (defaults to 2).
\texttt{verbosity} Level of HTTP information to print during the call:
   - 0: No output
   - 1: Show headers
   - 2: Show headers and bodies
   - 3: Show headers, bodies, and CURL status message.
\texttt{timeout} Maximum number of seconds to wait for the API response.

Details

- Retrieves data directly from KHIS analytics tables.
- Allows specifying KHIS session objects, retry attempts, and logging verbosity.

Value

A tibble with detailed information

Examples

```r
# Clinical Breast Examination data elements
# XEX93uLsAmZ = CBE Abnormal
# cXe64Yk0QMY = CBE Normal
element_id = c('cXe64Yk0QMY', 'XEX93uLsAmZ')

# Download data from February 2023 to current date
data <- get_analytics(dx .d% element_id, pe .d% 'LAST\_MONTH')
data
```
get_metadata

Usage

get_metadata(
    endpoint,
    ...,
    fields = c("id", "name"),
    retry = 2,
    verbosity = 0,
    timeout = 60
)

Arguments

endpoint The KHIS API endpoint for the metadata of interest (e.g. dataElements, organisationUnits).
...
One or more metadata_filter() params in key-value pairs.
fields The specific columns to be returned in the tibble.
retry Number of times to retry the API call in case of failure (defaults to 2).
verbosity Level of HTTP information to print during the call:
• 0: No output
• 1: Show headers
• 2: Show headers and bodies
• 3: Show headers, bodies, and CURL status message.
timeout Maximum number of seconds to wait for the API response.

Value

A tibble with the KHIS metadata response.

Examples

# Get the categories metadata
get_metadata('categories')

# Get the datasets metadata with fields 'id,name,organisationUnits' and filter
# only the datasets with id 'WWshbCmvN9'
get_metadata('dataSets',
    fields = 'id,name,organisationUnits[id,name,path]',
    id %.eq% 'WWshbCmvND')

# Get data elements filtered by dataElementGroups id
get_metadata('dataElements',
    dataElementGroups.id %.eq% 'IXd7XxZqzL',
    fields = ':all')
Description
Some aspects of khisr behaviour can be controlled via an option.

Usage

with_khis_quiet(code)
local_khis_quiet(env = parent.frame())

Arguments

code Code to execute quietly
env The environment to use for scoping

Value
No return value, called for side effects
No return value, called for side effects
No return value, called for side effects

Messages
The khis_quiet option can be used to suppress messages form khisr. By default, khisr always messages, i.e. it is not quiet.
set khis_quiet to TRUE to suppress message, by one of these means, in order of decreasing scope:
• Put options(khis_quiet = TRUE) in the start-up file, such as .Rprofile, or in your R script.
• Use local_khis_quiet() to silence khisr in a specific scope.
• Use with_khis_quite to run small bit of code silently.

local_khis_quiet and with_khis follow the conventions of the withr package.

Examples

# message: "The credentials have been set."
khis_cred(username = 'username', password = 'password')

# suppress messages for a small amount of code
with_khis_quiet(
    khis_cred(username = 'username', password = 'password')
)
# message: "The credentials have been set."
khis_cred(username = 'username', password = 'password')
# suppress messages for a in a specific scope
local_khis_quiet()

# no message
khis_cred(username = 'username', password = 'password')

# clear credentials
khis_cred_clear()

---

### khis_base_url

*Produces the Configured KHIS API Base URI*

**Description**

Produces the Configured KHIS API Base URI

**Usage**

```r
khis_base_url()
```

**Value**

the KHIS base URI

**Examples**

```r
# Set the credentials
khis_cred(username = 'KHIS username', password = 'KHIS password')

# View the username expect 'KHIS username'
khis_base_url()
```

---

### khis_cred

*Sets the KHIS Credentials*

**Description**

Sets the KHIS Credentials

**Usage**

```r
khis_cred(
    config_path = NULL,
    username = NULL,
    password = NULL,
    base_url = NULL
)
```
Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>config_path</td>
<td>An optional parameters that contains the path to configuration file with username and password.</td>
</tr>
<tr>
<td>username</td>
<td>The KHIS username. Can be optional if config_path is already provided.</td>
</tr>
<tr>
<td>password</td>
<td>The KHIS password. Can be optional if config_path is already provided.</td>
</tr>
<tr>
<td>base_url</td>
<td>The base url used for the KHIS instance. The default is NULL which is the <a href="https://hiskenya.org/api">https://hiskenya.org/api</a></td>
</tr>
</tbody>
</table>

Details

The credentials can be provided using a configuration file (more secure) or providing username and password arguments. The config_path is considered more secure since credentials will not appear in the code.

Value

No return value

See Also

Other credential functions: `khis_cred_clear()`, `khis_has_cred()`, `khis_username()`

Examples

```python
# Load username and password
khis_cred(username = 'khis_username', password = 'PASSWORD')
```

### khis_cred_clear

**Clear the Credentials from Memory**

Description

Clear the Credentials from Memory

Usage

```python
khis_cred_clear()
```

Value

No return value

See Also

Other credential functions: `khis_cred()`, `khis_has_cred()`, `khis_username()`
```

### Examples

```r
khis_cred_clear()
```

---

`khis_has_cred` | **Are There Credentials on Hand?**
---

#### Description

Are There Credentials on Hand?

#### Usage

```r
khis_has_cred()
```

#### Value

a boolean value indicating if the credentials are available

#### See Also

Other credential functions: `khis_cred()`, `khis_cred_clear()`, `khis_username()`

#### Examples

```r
# Set the credentials
khis_cred(username = 'KHIS username', password = 'KHIS password')

# Check if credentials available. Expect TRUE
khis_has_cred()

# Clear credentials
khis_cred_clear()

# Check if credentials available. Expect FALSE
khis_has_cred()
```
khis_username  

*Produces the Configured Username*

**Description**

Produces the Configured Username

**Usage**

```
khis_username()
```

**Value**

the username of the user credentials

**See Also**

Other credential functions: `khis_cred()`, `khis_cred_clear()`, `khis_has_cred()`

**Examples**

```
# Set the credentials
khis_cred(username = 'KHIS username', password = 'KHIS password')

# View the username expect 'KHIS username'
khis_username()

# Clear credentials
khis_cred_clear()

# View the username expect 'NULL'
khis_username()
```

**metadata-filter**  

*Metadata Filter*

**Description**

Formats a metadata filter to DHIS 2 comparison operators.
Usage

```
metadata_filter(property, operator, values, call = caller_env())
```

- `property %.eq% values`
- `property %.ieq% values`
- `property %.~eq% values`
- `property %.ne% values`
- `property %.Like% values`
- `property %.~Like% values`
- `property %.^Like% values`
- `property %.~^Like% values`
- `property %.Like$% values`
- `property %.~Like$% values`
- `property %.like% values`
- `property %.~like% values`
- `property %.^like% values`
- `property %.~^like% values`
- `property %.like$% values`
- `property %.~like$% values`
- `property %.gt% values`
- `property %.ge% values`
- `property %.lt% values`
- `property %.le% values`
- `property %.token% values`
- `property %.~token% values`
- `property %.in% values`
property %.~in% values

Arguments

property The property on the metadata you want to filter on
operator The comparison operator you want to perform
values The value to check against
call description

Details

To filter the metadata there are several filter operations that can be applied to the returned list of metadata. The format of the filter itself is straight-forward and follows the pattern property:operator:value, where property is the property on the metadata you want to filter on, operator is the comparison operator you want to perform and value is the value to check against (not all operators require value). To view the operator see DHIS 2 Operator

- %.eq% - Equality
- %.ieq% - Case insensitive string, match exact
- %.~eq% - Inequality
- %.ne% - Inequality
- %.Like% - Case sensitive string, match anywhere
- %.~Like% - Case sensitive string, not match anywhere
- %.^Like% - Case sensitive string, match start
- %.~^Like% - Case sensitive string, not match start
- %.Like$% - Case sensitive string, match end
- %.~Like$% - Case sensitive string, not match end
- %.like% - Case insensitive string, match anywhere
- %.~like% - Case insensitive string, not match anywhere
- %.like% - Case insensitive string, match anywhere
- %.~like% - Case insensitive string, not match anywhere
- %.gt% - Greater than
- %.ge% - Greater than or equal
- %.lt% - Less than
- %.le% - Less than or equal
- %.token% - Match on multiple tokens in search property
- %.~token% - Not match on multiple tokens in search property
- %.in% - Find objects matching 1 or more values
- %.~in% - Find objects not matching 1 or more values

Value

A spliced list with filter in the format property:operator:value
Examples

# Generate an equality filter
id %.eq% 'element_id'

# Finding multiple ids
'id' %.in% c('id1', 'id2', 'id3')

# Get all data elements which have a data set with id ID1
'dataSetElements.dataSet.id' %.eq% 'ID1'

# Get data elements which are members of the ANC data element group
'dataElementGroups.id' %.eq% 'qfxEYY9xA16'

# Get data elements which have any option set
metadata_filter('optionSet', '!null', NULL)

Metadata Helper Functions

Description

Wrappers for `get_metadata()` that retrieves data from a specific KHIS API endpoint.

Usage

generate_categories(..., fields = c("id", "name"))
generate_category_combos(..., fields = c("id", "name"))
generate_category_option_combos(..., fields = c("id", "name"))
generate_category_option_group_sets(..., fields = c("id", "name"))
generate_category_option_groups(..., fields = c("id", "name"))
generate_category_options(..., fields = c("id", "name"))
generate_data_element_group_sets(..., fields = c("id", "name"))
generate_data_element_groups(..., fields = c("id", "name"))
generate_data_elements(..., fields = c("id", "name"))
generate_data_sets(..., fields = c("id", "name"))
generate_user_groups(..., fields = c("id", "name"))


get_indicator_group_sets(..., fields = c("id", "name"))

get_indicator_groups(..., fields = c("id", "name"))

get_indicators(..., fields = c("id", "name"))

get_option_group_sets(..., fields = c("id", "name"))

get_option_groups(..., fields = c("id", "name"))

get_option_sets(..., fields = c("id", "name"))

get_options(..., fields = c("id", "name"))

get_organisation_unit_groupsets(..., fields = c("id", "name"))

get_organisation_unit_groups(..., fields = c("id", "name"))

get_organisation_units(..., fields = c("id", "name"))

get_dimensions(..., fields = c("id", "name"))

get_period_types(..., fields = c("id", "name"))

**Arguments**

... Arguments passed on to `get_metadata`

  retry Number of times to retry the API call in case of failure (defaults to 2).

  verbosity Level of HTTP information to print during the call:

  • 0: No output
  • 1: Show headers
  • 2: Show headers and bodies
  • 3: Show headers, bodies, and CURL status message.

  timeout Maximum number of seconds to wait for the API response.

  fields The specific columns to be returned in the tibble.

**Value**

A tibble with the KHIS metadata response.

**Examples**

```r
# Get all organisation units
get_organisation_units()
```
# Get all data elements
get_data_elements()

# Get data elements by element ids
get_data_elements(id %.in% c('VR7vdS7P0Gb', 'gQro1y7Rsbq'))

# Get datasets by name with the word 'MOH 705'
get_data_sets(name %.like% 'MOH 705')
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