

Package ‘FAIRmaterials’

August 9, 2023

Title Make Materials Data FAIR

Version 0.4.1

Description

We provide here tools used by the Solar Durability and Lifetime Extension Center (SDLE) for FAIRifying data from materials science projects. Functions have been created for numerous tools common in the field in order to make the metadata more Findable, Accessible, Interoperable, and Reproducible.

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Encoding UTF-8

LazyData true

Imports stringr, jsonlite, svDialogs, tidyjson, RColorBrewer, igraph,
dplyr, graphics, jsonld, utils

RoxygenNote 7.2.3

Depends R (>= 2.10)

Suggests knitr, rmarkdown, testthat (>= 3.0.0)

Config/testthat/edition 3

VignetteBuilder knitr

NeedsCompilation no

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Repository CRAN

Date/Publication 2023-08-09 21:10:03 UTC

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fairify_data	<i>FAIRify Data</i>
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Description

Function that receives user input metadata and converts that into a FAIRified json-ld file based on a template created as part of this package.

Usage

```

fairify_data(
  dataframe,
  unit_dataframe = data.frame(),
  domain,
  saveLocal = FALSE,
  data_list = list()
)

```

Arguments

dataframe	User input metadata dataframe
unit_dataframe	User input units (one row dataframe)
domain	Json-LD template to be filled by function
saveLocal	Boolean stating whether the files should be saved locally
data_list	List of columns included in any of your raw dataframes User can FAIRify data in the following domains:

- asterGdem
- buildings
- capillaryElectrophoresis
- computedTomographyXRy
- diffractionXRy
- environmentalExposure
- geospatialWell
- materialsProcessing
- metalAdditiveManufacturing
- opticalProfilometry
- opticalSpectroscopy
- photovoltaicBacksheet
- photovoltaicCell
- photovoltaicInverter
- photovoltaicModule
- photovoltaicSystem
- polymerAdditiveManufacturing
- polymerFormulation
- soil
- streamWater

Value

FAIRified .json-ld text document

Examples

```
metadata <- data.frame('CellMaterial' = 'mono-silicon',
                      'Module Efficiency' = 20.1)

metadata_units <- data.frame('CellMaterial' = NA,
                             'ModuleEfficiency' = '%')

fairify_data(metadata, metadata_units, 'photovoltaicModule', saveLocal = FALSE)
```

fair_expand	<i>Expand Json Files</i>
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Description

Expand Json Files

Usage

```
fair_expand(json_file)
```

Arguments

json_file Json-ld created from the fairify_data function

Value

Expanded json-ld file

Examples

```
json_file <- '{
"@context": "http://schema.org/",
"@type": "Person",
"name": "Jane Doe",
"jobTitle": "Professor",
"telephone": "(425) 123-4567",
"url": "http://www.janedoe.com"}'
```

```
fair_expand(json_file)
```

json_conversion	<i>Convert Dataframe to Json from a Template</i>
-----------------	--

Description

Convert Dataframe to Json from a Template

Usage

```
json_conversion(row, unit_dataframe, domain, i, data_list)
```

Arguments

row	Row of a user input csv that includes metadata
unit_dataframe	User input units
domain	Json-LD template to be filled by function
i	Iteration of the loop tracker
data_list	List of columns included in any of your raw dataframes

Value

FAIRified .json-ld text document

plot_json_graph	<i>Plot an igraph visualization of a JSON document</i>
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Description

Plot an igraph visualization of a JSON document

Usage

```
plot_json_graph(  
  .x,  
  legend = TRUE,  
  vertex.size = 6,  
  edge.color = "grey70",  
  edge.width = 0.5,  
  show.labels = TRUE,  
  plot = TRUE,  
  ...  
)
```

Arguments

.x	a JSON string or tbl_json object
legend	add a type color legend automatically
vertex.size	the size of the vertices
edge.color	the color for the edges
edge.width	the width of the edge lines
show.labels	should object names be shown
plot	should the plot be rendered?
...	further arguments to igraph::plot.igraph

Value

Graph visualization of a json-ld

Examples

```
json_file <- '{
"@context": "http://schema.org/",
"@type": "Person",
"name": "Jane Doe",
"jobTitle": "Professor",
"telephone": "(425) 123-4567",
"url": "http://www.janedoe.com"}'
```

```
plot_json_graph(json_file)
```

remove_adjacent_numbered_suffixes

Remove Adjacent Numbered Suffixes

Description

This function identifies and removes adjacent numbered suffixes from a character vector. If any strings in the vector have adjacent numerical suffixes, they are replaced with the base string without the numerical suffix.

Usage

```
remove_adjacent_numbered_suffixes(vec)
```

Arguments

vec A character vector containing strings. The strings may end with numbers.

Value

A character vector with the same elements as the input, but with adjacent numbered suffixes removed as described.

Examples

```
template_fill <- c("item1", "item5", "item2", "item3", "item4", "item", "item100",
"product1", "product2", "product3", "product", "product11", "j8j", "j9j")
result <- remove_adjacent_numbered_suffixes(template_fill)
print(result)
# "item", "item", "item", "item", "item", "item", "item100", "product",
# "product", "product", "product", "product11", "j8j", "j9j"
```

rename_fair	<i>Rename Column Names</i>
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Description

Rename Column Names

Usage

```
rename_fair(dataframe, domain)
```

Arguments

dataframe	User input dataframe
domain	Json-LD template to be filled by function

Value

Dataframe with FAIRified column names

replace_null_recursive	<i>Replace NULL Values Recursively in a List</i>
------------------------	--

Description

This function recursively searches through a list or nested list and replaces all NULL values with NA. It also records the path where replacements occurred.

Usage

```
replace_null_recursive(lst, indices = character(0))
```

Arguments

lst	A list or nested list where NULL values should be replaced.
indices	A character vector used for recursive tracking of indices. This should typically be left at its default value when the function is called.

Value

A list with NULL values replaced by NA.

Examples

```
# Example usage:
test_lst <- list(a = 1, b = NULL, c = list(d = 4, e = NULL))
replace_null_recursive(test_lst)
```

validate_jsonld	<i>Validate Json-ld</i>
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Description

Validate Json-ld

Usage

```
validate_jsonld(json_file)
```

Arguments

json_file	Json-ld created from the fairify_data function
-----------	--

Value

Returns a prompt that says whether or not a json-ld is valid

Examples

```
test_pass <- '{
"@context": "http://schema.org/",
"@type": "Person",
"name": "Jane Doe",
"jobTitle": "Professor",
"telephone": "(425) 123-4567",
"url": "http://www.janedoe.com"}'
```

```
#validate_jsonld(test_pass)
```


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