

Package ‘FAIRmaterials’

April 5, 2023

Title Make Materials Data FAIR

Version 0.3.0

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.

License BSD_3_clause + file LICENSE

Encoding UTF-8

LazyData true

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

Roxygen list(markdown = TRUE)

RoxygenNote 7.2.3

Depends R (>= 2.10)

Suggests knitr, rmarkdown, testthat (>= 3.0.0)

Config/testthat/edition 3

VignetteBuilder knitr

NeedsCompilation no

Author Will Oltjen [aut] (<<https://orcid.org/0000-0003-0380-1033>>),
Mingjian Lu [aut],
Liangyi Huang [aut] (<<https://orcid.org/0000-0003-0845-3293>>),
Xuanji Yu [aut] (<<https://orcid.org/0000-0003-1967-3769>>),
Arafath Nihar [aut],
Tommy Ciardi [aut],
Erika Barcelos [aut] (<<https://orcid.org/0000-0002-9273-8488>>),
Pawan Tripathi [aut] (<<https://orcid.org/0000-0002-8604-7744>>),
Abhishek Daundkar [aut],
Deepa Bhuvanagiri [aut] (<<https://orcid.org/0000-0002-5896-545X>>),
Hope Omodolor [aut],
Hein Htet-Aung [aut] (<<https://orcid.org/0000-0002-8191-8213>>),

Kristen Hernandez [aut] (<<https://orcid.org/0000-0001-6139-1218>>),
Mirra Rasmussen [aut],
Olatunde Akanbi [aut] (<<https://orcid.org/0000-0001-7719-2619>>),
Raymond Wieser [aut] (<<https://orcid.org/0000-0003-1531-6430>>),
Sameera Nalin-Venkat [aut] (<<https://orcid.org/0000-0002-9114-4602>>),
Tian Wang [aut] (<<https://orcid.org/0000-0002-6088-4405>>),
Weiqi Yue [aut],
Yangxin Fan [aut] (<<https://orcid.org/0000-0003-1728-9560>>),
Rounak Chawla [aut],
Lecan Jo [aut] (<<https://orcid.org/0000-0001-7026-3779>>),
Jarod Kaltenbaugh [aut],
Zelin Li [aut] (<<https://orcid.org/0000-0002-6287-3697>>),
Jeffrey Yarus [aut] (<<https://orcid.org/0000-0002-9331-9568>>),
Mengjie Li [aut],
Kristopher O Davis [aut],
Laura Bruckman [aut] (<<https://orcid.org/0000-0003-1271-1072>>),
Yinghui Wu [aut] (<<https://orcid.org/0000-0003-3991-5155>>),
Roger French [aut, cre] (<<https://orcid.org/0000-0002-6162-0532>>),
Solar Durability and Lifetime Extension Center [cph, fnd]

Maintainer Roger French <roger.french@case.edu>

R topics documented:

fairify_data	2
fair_expand	4
json_conversion	4
plot_json_graph	5
rename_FAIR	6
rename_fair	6
validate_jsonld	7

Index	8
--------------	----------

fairify_data	<i>FAIRify Data</i>
--------------	---------------------

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	<p>List of columns included in any of your raw dataframes User can FAIRify data in the following domains:</p> <ul style="list-style-type: none"> 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*Expand Json Files*

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*Convert Dataframe to Json from a Template*

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>
-----------------	--

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)
```

rename_FAIR	<i>Rename Columns to FAIR Names</i>
-------------	-------------------------------------

Description

Rename Columns to FAIR Names

Usage

```
rename_FAIR(dataframe, domain)
```

Arguments

- dataframe Dataframe with columns to be renamed
- domain Json-LD template to use for renaming

Value

Dataframe with FAIR column names

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

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

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

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)
```

Index

`fair_expand`, [4](#)

`fairify_data`, [2](#)

`json_conversion`, [4](#)

`plot_json_graph`, [5](#)

`rename_FAIR`, [6](#)

`rename_fair`, [6](#)

`validate_jsonld`, [7](#)