**Types of attributes and methods of the SpectralAnalyzer class**

Notation

* denotes the number of items.
* denotes the number of separate categories associated with the items.
* denotes the number of separate values in the category .
* denotes the number of nodes.
* denotes the number of patterns.
* denotes the number of years for which observations exist.

Attributes

**observations**: list

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CODE** | vector(character) or vector(numeric) | **YEAR** | numeric | **…** | … |
| **CODE** | vector(character) or vector(numeric) | **YEAR** | numeric | **…** | … |
| **…** | … | **…** | … | **…** | … |
| **CODE** | vector(character) or vector(numeric) | **YEAR** | numeric | **…** | … |

**items**: named vector(character)

**items\_categories**: data.frame

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **category 1** | **category 2** | **…** | **category C** |
| **item 1** | factor | factor | … | factor |
| **item 2** | factor | factor | … | factor |
| **…** | … | … | … | … |
| **item I** | factor | factor | … | factor |

**categories\_colors**: list(named vector(character))

|  |  |  |  |
| --- | --- | --- | --- |
| $category1 | $category2 | … | $categoryC |
| |  |  | | --- | --- | | **value 1** | character | | **value 2** | character | | **…** | … | | **value** | character | | |  |  | | --- | --- | | **value 1** | character | | **value 2** | character | | **…** | … | | **value** | character | | … | |  |  | | --- | --- | | **value 1** | character | | **value 2** | character | | **…** | … | | **value** | character | |

**target**: character

**count**: numeric

**min\_length**: numeric

**max\_length**: numeric

**status\_limit**: numeric

**nodes**: data.frame

|  |  |  |
| --- | --- | --- |
| **node** | **length** | **weight** |
| vector(character) | numeric | numeric |

**nodes\_per\_year**: matrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **year 1** | **year 2** | **…** | **year Y** |
| **node 1** | numeric | numeric | … | numeric |
| **node 2** | numeric | numeric | … | numeric |
| **…** | … | … | … | … |
| **node N** | numeric | numeric | … | numeric |

**n\_links**: matrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **node 1** | **node 2** | **…** | **node N** |
| **node 1** | numeric | numeric | … | numeric |
| **node 2** | numeric | numeric | … | numeric |
| **…** | … | … | … | … |
| **node N** | numeric | numeric | … | numeric |

**nodes\_links**: data.frame

|  |  |  |  |
| --- | --- | --- | --- |
| **endpoint.1** | **endpoint.2** | **items** | **weight** |
| numeric | numeric | character | numeric |

**obs\_patterns**: matrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **pattern 1** | **pattern 2** | **…** | **pattern P** |
| **node 1** | logical | logical | … | logical |
| **node 2** | logical | logical | … | logical |
| **…** | … | … | … | … |
| **node N** | logical | logical | … | logical |

**patterns**: data.frame

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **pattern** | **year** | **frequency** | **weight** | **order** | **specificity** | **status** |
| vector(character) | numeric | numeric | numeric | numeric | numeric | character |

**patterns\_per\_year**: matrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **year 1** | **year 2** | **…** | **year Y** |
| **pattern 1** | numeric | numeric | … | numeric |
| **pattern 2** | numeric | numeric | … | numeric |
| **…** | … | … | … | … |
| **pattern P** | numeric | numeric | … | numeric |

**p\_links**: matrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **pattern 1** | **pattern 2** | **…** | **pattern P** |
| **pattern 1** | numeric | numeric | … | numeric |
| **pattern 2** | numeric | numeric | … | numeric |
| **…** | … | … | … | … |
| **pattern P** | numeric | numeric | … | numeric |

**patterns\_links**: data.frame

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **endpoint.1** | **endpoint.2** | **items** | **weight** | **year** |
| numeric | numeric | character | numeric | numeric |

Methods

**spectral.analyzer(observations**: see attribute **observations**, **items**: see data.frame below,

**target**: character, **count**: numeric, **min\_length**: numeric, **max\_length**: numeric,

**status\_limit**: numeric**)**: SpectralAnalyzer

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **item** | **name** | **category 1** | **category 2** | **…** | **category C** |
| character | character | factor | factor | … | factor |

**reset(object**: SpectralAnalyzer, **from**: numeric**)**

**list\_obs\_per\_year()**: see attribute **nodes\_per\_year**

**list\_separate\_obs()**: see attribute **nodes**

**count\_links(entities**: character**)**: see attributes **n\_links** and **p\_links**

**search\_links(entities**: character**)**: see attributes **nodes\_links** and **patterns\_links**

**list\_separate\_patterns(target**: character, **count**: numeric, **min\_length**: numeric,

**max\_length**: numeric**)**: data.frame

|  |  |
| --- | --- |
| **pattern** | **weight** |
| vector(character) | numeric |

**list\_patterns\_by\_obs()**: see attribute **obs\_patterns**

**list\_patterns\_per\_year()**: see attribute **patterns\_per\_year**

**compute\_patterns\_characteristics()**: see attribute **patterns**

**compute\_specificity(patterns**: list(vector(numeric)), **frequencies**: vector(numeric),

**weights**: vector(numeric)**)**: vector(numeric)

**compute\_ksi\_threshold(reporting\_indexes**: vector(numeric)**)**: numeric

**compute\_ri\_threshold(reporting\_indexes**: vector(numeric), **ksi**: numeric**)**: numeric

**compute\_reporting\_indexes(patterns**: list(vector(numeric)), **t**: numeric, **period**: numeric**)**:

data.frame

|  |  |
| --- | --- |
| **pattern** | **ri** |
| vector(character) | numeric |

**check\_params\_for\_RI(t**: numeric, **period**: numeric**)**: list

|  |  |
| --- | --- |
| **t** | numeric |
| **period** | numeric |

**compute\_reporting\_indexes\_limits(patterns**: list(vector(numeric)), **first\_limit**: numeric, **t**: numeric,

**period**: numeric**)**: data.frame

|  |  |  |
| --- | --- | --- |
| **pattern** | **ri\_2** | **ri\_period** |
| vector(character) | numeric | numeric |

**define\_dynamic\_status(patterns**: list(vector(numeric)), **status\_limit**: numeric, **t**: numeric,

**period**: numeric**)**: data.frame

|  |  |
| --- | --- |
| **pattern** | **Status** |
| vector(character) | character |

**spectrum\_chart(patterns\_characteristics**: see attribute **patterns**, **identifiers**: character,

**title**: character, **path**: character, **name**: character**)**: data.frame

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ID** | **pattern** | **frequency** | **weight** | **order** | **specificity** | **status** |
| numeric | vector(character) | numeric | numeric | numeric | numeric | character |

**plot\_spectrum\_chart(patterns\_characteristics**: see attribute **patterns**,

**weights\_by\_node\_type**: see data.frame below, **title**: character**)**

|  |  |
| --- | --- |
| **complex\_nodes** | **simple\_node** |
| numeric | numeric |

**compute\_pattern\_distribution\_in\_nodes(patterns**: list(vector(numeric))**)**: list

[["weight\_distribution"]]:

|  |  |
| --- | --- |
| **1** | vector(numeric) |
| **2** | vector(numeric) |
| **…** | … |
| **P** | vector(numeric) |

[["length\_distribution"]]:

|  |  |
| --- | --- |
| **1** | vector(numeric) |
| **2** | vector(numeric) |
| **…** | … |
| **P** | vector(numeric) |

**spectrosome\_chart(entities**: character, **characteristics**: see attribute **nodes** or **patterns**,

**identifiers**: character, **nb\_graphs**: numeric, **min\_link\_weight**: numeric,

**size\_range**: vector(numeric), **vertex\_size**: character, **vertex\_col**: character,

**clusters**: numeric, **highlight**: numeric, **use\_names**: logical, **n.cutoff**: numeric,

**c.cutoff**: numeric, **display\_mixt**: logical, **title**: character, **path**: character,

**name**: character, **…)**: list

[["vertices"]]:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **node** | **length** | **weight** | **degree** |
| numeric | vector(character) | numeric | numeric | numeric |

or (depends on the value of **entities**)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **pattern** | **frequency** | **weight** | **order** | **specificity** | **status** | **degree** |
| numeric | vector(character) | numeric | numeric | numeric | numeric | character | numeric |

[["edges"]]:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **endpoint.1** | **endpoint.2** | **items** | **weight** |
| numeric | numeric | numeric | character | numeric |

or (depends on the value of **entities**)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **endpoint.1** | **endpoint.2** | **items** | **weight** | **year** |
| numeric | numeric | numeric | character | numeric | numeric |

[["coords"]]: list(matrix)

|  |  |  |
| --- | --- | --- |
|  | **x** | **y** |
| **vertex 1** | numeric | numeric |
| **vertex 2** | numeric | numeric |
| **…** | … | … |
| **vertex P** | numeric | numeric |

**cluster\_text(graph**: see matrix below, **links**: see attributes **nodes\_links** and **patterns\_links**,

**display**: numeric, **highlight**: numeric, **use\_names**: logical, **cutoff**: numeric**)**

|  |  |  |
| --- | --- | --- |
|  | **x** | **y** |
| **vertex 1** | numeric | numeric |
| **vertex 2** | numeric | numeric |
| **…** | … | … |
| **vertex P** | numeric | numeric |

**cluster\_chart(entities**: character, **characteristics**: see attribute **nodes** or **patterns**, **item**: numeric,

**identifiers**: character, **use\_name**: logical, **n.cutoff**: numeric, **vertex\_size**: character,

**size\_range**: vector(numeric), **vertex\_col**: character, **c.cutoff**: numeric,

**display\_mixt**: logical, **title**: character, **path**: character, **name**: character, **…)**: list

[["vertices"]]:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **node** | **length** | **weight** | **degree** |
| numeric | vector(character) | numeric | numeric | numeric |

or (depends on the value of **entities**)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **pattern** | **frequency** | **weight** | **order** | **specificity** | **status** | **degree** |
| numeric | vector(character) | numeric | numeric | numeric | numeric | character | numeric |

[["edges"]]:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **endpoint.1** | **endpoint.2** | **items** | **weight** |
| numeric | numeric | numeric | character | numeric |

or (depends on the value of **entities**)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **endpoint.1** | **endpoint.2** | **items** | **weight** | **year** |
| numeric | numeric | numeric | character | numeric | numeric |

[["coords"]]: matrix

|  |  |  |
| --- | --- | --- |
|  | **x** | **y** |
| **vertex 1** | numeric | numeric |
| **vertex 2** | numeric | numeric |
| **…** | … | … |
| **vertex P** | numeric | numeric |

**network\_density(links:** see attribute **nodes\_links** or **patterns\_links)**: numeric

**degree(ID:** numeric**, links:** see attribute **nodes\_links** or **patterns\_links)**: numeric

**tree\_chart(patterns\_characteristics**: see attribute **patterns**, **identifiers**: character,

**use\_names**: logical, **n.cutoff**: numeric, **display\_status**: logical, **display\_text**: character,

**c.cutoff**: numeric, **title**: character, **path**: character, **name**: character**)**: data.frame

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ID** | **pattern** | **frequency** | **weight** | **order** | **specificity** | **status** |
| numeric | vector(character) | numeric | numeric | numeric | numeric | character |

**plot\_tree\_chart(patterns\_characteristics**: see attribute **patterns**,

**items\_category:** see data.frame below , **category:** character, **c.cutoff:** numeric,

**use\_names**: logical, **n.cutoff**: numeric, **display\_status**: logical,

**display\_text:** character, **title:** character)

|  |  |
| --- | --- |
| **item** | **category** |
| character | character |

**extract\_rules(from**: character or list, **pruning**: logical, **as\_sets**: logical, **…)**: data.frame

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **antecedent** |  | **consequent** | **support** | **confidence** | **lift** | **count** |
| vector(character) | => | character | numeric | numeric | numeric | numeric |

or (**antecedent** and **consequent** types depend on the value of **as\_sets**. Presence of **count** or **itemset** depends on the value of **from**)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **antecedent** |  | **consequent** | **support** | **confidence** | **lift** | **itemset** |
| factor | => | factor | numeric | numeric | numeric | numeric |

**save\_characteristics(entities**: character, **characteristics**: see attribute **nodes** or **patterns** or return of

function **extract\_rules**, **…)**

**check\_access\_for\_category(category**: character or numeric, **value**: character, **stop**: logical**)**: logical

**get\_nodes(nodes\_characteristics**: see attribute **nodes**, **element**: character or numeric,

**value**: numeric or vector(numeric) or character or vector(character),

**condition**: character**)**: see attribute **nodes**

**get\_nodes\_from\_items(nodes\_characteristics**: see attribute **nodes**, **items**: vector(numeric),

**condition**: character**)**: see attribute **nodes**

**get\_nodes\_from\_characteristic(nodes\_characteristics**: see attribute **nodes**,

**characteristic**: character, **value**: numeric,

**condition**: character**)**: see attribute **nodes**

**get\_nodes\_from\_category(nodes\_characteristics**: see attribute **nodes**,

**category**: character or numeric, **value**: character,

**condition**: character**)**: see attribute **nodes**

**get\_patterns(patterns\_characteristics**: see attribute **patterns**, **element**: character or numeric,

**value**: numeric or vector(numeric) or character or vector(character),

**condition**: character**)**: see attribute **patterns**

**get\_patterns\_from\_items(patterns\_characteristics**: see attribute **patterns**, **items**: vector(numeric),

**condition**: character**)**: see attribute **patterns**

**get\_patterns\_from\_characteristic(patterns\_characteristics**: see attribute **patterns**,

**characteristic**: character, **value**: numeric, **condition**: character**)**:

see attribute **patterns**

**get\_patterns\_from\_status(patterns\_characteristics**: see attribute **patterns**, **value**: vector(character),

**condition**: character**)**: see attribute **patterns**

**get\_patterns\_from\_category(patterns\_characteristics**: see attribute **patterns**,

**category**: character or numeric, **value**: character,

**condition**: character**)**: see attribute **patterns**

**get\_links(entities**: character, **characteristics**: see attribute **nodes** or **patterns)**: see attribute

**nodes\_links** or **patterns\_links**

**get\_isolates(entities**: character, **characteristics**: see attribute **nodes** or **patterns)**: see attribute

**nodes** or **patterns**

**get\_non\_isolates(entities**: character, **characteristics**: see attribute **nodes** or **patterns)**: see attribute

**nodes** or **patterns**

**get\_complexes(entities**: character, **characteristics**: see attribute **nodes** or **patterns**,

**category**: character or numeric, **condition**: character, **min\_nb\_values**: numeric**)**: see

attribute **nodes** or **patterns**