

Types of attributes and methods of the class SpectralAnalyzer

Notation

- I denotes the number of items.
- C denotes the number of separate categories associated with the items.
- V_c denotes the number of separate values in the category c .
- N denotes the number of nodes.
- P denotes the number of patterns.
- Y denotes the number of years for which transactions exist.
- $+$ denotes public attributes and methods (i.e. exported attributes and methods).
- $-$ denotes private attributes and methods (i.e. attributes and methods not exported).

Class attributes

- ***STATUS_PERSISTENT***: character
- ***STATUS_DECLINING***: character
- ***STATUS_EMERGENT***: character
- ***STATUS_LATENT***: character

- ***TRANSACTIONS***: character
- ***NODES***: character
- ***PATTERNS***: character
- ***RULES***: character

- ***NODES_OR_PATTERNS***: character
- ***NODES_PATTERNS_OR_RULES***: character
- ***NODES_PATTERNS_OR_TRANSACTIONS***: character

- ***NODE_LINKS***: character
- ***PATTERN_LINKS***: character

Attributes

- + **transactions**: TransactionSet
- + **items**: named vector(character) or named vector(numeric)

+ **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

value 1	character
value 2	character
...	...
value V_1	character

\$category2

value 1	character
value 2	character
...	...
value V_2	character

...

\$categoryC

value 1	character
value 2	character
...	...
value V_C	character

+ **status_colors**: vector(character)

+ **parameters**: list(**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

+ **node_links**: data.frame

endpoint.1	endpoint.2	items	weight
numeric	numeric	character	numeric

+ **nodes_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	length	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

+ **pattern_links**: data.frame

endpoint.1	endpoint.2	items	weight	year
numeric	numeric	character	numeric	numeric

Methods

+ **spectral.analyzer**(**transactions**: see attribute **transactions**, **items**: see data.frame below, **target**: character, **count**: numeric, **min_length**: numeric, **max_length**: numeric, **status_limit**: numeric, **init**: logical, **verbose**: logical): SpectralAnalyzer

item	name	category 1	category 2	...	category C
character	character	factor	factor	...	factor

+ **reset**(**object**: SpectralAnalyzer, **from**: numeric, **verbose**: logical)

+ **init**(**part**: character, **verbose**: logical): itemsets (class object from arules package) or NULL

– **init_nodes**(**verbose**: logical)

- **init_node_links(verbose: logical)**
- **init_patterns(verbose: logical):** itemsets (class object from arules package) or NULL
- **init_pattern_links(verbose: logical)**

- + **is_init(part: character):** logical or vector(logical)
- **is_init_nodes():** logical
- **is_init_node_links():** logical
- **is_init_patterns():** logical
- **is_init_pattern_links():** logical
- **check_init(part: character or vector(character), stop: logical, prefix: character, suffix: character):**
logical or vector(logical)

- **list_trx_per_year():** see attribute **nodes_per_year**
- **list_separate_trx():** see attribute **nodes**
- **count_links(entities: character):** see attributes **n_links** and **p_links**
- **search_links(entities: character):** see attributes **node_links** and **pattern_links**

- **list_separate_patterns(target: character, count: numeric, min_length: numeric, max_length: numeric, arules: logical):** itemsets (class object from arules package) or data.frame

pattern	weight
vector(character)	numeric

- **list_patterns_by_trx():** see attribute **nodes_patterns**
- **list_patterns_per_year():** see attribute **patterns_per_year**
- **compute_patterns_characteristics():** see attribute **patterns**

- **compute_specificity(patterns: list(vector(character)), frequencies: vector(numeric), weights: vector(numeric)):** vector(numeric)

- **check_RI_params(t: numeric, period: numeric):** list

t	numeric
period	numeric

- **compute_reporting_indexes(patterns: list(vector(character)), t: numeric, period: numeric):**
vector(numeric)
- **compute_reporting_indexes_limits(patterns: list(vector(character)), t: numeric, period: numeric, short_limit: numeric):** matrix

RI.period	RI.limit
numeric	numeric

- **compute_xi_threshold(reporting_indexes: vector(numeric)):** numeric

- **compute_ri_threshold**(reporting_indexes: vector(numeric), xi: numeric): numeric
- + **define_dynamic_status**(patterns: list(vector(character)), t: numeric, period: numeric, short_limit: numeric): list

[[“res”]]: data.frame

RI.period	is.above.threshold.1	RI.limit	is.above.threshold.2	status
numeric	logical	numeric	logical	character

[[“thresholds”]]: matrix

	threshold.1	threshold.2
xi	numeric	numeric
RI	numeric	numeric

- + **spectrum_chart**(pc: character or see attribute patterns, identifiers: character, sort: logical, title: character, path: character, name: character): data.frame

ID	pattern	frequency	weight	length	specificity	status
numeric	vector(character)	numeric	numeric	numeric	numeric	character

- **plot_spectrum_chart**(pc: see attribute patterns, weights: see method weight_by_node_complexity, title: character)

- **pattern_node_characteristics**(patterns: list(vector(character))): list

[[“weights”]]:

1	vector(numeric)
2	vector(numeric)
...	...
P	vector(numeric)

[[“lengths”]]:

1	vector(numeric)
2	vector(numeric)
...	...
P	vector(numeric)

- + **weight_by_node_complexity**(patterns: list(vector(character))): matrix

complex	simple
numeric	numeric

- + **spectrosome_chart**(nopc: character or see attribute nodes or patterns, identifiers: character, nb_graphs: numeric, min_link_weight: numeric, vertex_size: character or numeric or vector(numeric), size_range: vector(numeric), vertex_col: character or vector(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"]]: data.frame

ID	node	length	weight	degree
numeric	vector(character)	numeric	numeric	numeric

or (depends on the type of entities contained in **nopc**)

ID	pattern	frequency	weight	length	specificity	status	degree
numeric	vector(character)	numeric	numeric	numeric	numeric	character	numeric

[["edges"]]: data.frame

ID	endpoint.1	endpoint.2	items	weight
numeric	numeric	numeric	character	numeric

or (depends on the type of entities contained in **nopc**)

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 **node_links** and **pattern_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**(**nopc**: character or see attribute **nodes** or **patterns**, **item**: numeric,
identifiers: character, **use_name**: logical, **n.cutoff**: numeric,
vertex_size: character or numeric or vector(numeric),
size_range: vector(numeric), **vertex_col**: character or vector(character),
c.cutoff: numeric, **display_mixed**: logical, **title**: character, **path**: character,
name: character, ...): list

[["vertices"]]: data.frame

ID	node	length	weight	degree
numeric	vector(character)	numeric	numeric	numeric

or (depends on the type of entities contained in **nopc**)

ID	pattern	frequency	weight	length	specificity	status	degree
numeric	vector(character)	numeric	numeric	numeric	numeric	character	numeric

[["edges"]]: data.frame

ID	endpoint.1	endpoint.2	items	weight
numeric	numeric	numeric	character	numeric

or (depends on the type of entities contained in **nopc**)

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 **node_links** or **pattern_links**): numeric

+ **degree**(ID: numeric, links: see attribute **node_links** or **pattern_links**): numeric

+ **itemset_chart**(nopc: character or see attribute **nodes** or **patterns**, identifiers: character, length_one: logical, jitter: logical, under: character, over: character, use_names: logical, n.cutoff: numeric, category: character or numeric, c.cutoff: numeric, sort_by: character, title: character, path: character, name: character): data.frame

ID	node	length	weight
numeric	vector(character)	numeric	numeric

or (depends on the type of entities contained in **nopc**)

ID	pattern	frequency	weight	length	specificity	status
numeric	vector(character)	numeric	numeric	numeric	numeric	character

+ **category_tree_chart**(category: character or numeric, items: see attribute **items**,

use_names: logical, n.cutoff: numeric, c.cutoff: numeric,

vertex_size: numeric, vertex_alpha: numeric, leaf_size: numeric,

leaf_alpha: numeric, leaf_margin: numeric, label_size: numeric,

label_margin: numeric): ggplot2 graph

+ **co_occurrence_chart**(items: see attribute **items**, category: character or numeric,

min_occ: numeric, max_occ: numeric, use_names: logical, n.cutoff: numeric,

c.cutoff: numeric, sort_by: character, vertex_size: numeric,

vertex_alpha: numeric, vertex_margin: numeric, label_size: numeric,

label_margin: numeric, edge_tension: numeric, edge_alpha: numeric,

palette: character or numeric, palette_direction: numeric): ggplot2 graph

+ **extract_rules**(**from**: character or list, **pruning**: logical, **arules**: logical, **as_sets**: logical, ...): rules (class object from arules package) or 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

+ **rules_chart**(**rules**: see method **extract_rules**, **items**: see attribute **items**, **parameters**: list, **display**: character, **threshold**: numeric, **use_names**: logical, **n.cutoff**: numeric, **category**: character or numeric, **c.cutoff**: numeric, **sort_by**: character, **vertex_size**: numeric, **vertex_alpha**: numeric, **vertex_margin**: numeric, **label_size**: numeric, **label_margin**: numeric, **edge_tension**: numeric, **edge_alpha**: numeric, **palette**: character, **palette_direction**: numeric): list

[[**"graph"**]]: ggplot2 graph

[[**"rules"**]]: see method **extract_rules**

+ **save_characteristics**(**characteristics**: character or see attribute **nodes** or **patterns** or return of function **extract_rules**, ...)

+ **get_nodes**(**nc**: character or 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**(**nc**: character or see attribute **nodes**, **items**: vector(numeric), **condition**: character): see attribute **nodes**

– **get_nodes_from_characteristic**(**nc**: character or see attribute **nodes**, **characteristic**: character, **value**: numeric, **condition**: character): see attribute **nodes**

– **get_nodes_from_category**(**nc**: character or see attribute **nodes**, **category**: character or numeric, **value**: character, **condition**: character): see attribute **nodes**

+ **get_patterns**(**pc**: character or 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**(**pc**: character or see attribute **patterns**, **items**: vector(numeric), **condition**: character): see attribute **patterns**

– **get_patterns_from_characteristic**(**pc**: character or see attribute **patterns**, **characteristic**: character, **value**: numeric, **condition**: character): see attribute **patterns**

– **get_patterns_from_status**(**pc**: character or see attribute **patterns**, **value**: vector(character), **condition**: character): see attribute **patterns**

- **get_patterns_from_category**(**pc**: character or see attribute **patterns**,
category: character or numeric, **value**: character,
condition: character): see attribute **patterns**

- + **get_links**(**nopc**: character or see attribute **nodes** or **patterns**): see attribute **node_links** or
pattern_links
- + **get_isolates**(**nopc**: character or see attribute **nodes** or **patterns**): see attribute **nodes** or **patterns**
- + **get_non_isolates**(**nopc**: character or see attribute **nodes** or **patterns**): see attribute **nodes** or
patterns
- + **get_complexes**(**nopc**: character or see attribute **nodes** or **patterns**,
category: character or numeric, **condition**: character, **min_nb_values**: numeric):
see attribute **nodes** or **patterns**

- **check_access_for_category**(**category**: character or numeric, **value**: character, **stop**: logical): logical
- **has_item_names**(): logical
- **get_item_names**(**items**: vector(character) or vector(numeric) according to the attribute **items**):
vector(character)
- **get_items**(**items**: vector(character) or vector(numeric) according to the attribute **items**):
see attribute **items**
- **get_tnp**(**tnp**: character or TransactionSet or see attribute **nodes** or **patterns**, **entities**: character):
see attribute **transactions**, **nodes** or **patterns**
- **get_tnp_itemsets**(**tnp**: character or list(vector(character)), **entities**: character):
list(vector(character))
- **which_entities**(**npr**: see attribute **nodes** or **patterns** or return of function **extract_rules**,
entities: character): character
- **which_associated_links**(**name**: character): character
- **which_name**(**name**: character or vector(character)): character or vector(character)