Package ‘SynthCast’

June 14, 2021

Type Package

Title Synthetic Control Method to Forecast Series

Version 0.2.0

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Description Not a new method implementation.
Usage of the Synthetic Control Method, see Abadie et al. (2011) <doi:10.18637/jss.v042.i13>, as an ad-hoc approach to forecast series with panel in a specific context. The context being: There are units in different stages of a certain journey, there the assumption that the units’ behavior throw out the journey are similar is valid and there are not enough data to use traditional forecasting methods.
For a usage example see the package home page documentation.

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URL https://viniciusmsousa.github.io/SynthCast/

Encoding UTF-8

LazyData true

Imports dplyr, tidyr, Synth, utils, forcats

RoxygenNote 7.1.1

Depends R (>= 2.10)

Suggests covr, testthat (>= 3.0.0)

Config/testthat/edition 3

NeedsCompilation no

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Repository CRAN

Date/Publication 2021-06-14 07:40:13 UTC

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compute_result_tables

compute_result_tables

Description

Internal function. Please refer to run_synthetic_forecast documentation.

Usage

compute_result_tables(
  df,
  synthetic_control_output,
  col_unit_name,
  unit_of_interest,
  serie_of_interest,
  max_time_unit_of_interest,
  periods_to_forecast,
  col_time
)

Arguments

df               Main DataFrame.
synthetic_control_output  Output from compute_synthetic_control().
col_unit_name     String with column name of the column with the units names.
unit_of_interest  Value of the col_unit_name that is of interest.
serie_of_interest Column name of the serie to be projected.
max_time_unit_of_interest  Output from intern_get_max_time_unit_of_interest().
periods_to_forecast  (Integer) Number of periods to forecast.
col_time           String with the column name of the time column.

Value

List with result tables.
compute_synthetic_control

Description

Internal function. Please refer to run_synthetic_forecast documentation.

Usage

compute_synthetic_control(
  prepared_dataset,
  unit_of_interest,
  serie_of_interest,
  col_time,
  max_time_unit_of_interest
)

Arguments

prepared_dataset
  Output from prepare_dataset().
unit_of_interest
  Value of the col_unit_name that is of interest.
serie_of_interest
  Column name os the serie to be projected.
col_time
  String with the column name of the time column.
max_time_unit_of_interest
  Outout from intern_get_max_time_unit_of_interest().

Details

Compute the synthetic control 9wraps Synth package).

Value

List with (i) Synth::dataprep() output and (ii) Synth::Synth() output.
df_example

Dataset with a y series to be forecasted, and its cumulated value.

Description

A generic dataset with a Y value and X predictors.

Usage

df_example

Format

A dataframe with 1275 rows e 32 variaveis:

unit    Unit identification
time_period    Time period, ascending integers.
x1-x28    Variables.

Description

Internal function. Please refer to run_synthetic_forecast documentation.

Usage

intern_elegile_units(
    df,
    col_unit_name,
    col_time,
    max_time_unit_of_interest,
    periods_to_forecast
)

Arguments

df    Main DataFrame.
col_unit_name    String with column name of the column with the units names.
col_time    String with the column name of the time column.
max_time_unit_of_interest
    Output from intern_get_max_time_unit_of_interest().
periods_to_forecast    (Integer) Number of periods to forecast.
**Details**

Selects the eligible units to build the synthetic control: Rule the eligible units are the units that have at least `max_time_unit_of_interest + periods_to_forecast` time periods.

**Value**

DataFrame with the columns: (i) `col_unit_name` and (ii) `manter` (bool)

```python
intern_get_max_time_unit_of_interest

**Description**

Internal function. Please refer to `run_synthetic_forecast` documentation.

**Usage**

```python
intern_get_max_time_unit_of_interest(df, col_unit_name, unit_of_interest, col_time)
```

**Arguments**

- `df` : Main DataFrame.
- `col_unit_name` : String with column name of the column with the units names.
- `unit_of_interest` : Value of the `col_unit_name` that is of interest.
- `col_time` : String with the column name of the time column.

**Details**

Internal function to compute the max time period of the unit of interest.

**Value**

Same type as `col_time`, max value.
**prepare_dataset**

Description

Internal function. Please refer to run_synthetic_forecast documentation.

Usage

```r
prepare_dataset(
  df,
  df_elegible_units,
  col_unit_name,
  col_time,
  unit_of_interest,
  max_time_unit_of_interest
)
```

Arguments

- `df`: Main DataFrame.
- `df_elegible_units`: output from intern_elegible_units().
- `col_unit_name`: String with column name of the column with the units names.
- `col_time`: String with the column name of the time column.
- `unit_of_interest`: Value of the col_unit_name that is of interest.
- `max_time_unit_of_interest`: Outout from intern_get_max_time_unit_of_interest().

Value

A dataset to be inputed in the compute_synthetic_control().

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**run_synthetic_forecast**

Description

Executes all the other package functions in order to have a list with the results table.
run_synthetic_forecast

Usage

run_synthetic_forecast(
  df,  
  col_unit_name,  
  unit_of_interest,  
  col_time,  
  periods_to_forecast,  
  serie_of_interest  
)

Arguments

df                 Main DataFrame.
col_unit_name      String with column name of the column with the units names.
unit_of_interest   Value of the col_unit_name that is of interest.
col_time           String with the column name of the time column.
periods_to_forecast (Integer) Number of periods to forecast.
serie_of_interest  Column name os the serie to be projected.

Value

List with results table.

Examples

synthetic_forecast <- run_synthetic_forecast(
  df = df_example,  
  col_unit_name = 'unit',  
  col_time='time_period',  
  periods_to_forecast=12,  
  unit_of_interest = '30',  
  serie_of_interest = 'x1'  
)
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