

Package: TrafficBDE (via r-universe)

October 9, 2024

Type Package

Title Traffic Predictions Using Neural Networks

Version 0.1.1

Date 2022-07-07

Description Estimate and return either the traffic speed or the car entries in the city of Thessaloniki using historical traffic data. It's used in transport pilot of the 'BigDataEurope' project. There are functions for processing these data, training a neural network, select the most appropriate model and predict the traffic speed or the car entries for a selected time date.

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URL <https://github.com/okgreece/TrafficBDE>

BugReports <https://github.com/okgreece/TrafficBDE/issues>

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Encoding UTF-8

LazyData true

Imports caret, data.table, DescriptiveStats.OBeu, dplyr, lubridate, RCurl, stats, zoo

Suggests devtools, knitr, neuralnet, rmarkdown

VignetteBuilder knitr

RoxygenNote 7.2.0

Repository <https://okgreece.r-universe.dev>

RemoteUrl <https://github.com/okgreece/trafficbde>

RemoteRef HEAD

RemoteSha a4f1d7a0db14e207ed48548504ac02053fe582a0

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| | |
|------------------|---------------------------|
| fillMissingDates | <i>Fill Missing Dates</i> |
|------------------|---------------------------|

Description

This function fills the missing dates from the data.

Usage

```
fillMissingDates(Data, datetime)
```

Arguments

| | |
|----------|---------------------|
| Data | The historical data |
| datetime | The datetime wanted |

Details

This function returns a data frame without missing dates.

Value

A data frame with all the historical data between the first date and the date wanted.

Author(s)

Aikaterini Chatzopoulou, Charalampos Bratsas

See Also

[loadData](#), [fillMissingValues](#)

Examples

```
Speclink <- loadDataSpeclink("163204843", "1", X163204843_1)
x <- fillMissingValues(Speclink)
datetime <- "2017-01-27 14:00:00"
newData <- fillMissingDates (x, datetime)
```

`fillMissingValues` *Fill Missing Values*

Description

This function fills the missing values from the data.

Usage

```
fillMissingValues(Data)
```

Arguments

`Data` The historical data of the roads of Thessaloniki

Details

This function returns a data frame without missing values.

Value

A data frame with all the historical data without missing values

Author(s)

Aikaterini Chatzopoulou, Kleanthis Koupidis, Charalampos Bratsas

See Also

[loadData](#)

Examples

```
Speclink <- loadDataSpeclink("163204843", "1", X163204843_1)
x <- fillMissingValues(Speclink)
```

| | |
|---------------|------------------------|
| kStepsForward | <i>k Steps Forward</i> |
|---------------|------------------------|

Description

This function predicts the wanted value after k steps.

Usage

```
kStepsForward (Data, Link_id, direction, datetime, predict, steps)
```

Arguments

| | |
|-----------|--|
| Data | A data frame with the historical data |
| Link_id | A character with the id of the road needed |
| direction | The direction of the road |
| datetime | The datetime wanted |
| predict | The value to be predicted |
| steps | The number of steps |

Details

This function returns the predicted value after k steps.

Value

The predicted value

Author(s)

Aikaterini Chatzopoulou, Kleanthis Koupidis, Charalampos Bratsas

See Also

[loadData](#)

Examples

```
## Not run:  
kStepsForward (X163204843_1, "163204843", "1", "2017-01-27 14:00:00", "Mean_speed", 1)  
## End(Not run)
```

| | |
|----------|--------------------------|
| loadData | <i>Load traffic data</i> |
|----------|--------------------------|

Description

This function loads the traffic data.

Usage

```
loadData(path)
```

Arguments

| | |
|------|------------------------------|
| path | The path where the data are. |
|------|------------------------------|

Details

This function returns a data frame with the traffic data of the roads of Thessaloniki ordered by the roads.

Value

Returns a data frame.

Author(s)

Aikaterini Chatzopoulou, Kleanthis Koupidis, Charalampos Bratsas

| | |
|------------------|--|
| loadDataSpecLink | <i>Load data for a specific road of Thessaloniki</i> |
|------------------|--|

Description

This function extracts the data of one road of Thessaloniki.

Usage

```
loadDataSpecLink(Link_id, direction, Data)
```

Arguments

| | |
|-----------|--|
| Link_id | A character with the id of the road needed |
| direction | The direction of the road |
| Data | The historical data of the roads of Thessaloniki |

Details

This function returns a data frame with the historical data of a specific road.

Value

A data frame with the data of a specific road

Author(s)

Aikaterini Chatzopoulou, Kleanthis Koupidis

See Also

[loadData](#)

loadTrainTest

Load Train and Test Data

Description

This function returns a list with the train and test data.

Usage

```
loadTrainTest(Data, datetime, predict)
```

Arguments

| | |
|----------|--|
| Data | The historical data |
| datetime | The date time the user wants to predict |
| predict | The value he user wants to predict must be a column name of the data set |

Details

This function returns a list with the train and test data that will be used for train and prediction.

Value

A list with the following components:

- trainsData The trainData for the model
- testsData The testData to be predict

Author(s)

Aikaterini Chatzopoulou, Kleanthis Koupidis, Charalampos Bratsas

Examples

```
SpecLink <- loadDataSpecLink("163204843","1", X163204843_1)
x <- fillMissingValues(SpecLink)
datetime <- "2017-01-27 14:00:00"
newData <- fillMissingDates(x, datetime)
DataList <- loadTrainTest(newData, datetime, "Mean_speed")
```

| | |
|--------------|-------------------|
| PredictionCR | <i>Prediction</i> |
|--------------|-------------------|

Description

This function predicts the average speed of the road.

Usage

```
PredictionCR(List, NNOut, predict)
```

Arguments

| | |
|---------|--|
| List | A list with the following components: trainset, testset, MinMaxFromScaling |
| NNOut | The train model |
| predict | The value to be predicted |

Details

This function returns the predicted average speed.

Value

The predicted average speed of the road

Author(s)

Aikaterini Chatzopoulou, Kleanthis Koupidis, Charalampos Bratsas

See Also

[PreProcessingLink](#), [TrainCR](#)

Examples

```
## Not run:
Speclink <- loadDataSpeclink("163204843", "1", X163204843_1)
x <- fillMissingValues(Speclink)
datetime <- "2017-01-27 14:00:00"
newData <- fillMissingDates(x, datetime)
DataList <- loadTrainTest(newData, datetime, "Mean_speed")
List <- PreProcessingLink(DataList)
NNOut <- TrainCR(List, "Mean_speed")
predicted <- PredictionCR(List, NNOut, "Mean_speed")
## End(Not run)
```

PreProcessingLink *PreProcessing second model*

Description

This function processes the data.

Usage

```
PreProcessingLink(DataList)
```

Arguments

DataList A list with the following components: trainData, testData, trainDataWide, cor-mat

Details

This function returns as a list object the parameters needed to train the model and predict.

Value

A list with the following components:

- trainset The trainset for the model
- testset The testset to be predict
- Minimum The min values of each column of the initial dataset
- Maximum The max values of each column of the initial dataset

Author(s)

Aikaterini Chatzopoulou, Kleanthis Koupidis

Examples

```
SpecLink <- loadDataSpecLink("163204843","1", X163204843_1)
x <- fillMissingValues(SpecLink)
datetime <- "2017-01-27 14:00:00"
newData <- fillMissingDates(x, datetime)
DataList <- loadTrainTest(newData, datetime, "Mean_speed")
List <- PreProcessingLink(DataList)
```

TrainCR

Train

Description

This function trains the model.

Usage

```
TrainCR(List, predict)
```

Arguments

| | |
|---------|---|
| List | A list with the following components: trainset, testset, Min, Max |
| predict | The value to be predicted |

Details

This function returns the trained model.

Value

The train model

Author(s)

Aikaterini Chatzopoulou, Kleanthis Koupidis

See Also

[PreProcessingLink](#)

Examples

```
## Not run:
Speclink <- loadDataSpeclink("163204843","1", X163204843_1)
x <- fillMissingValues(Speclink)
datetime <- "2017-01-27 14:00:00"
newData <- fillMissingDates(x, datetime)
DataList <- loadTrainTest(newData, datetime, "Mean_speed")
List <- PreProcessingLink(DataList)
NNout <- TrainCR(List,"Mean_speed")
## End(Not run)
```

X163204843_1

Sample data from Traffic BDE

Description

Sample data of the traffic data of the road with Lik id "163204843" and direction = "1"

- The Link id of the road
- The direction of the road
- The date and time of the recorded arguments
- The min speed each time
- The max speed each time
- The mean speed each time
- The standard deviation of the speed
- The skewness of the speed
- The kurtosis of the speed
- The entries each time
- The unique entries each time

Format

RData file

Source

TrafficBDE

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