Package 'TrafficBDE'

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Type Package

Title Traffic Predictions Using Neural Networks

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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.

Author Kleanthis Koupidis [aut, cre],
Aikaterini Chatzopoulou [aut],
Charalampos Bratsas [aut],
Panagiotis Tzenos [dtc],
Josep Maria Salanova [dtc]

Maintainer Kleanthis Koupidis <koupidis.okfgr@gmail.com>

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 7.2.1

NeedsCompilation no

Depends R (>= 3.5.0)

Repository CRAN

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R topics documented:

`fillMissingDates` *Fill Missing Dates*

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

```
## Not run:
SpecLink <- loadDataSpecLink("163204843","1", X163204843_1)
x <- fillMissingValues(SpecLink)
datetime <- "2017-01-27 14:00:00"
newData <- fillMissingDates (x, datetime)
## End(Not run)
```

`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 *k Steps Forward*

Description

This function predictes 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 *Load traffic data*

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 *Load data for a specific road of Thessaloniki*

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

```
## 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")
## End(Not run)
```

PredictionCR *Prediction*

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, cormat

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

```
## 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)
## End(Not run)
```

`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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