Package 'ResidentialEnergyConsumption'

January 20, 2025

Type Package

Title Residential Energy Consumption Data

Version 1.1.0

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Description Datasets with energy consumption data of different data measurement frequencies. The data stems from several publicly funded research projects of the Chair of Information Systems and Energy Efficient Systems at the University of Bamberg.

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Depends R (>= 3.5.0)

Enhances SmartMeterAnalytics

Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

NeedsCompilation no

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Contents

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elcons_15min   *15-minute electricity consumption smart meter data.*

Description

Electricity consumption of residential households in Switzerland for seven weeks. The data is provided as *kWh* measurements in 15-min intervals.

Usage

elcons_15min

Format

A data frame with two types of variables:

VID An pseudonym for the household

V001, ..., V672 Electricity consumption trace for one week in kWh

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heatinginfo_15min   *Heating info for 15-min smart meter data.*

Description

Ground truth data on housing type and heating information for the 15-minute smart meter dataset *elcons_15min*. The data was collected from customers of an electric utility company in Switzerland with a survey in 2018.

Usage

heatinginfo_15min

Format

A data frame with the following of variables:

VID An pseudonym for the household

household_type The housing type: *single family home* (detached house), *multi-family home* (multiple dwellings in one house), *semidetached house* and *teraced house* (multiple houses in a row)

heating_type Type of the heating system, either *electric heating*, *heat pump*, *heat pump and boiler*, or *other* (including gas, central heating in a multi-family home)

survey_WP_type Type of the heat pump, when a heat pump is installed, according to the survey response. Can be either *air*, *geothermal*, or *don't know*.

survey_WP_age The age of the heat pump according to the survey response. Can be either *<10 years*, *10-20 years*, *20-30 years*, *>30 years*, or *don't know*

Details

Not all study participants answered the survey, thus, several rows of the table contain only *NA* values.

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solarcadaster_features

Solarcadaster features for individual households.

Description

Data contains information about floor and roof spaces, as well as the energy demand for each individual household. For each household in *elcons_15min*, at least five nearest neighbors are available in this dataset. When there are more than five nearest neighbors, there are at least two core addresses from which the distances were calculated (e.g., 2 adresses means 10 nearest neighbors).

Usage

solarcadaster_features

Format

A data frame with the following of variables:

VID An pseudonym for the household

neighbor_distance Euclidean Distance to the corresponding neighbor

total_revenue_electricity Total revenue of electricity of the household

floor_space The floor space of the household in m2

roof_space The roof space of the household in m2

roof_space_low_m2 The roof space of the household in m2, which is classified as low solar potential

roof_space_medium_m2 The roof space of the household in m2, which is classified as medium solar potential

roof_space_good_m2 The roof space of the household in m2, which is classified as good solar potential

roof_space_verygood_m2 The roof space of the household in m2, which is classified as very good solar potential

roof_space_excellent_m2 The roof space of the household in m2, which is classified as excellent solar potential

roof_space_n The number of different roof spaces of the household.

roof_space_low The roof space of the household in m2, which is classified as low solar potential

roof_space_medium The number of roof spaces of the household, which are classified as medium solar potential

roof_space_good The number of roof spaces of the household, which are classified as good solar
    potential

roof_space_verygood The number of roof spaces of the household, which are classified as very
    good solar potential

roof_space_excellent The number of roof spaces of the household, which are classified as ex-
    cellent solar potential

demand_hotwater The ernergy demand of the household for hot water per year

demand_heating The ernergy demand of the household for floor heating per year

References

Klauser, Daniel (2016). Solarpotentialanalyse für Sonnendach.ch - Schlussbericht. Bundesamt für
Energie BFE, Schweiz. https://pubdb.bfe.admin.ch/de/publication/download/8196

| weather_data | *Weather data from one measuring station.* |

Description

Weather data from a weather station in a central location of the study region. The data contains
hourly measurements over a period of ten weeks, similar to the time span of the dataset *el-
cons_15min*. Weather data are averaged across all available weather stations in the study area
for each unit of time.

Usage

```
weather_data
```

Format

A data frame with the following of variables:

DATE_CET The date and time of the weather observation in Central European Time

WEEK Week of the year as decimal number (00–53) using Monday as the first day of week

WIND_DIRECTION Wind direction in compass degrees. *NA* when air is calm (no wind speed)

CLOUD_CEILING Lowest opaque layer with 5/8 or greater coverage

SKY_COVER Sky cover: CLR-clear, SCT-scattered (1/8 to 4/8), BKN-broken (5/8 to 7/8), OVC-
    overcast, OBS-obscured, POB-partial obscuration

VISIBILITY Visibilityin statute miles (rounded to nearest tenth)

TEMP Temperature measured in fahrenheit

SEA_LEVEL_PRESSURE Sea level pressure measured in millibars (rounded to nearest tenth)

STATION_PRESSURE Station pressure measured in millibars (rounded to nearest tenth)

PCP01 1-hour liquid precip reportin inches and hundredths, that is, the precip for the preceding
    1-hour period

WIND_SPEED Wind speed in miles per hour

Details

This data cannot be used or redistributed for commercial purposes. Re-distribution of these data by others must provide this same notification. (see https://www.ncdc.noaa.gov/)

References

NOAA National Centers for Environmental Information (2020)

Examples

```
data(elcons_15min, weather_data)

#transform 15-minute electricity measurements to hourly consumption values
hourly_cons <- colSums(matrix(t(elcons_15min$w44[1,2:673]), nrow=4))

#select temperature observations for week 44
hourly_temp <- weather_data[weather_data$WEEK==44,"TEMP"]

#compute correlation
cor(hourly_cons, hourly_temp)
```

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