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A review and analysis of regression and machine learning models on commercial building electricity load forecasting.

Autores: Yildiz, B.[1]
Bilbao, J.I.[1] *j.bilbao@unsw.edu.au*
Sproul, A.B.[1]

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Palabras clave proporcionadas por el autor: ANN Artificial Neural Network
AR Auto Regressive
ARIMA Auto Regressive Integrated Moving Average
ARMA Auto Regressive Moving Average
CV Coefficient of Variance
CV-RMSE Percentage RMSE by the mean
DBT Dry Bulb Temperature
DDCAV Dual Duct Under Constant Air Volume
DDVAV Dual Duct Under Variable Air Volume
I Indicator Variable
MA Moving Average
MAPE Mean Absolute Percentage Error
MLR Multivariate Linear Regression
MPE Mean Percentage Error
NARX Nonlinear Autoregressive Network with Exogenous Inputs
Neural Networks
PRISM The Princeton Scorekeeping Method
q i Sensible Heat Gains
q sol Solar Heat Gains
R 2 Coefficient of Determination
R ad j 2 Adjusted Coefficient of Determination
Regression Trees
Review of regression models
RH Relative Humidity
RMSE Root Mean Squared Error
Short term load forecasting for commercial buildings
SLR Single Linear Regression

Support Vector Regression
SVM Support Vector Machine
SVR Support Vector Regression
T dp Dew Point Temperature
TMY Typical Meteorological Year
TRCAV Terminal Reheat Under Constant Air Volume
TRVAV Terminal Reheat Under Variable Air Volume
UNSW University of New South Wales
WWR Window to Wall Ratio

Resumen: Electricity load forecasting is an important tool which can be utilized to enable effective control of commercial building electricity loads. Accurate forecasts of commercial building electricity loads can bring significant environmental and economic benefits by reducing electricity use and peak demand and the corresponding GHG emissions. This paper presents a review of different electricity load forecasting models with a particular focus on regression models, discussing different applications, most commonly used regression variables and methods to improve the performance and accuracy of the models. A comparison between the models is then presented for forecasting day ahead hourly electricity loads using real building and Campus data obtained from the Kensington Campus and Tyree Energy Technologies Building (TETB) at the University of New South Wales (UNSW). The results reveal that Artificial Neural Networks with Bayesian Regulation Backpropagation have the best overall root mean squared and mean absolute percentage error performance and almost all the models performed better predicting the overall Campus load than the single building load. The models were also tested on forecasting daily peak electricity demand. For each model, the obtained error for daily peak demand forecasts was higher than the average day ahead hourly forecasts. The regression models which were the main focus of the study performed fairly well in comparison to other more advanced machine learning models. [ABSTRACT FROM AUTHOR]

Afiliaciones del autor: [1]School of Photovoltaics and Renewable Energy Engineering, University of New South Wales, Sydney, NSW 2052, Australia

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