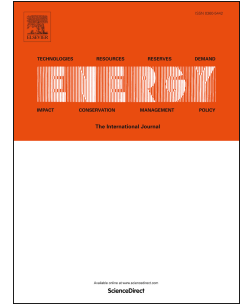


Accepted Manuscript

Water source heat pump energy demand prognosticate using disparate data-mining based approaches

Tanveer Ahmad, Huanxin Chen, Jan Shair



PII: S0360-5442(18)30578-4

DOI: [10.1016/j.energy.2018.03.169](https://doi.org/10.1016/j.energy.2018.03.169)

Reference: EGY 12627

To appear in: *Energy*

Received Date: 29 June 2017

Revised Date: 12 February 2018

Accepted Date: 30 March 2018

Please cite this article as: Ahmad T, Chen H, Shair J, Water source heat pump energy demand prognosticate using disparate data-mining based approaches, *Energy* (2018), doi: 10.1016/j.energy.2018.03.169.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Water source heat pump energy demand prognosticate using disparate data-mining based approaches

Tanveer Ahmad^a, Huanxin Chen^{a*}, Jan Shair^b

^a School of Energy & Power Engineering, Huazhong University of Science and Technology, Wuhan, China

^b State Key Laboratory of Power Systems, Department of Electrical Engineering, Tsinghua University, Beijing, China

*Corresponding author: Prof. Huanxin Chen (chenhuanxin@tsinghua.org.cn)

School of Energy & Power Engineering, Huazhong University of Science and Technology, Wuhan, China

Abstract

This paper examines the data-mining and supervised based machine learning models for predicting 1-month ahead cooling load demand of an office building, including the primitive intention of enhancing the forecasting performance and the accuracy. The data-mining and supervised based machine learning models include; regression support vector machine, Gaussian process regression, scaled conjugate gradient, tree bagger, boosted tree, bagged tree, neural network, multiple linear regression and bayesian regularization. The external climate data, hours/day in a week, previous week load, previous day load and previous 24-hour average load are applied as input parameters for these models. Whereas, the output of the models is the electrical power required for water source heat pump. A water source heat pump located in Beijing, China, is selected for examining 1-month ahead cooling load forecasting, i.e., from July 8 to August 7, 2016. In this paper, simulations are classified into three sessions: 7-days, 14-days and 1-month. The forecast performance is assessed by computing four performance indices such as mean square error, mean absolute error, root mean square error and mean absolute percentage error. The mean absolute percentage error for 7-days ahead cooling load prediction of the water source heat pump from data-mining based models, Gaussian process regression, tree bagger, boosted tree, bagged tree and multiple linear regression were 0.405%, 3.544%, 1.928%, 1.703% and 13.053% respectively. While, mean absolute percentage error of 7-days ahead forecasting in case of machine learning based models such as a regression support vector machine, Bayesian regularization, scaled conjugate gradient and neural network were 12.761%, 2.314%, 6.314%, 2.592% respectively. The percentage forecasting error index proved that the results of data-mining based models are more precise and similar to the existing machine learning models. The results also demonstrate that the better performance and efficiency in foreseeing the abnormal behavior in forecasting and future cooling load demand in the building environment.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات