Robust Big Data Analytics for Electricity Price Forecasting in the Smart Grid

ABSTRACT

Electricity price forecasting is a significant part of smart grid because it makes smart grid cost efficient. Nevertheless, existing methods for price forecasting may be difficult to handle with huge price data in the grid, since the redundancy from feature selection cannot be averted and an integrated infrastructure is also lacked for coordinating the procedures in electricity price forecasting. To solve such a problem, a novel electricity price forecasting model is developed. Specifically, three modules are integrated in the proposed model. First, by merging of Random Forest (RF) and Relief-F algorithm, we propose a hybrid feature selector based on Grey Correlation Analysis (GCA) to eliminate the feature redundancy. Second, an integration of Kernel function and Principle Component Analysis (KPCA) is used in feature extraction process to realize the dimensionality reduction. Finally, to forecast price classification, we put forward a differential evolution (DE) based Support Vector Machine (SVM) classifier. Our proposed electricity price forecasting model is realized via these three parts. Numerical results show that our proposal has superior performance than other methods.

EXISTING SYSTEM

In existing, generally we are consuming electricity for many purposes. Once, we are getting bill at the end of month we can be able to know the cost , number of units consumed and cost of each unit. We are not able to know the electricity bill in advance. Customers are able to partake in the operations where the energy cost can be reduced by energy preservation and load shifting

DRAWBACKS

- We are not in a position to know the price initially.
- We cannot minimize our energy preservations.

PROPOSED SYSTEM

In this paper, we are going to investigate the electricity price forecasting problem in smart grid via joint consideration of feature engineering and classifier parameters adjustment. An electricity price forecasting framework which consists of two- stages feature processing and improved

SVM classifier has been proposed to solve this problem. Specifically, to select those important features, a new hybrid feature selector based on GCA is used to process the n-dimensional time sequence as an input. Additionally, KPCA is applied to extract new features with less redundancy, which boosts SVM classifier in accuracy and speed. Moreover, the DE algorithm obtains the appropriate super parameters for DESVM automatically and efficiently. The numerical results have shown that our proposed framework is more accurate than other benchmark algorithms.

ADVANTAGES

- Customers are able to partake in the operations of smart grid, where the energy cost can be reduced by energy preservation and load shifting
- Reduce power peak load and to balance the gap between power supply and demand.

SYSTEM REQUIREMENTS

H/W System Configuration:-

- Processor - Pentium –IV
- RAM - 4 GB (min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

S/W System Configuration:-

- Operating System : Linux
- Application Server : Tomcat5.0/6.X
- Backend coding : Java
- Tool : Virtual Box
- Environment : Ubuntu
- Technology : Hadoop