Journal of Glycomics & Lipidomics

Extended Abstract

# Mining big data: Current status, and dynamic energy management using big data analytics

**Podili V S Srinivas**

## Abstract

Big Data is another term used to recognize the datasets because of their huge size and unpredictability. We cannot oversee them with our present procedures or information mining programming apparatuses. Huge Data mining is the capacity of extricating helpful data from these extensive datasets or surges of information, that because of its volume, variability, and speed, it was unrealistic before to do it. The Big Data test is getting to be a standout among the most energizing open doors for the following years. This paper proposes Dynamic Energy Management using Big Data Analytics where, our application model of brilliant power lattice empowers a two-path stream of force and information in the middle of suppliers and buyers so as to encourage the force stream advancement as far as financial productivity, unwavering quality and supportability. An attempt is made to present a wide outline of the point, its present status, debate, and figure to what's to come. We present the same by considering four articles as reference composed by compelling researchers in this field, covering the most fascinating and best in class themes on Big Data mining.

A smart grid (SG) is the next-generation power system able to manage electricity demand in a sustainable, reliable and economic manner, by employing advanced digital information and communication technologies. This new platform aims to achieve steady availability of power, energy sustainability, environmental protection, prevention of large-scale failures, as well as optimized operational expenses (OPEX) of power production and distribution, and reduced future capital expenses (CAPEX) for thermal generators and transmission networks. The upcoming technology in the framework of SG facilitates the development and efficient interactive utilization of millions of alternative distributed energy resources (DER) and electric vehicles [1–3]. To this end, each consumer location has to be equipped with a smart meter for monitoring and measuring the bi-directional flow of power and data, while supervisory control and data acquisition (SCADA) systems are needed to control the grid operation.

This is due to its much more complicated nature, since complex decision-making processes are required by the control centers. Energy management systems (EMSs) in SGs include i) real-time wide-area situational awareness (WASA) of grid status through advanced metering and monitoring systems, ii) consumers' participation through home EMSs (HEMS), demand response (DR) algorithms, and vehicle-to-grid (V2G) technology, and iii) supervisory control through computer-based systems. A typical overview of the SG and the included systems and technologies. The quality and reliability of the data collected is a key factor for the optimized operation of the SG, thus rendering data mining and predictive analytics tools essential for the effective management and utilization of the available sensor data. This is because effective DEM relies dramatically on short-term power supply and consumption forecasting, which handles prediction horizons from one hour up to one week. Additionally, the sensor data contains important correlations, trends, and patterns that need to be exploited for the optimization of the energy consumption and the DR, among others. Most of the research related to data mining in SGs deal with predictive analytics and load classification (LC), which are necessary for the load forecasting, bad data correction, determination of the optimal energy resources scheduling, and setting of the power prices. The efficient processing of the produced vast amount of data requires increased data storage and computing resources, which imply the need for high performance computing (HPC) techniques.

DR can be applied to both residential (e.g., cooling, heating, electric vehicles (EVs) charging, etc.) and industrial loads and includes three different concepts: i) energy consumption reduction, ii) energy consumption (or production) shifting to periods of low (or high) demand, and iii) efficient utilization of storage systems. It should be noticed here that plug-in EVs can be considered as storage devices, while the careful scheduling of their charging and discharging can benefit both their owners and the utilities. Obviously, this further increases the parameters that the DEM algorithms have to take into account, such as the EVs charging profiles. Consequently, the associated complexity is also increased, creating at the same time storage capacity prediction problems.Thus, a crucial issue in SGs is how to manage DR in order to reduce peak electricity load, utilizing at the same time renewable energies and storage systems more efficiently. Finally, effectiveness of DR algorithms depends critically on demand, price, load, and renewable energy forecasting, which highlights the need for sophisticated signal processing techniques.

A typical example of this interdependency is load-synchronization, where a large portion of load is shifted from hours of high prices to hours of low prices, without significantly reducing the peak-toaverage ratio. Moreover, insufficientmonitoring and control of the power flow can increase the possibility of failure (e.g., due to load synchronization, overloading, congestion, etc.). The power grid, which is consisted of multiple components such as relays, switches, transformers, and substations, must be carefully monitored. Therefore, the SG requires intelligent real-time monitoring techniques in order to be capable of detecting abnormal events, finding their location and causes, and most importantly predicting and eliminating faults before they happen. This self-healing behavior, renders the power grid a real "immune system", which is one of the most important characteristics of an SG framework, targeting uninterrupted power supply.

In order to deal with the high level of uncertainties in DEM, the extreme size of data, and the need for real-time learning/decision making, the SG demands advanced data analytic techniques, big data management, and powerful monitoring techniques.Since BDA is one of the major driving forces behind an SG, various techniques such as artificial intelligence, distributed and HPC, simulation and modeling, data network management, database management, data warehousing, and data analytics are to be used to guarantee smooth running of SGs. The main challenges of Big Data approaches in SGs is the selection, deployment, monitoring, and analysis of aggregated data in real-time. The BD's role in SG collective awareness, the self-organization capability of SGs, and the service interruptions limitation are thoroughly discussed in. Specifically, it is explained that the reliability of the electricity grid could be enhanced if the users were aware of the effects of their personal energy use on the total consumption and overloading

**This work is partly presented at 2nd International Conference on Big Data Analysis and Data Mining 30-December 01, 2015 San Antonio, USA**

Podili V S Srinivas
Gokaraju Rangaraju Institute of Engineering and Technology, India, E-mail: srinivassai1549@gmail.com