Prospect And Characteristics Of Big Data Analytic In The Health Care System

The prospect of Big data analytic in the health care system

Big data analytics owns the potential to revolutionize the routine of healthcare operational and administrational practices by opening the prospect to make affirmed conclusions by accessing clinical and additional medical data repositories. Big data relevance in health sector includes amassing large categories of data from diverse healthcare facilities subsequently trialed by storing, administering, controlling, analyzing, envisaging and delivering information to augment the decision-making capacity rendered by data acquisition parameters like electronic health records. The big data application in the health sector can be defined through 6 features: velocity, veracity, value, volume, variety and variability (Leventhal, 2013) (Wang, Kung, Wang, & Cegielski, 2014) (Wang & Alexander, 2015) (Jin, Wah, Cheng, & Wang, 2015).

Characteristics of Big data in health care

Volume: It represents the huge magnitude of information procured by the health care organization. Today data acquired by health sectors are in terabytes range (a whopping 1012 bytes), petabytes (1015 bytes or in extreme reach of Exabytes (1018 bytes) (Berger & Doban, 2014). With this range of data collection and with the advancing population enrolling in health services the records will trail in the range of zettabytes (1021 bytes) or yottabytes (1024 bytes). A huge amount of information is accompanied by various troubles such as storage and analysis predicaments in addition to the integrity, security and privacy factors.

Variety: Variety is attributed by the autonomous sources of information that offers extremely contrasting prospects and amalgamation of data ranges (Sepulveda, 2014). Data acquisition comprises of the collection of structures, semi-structured or unorganized data, where laboratory records, sensors data, clinical medication records from relational databases are termed organized (Bello-Orgaz, Jung, & Camacho, 2015). The data available in the XML (Extensible markup language) format falls under the semi-organized categories, with the free texts with no standardized design (mostly manual writings) are categorized as unorganized information (Kumar, Eswari, Sampath, & Lavanya, 2015). Data obtained from radiology reports, X-ray and similar medical imaging are contributed towards unorganized information (Van Horn & Toga, 2014) (Viceconti, Hunter, & Hose, 2015). The data from electronic health records are categorized mostly as unstructured data and thus in the perspective of this research, the application of big data over unstructured data is accentuated.

Velocity: About the literal translation, velocity signifies the frequency at which the most recent data are created, stored, communicated and managed (Jee & Kim, 2013), thus representing the swiftness in managing the data as well as the acuity in handling a large amount of data to stay up-to-date and meet the increasing demands. The velocity of data/ accelerated multiplication of data is a significant feature of big data analytics (Afendi, Ono, & Nakamura, 2013). The data being created as a batch or as real-time information are recurrently unpredictable owing to the increasing intensity of the data assemblies; rundown of previous information and through the

diverse categories of data being streamed from numerous sources (Bello-Orgaz, Jung, & Camacho, 2015). For instance, as the current population ages (as the number of aged persons is increasing), the number of patient attending the hospitals tend to increases by a rate of around 55-60% annually (Stanton, 2002), which signifies the velocity parameter of big data in the healthcare sector. Veracity: veracity refers to the authenticity of the data, the accuracy of the details stored in health care informatics. Data that comes under big data analytics is presumed to be less accurate (less than 100% accuracy) as it is intricate to validate the authenticity of the gathered data statistics (Bello-Orgaz, Jung, & Camacho, 2015). The lower veracity rates are owing to the unconfirmed and largely anonymous sources that contribute to the data. The genuineness of big data informatics can be augmented through the adaptation of standardized procedures.

Variability: Data fluctuation is a common variable in big data analytics as diverse data are inputted in health sector services. A standardized and organized understanding of the variable data enables the health sector's possibility to render valuable services for unforeseen circumstances.

Value: It denotes the method of extorting indispensable information from the huge data set available with the health sector. The data value is the focal point of big data analytics and is the core to guide a decision-making progress (Kaisler, Armour, Espinosa, & Money, 2013). According to (Groves, Kayyali, Knott, & Van Kuiken, 2013), the most efficient method to transform the data into being essential or non-essential with respect to the patient and health provider's perspective is through the following strategic criterion (based on the balance requirement among the outcomes and the cost):

Right living: Patient must be encouraged of the benefits of facilities like the EHR to persuade them to become an active member of their health service.

Right care: Patient must accept the timely treatment that is available at their disposal wholeheartedly and cooperate with facilitators throughout the treatment course.

Right provider: Only qualified medical professionals with qualification over the particular medical procedure must be prearranged to treat the patients to achieve best results.

Right value: Patient's, medical advisors, and administrator should unremittingly work towards expanding the value f medical care while adhering to the quality of service received (in case of patient's) and offered (in case of medical service providers).

Right innovation: This aspect relates to the clinical research that should innovate the medical approaches to improve the treatment qualities.

The application of Big data in healthcare serves the following categories: Data acquisition, data storage; data analytics, data management, data visualization and reporting.

Data Acquisition: Data acquisition essentially means the culmination of clinical information. The application of big data in healthcare contributes to the acquisition of structured, semi-structured and unstructured data (Feldman, Davis, & Chawla, 2015). Electronic health records fall as the primary data source (Al-Jarrah, Yoo, Muhaidat, Karagiannidis, & Taha, 2015). The role of the electronic health record in observed in this prospect as physician record, laboratory results,

health care sensor results in medical prescriptions, medication refill etc., are the foundation for data analyzed to provide better health service.