

An analysis on Effectiveness of Big Data Analytics in Healthcare Industry

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Abstract - Big data analytics is the powerful technology which provides effective service to many areas. In healthcare, this big data analytics provides lot of effects in human life saving. There are numerous amounts of data is being stored day by day. There are so many processes going on within healthcare sector. These are helps the patients as well as the doctors to diagnosis the diseases. Big data analytics helps to process that data for providing useful information and patterns. Though the role of big data analytics techniques, platforms, tools are used in various areas, their role on healthcare is more important.

Keywords: Big data, healthcare, Various Big Data types, Algorithms for Big Data.

INTRODUCTION

In digital world, data are produced from several sources and the fast conversion from digital technologies has led to development of big data. It delivers evolutionary breakthroughs in number of areas with gathering of large datasets. In general, it states to the collection of large and multifarious datasets which are hard to process using traditional database management tools or data processing applications. These are available in the models like structured, semi-structured, and unstructured format in petabytes and beyond. Formally, it is highlighted from 3Vs to 4Vs. 3Vs includes volume, velocity, and variety. Volume denotes to the vast amount of data that are being created everyday whereas velocity is the speed of growing and how fast the data are collected for being analysis. Variety delivers information about the kinds of data such as structured, unstructured, semi-structured etc. The fourth V refers to veracity that comprises accessibility and accountability. The ultimate purpose of big data analysis is to process data of great volume, velocity, variety, and veracity using numerous traditional and computational intelligent techniques

BIG DATA IN HEALTHCARE

The Big data in healthcare sector has processing the vast amounts of data. But it has overcome by disappointments due to the truths of insufficient, unavailability of perfect electronic data. Apart from this such databases are keeping the health related information are hard to link data to other databases and devices to the field of medical[4]. So the outcomes are not able to show on time.

NEEDS FOR BIG DATA ANALYTICS IN HEALTH CARE

To expand the quality of healthcare by considering the following

Afford Patient Centric Services: To distribute the quick help to patients by providing evidence based medicine identifying diseases at the earlier stages based on the clinical data available, reducing drug doses to avoid side effects and suggesting suitable medicine based on history. This helps in reducing re-admission rates there by decreasing the cost spend by patient for their health improvement.

Sensing Spreading Diseases earlier: Forecasting the viral diseases earlier before spreading based on the live analysis. This can be recognized by analyzing the social logs of the patients suffering from a disease in a particular geo-location. This supports the healthcare professionals to suggest the sufferers by taking the necessary preventive measures.

Checking the hospital's quality: Monitoring the hospital structures that are based to the norms setup by Indian medical council. This periodical check-up supports government in taking necessary actions against the hospitals with insufficient facilities.

Enhancing the treatment methods: Customized patient treatment monitoring the effect of medication continuously and based on the analysis dosages of medications can be changed for faster relief. checking patient vital symptoms to provide proactive care to patients. Making an analysis on the data produced by the patients who already suffered from the same symptoms, supports doctor to give effective treatments to new patients.

TYPES OF BIG DATA

Types of Big data in Healthcare are generally classifies in to two categories:

- a) Clinical Operations and
- b) Research & Development

a) Clinical Operations: Clinical Operations denote to all the accomplishments related to patients. It consist of identification or prediction of disease, checking the progress of disease trauma and observations, treatments and reports about the patient disease treatment[5]. The Electronics Healthcare Records are more useful for generating new patient principal of stratification and for illuminating unidentified associations of diseases.

b) Research and Development: The Research and Development is placed a major role in big data health care industry. It required

- 1. Statistical Algorithms and Tools:** for providing the quality treatments and to increase clinical experimental designing.
- 2. Adaptive Clinical Trial:** To estimate a medical treatment or device by the observation of patient outcomes and altering the parameters of the protocol trial in consensus with the earlier observations.
- 3. Predictive Modeling:** To produce more effective medicines and equipments[6].

Apart from this R&D can contribute to

1. *Genomic Analytics*: Implement gene analysis and gene sequencing as a part of common decision process of medical care and to create more cost effectively and efficiently

2. *Evidence Based Medicine*: Study and combine a variety of unstructured and structured data like, electronic medical care records, financial and operational data, genomic data and clinical data to find the treatments with improved results, predict patients from dangerous diseases and provide additional effective care[6].

3. *Patient Profile Analytics*: The patient profiles must be examined using advanced techniques like predictive modeling and segmentation to recognize the beneficiary of individuals because of proactive care. It helps to prevent the dangerous diseases[7].

4. *Remote Monitoring*: Capturing and investigating real enormous volumes of real time fast moving data from home devices and hospitals for adverse event prediction and safety monitoring[8].

5. *Accelerating Discovery*: To increase the trial operations for right innovation. It enhances the production, discovery and safety in R&D. The improved and better result in research and development areas are clinical decision support, cost efficiency research, public health, remote monitoring system and personalized medicine[9].

Life cycle of Big Data

Data Collection: It includes the collection of data from number of sources and saving it in HDFS. Data can be anything such as treatment progress, case history, medical images, social logs, sensor data etc.

Data Cleaning: It involves the process of verifying whether there is any noisy data or any data that has missed values. That kind of data needs to be removed for providing better results.

Data Classification: It involves the classification of data based on their structure. For example Medical Big data consists of mostly unstructured data such as hand written physician notes. Structured, semi-structured and unstructured data should be classified in order to perform meaningful analysis.

Data Modeling: It involves execution analysis on the classified data. For example Government may require the list of cancer patient in a particular location. First it has to classify the data based on the given location, need to trigger the health report of cancer patients, need to identify the patient whose family are under poverty line and these data should be processed.

Data Delivery: It involves the report generation based on the data modeling done. Based on the example after the data is processed it will produce a report based on cancer patient in a particular location. This will help the government to take necessary actions to avoid any further difficulties.

CONCLUSION

In recent years day by day, data are generated at a dramatic pace. Exploring these data is challenging for a common man. From this survey, it is agreed that every big data platform has its specific focus. Some of them are considered for batch processing whereas some are good at real-time analytics. Each big data platform also has certain functionality. Different techniques used for the analysis include cloud computing, intelligent analysis, statistical analysis, machine learning, data mining, quantum computing, and data stream processing. We believe that in future there is a need for giving more attention to some specific techniques to solve problems of big data effectively and efficiently.

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