Chapter 70
An Article on Big Data Analytics in Healthcare Applications and Challenges

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ABSTRACT

The technological advancement has also opened up various ways to collect data through automatic mechanisms. One installed mechanism collects a huge amount of data without any further maintenance or human interventions. The health industry has been confronted by the need to manage the big data being produced by various sources, which are well known for producing high volumes of heterogeneous data. A high level of sophistication has been incorporated in almost all the industry, and healthcare is also one of them. The article explores the existence of a huge amount of data in the healthcare industry, and the data generated in the healthcare industry is neither homogeneous nor simple. Then the various sources and objectives of data are highlighted and discussed. As data come from various sources, they must be versatile in nature in all aspects. So, rightly and meaningfully, big data analytics has penetrated the healthcare industry, and its impact is highlighted.

INTRODUCTION

Huge amount, high speed, versatility converts traditional database into Big Data. These characteristics make big data more difficult and challenging for compilation. The techniques used to compile traditional data; it cannot be used to compile such big data as it is not always collection of structured data (Jaimin & Undavia, 2018). Such informative mass of data prove crucial for purpose of analytics.

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This is because of availability of sophisticated data storage, which stores this huge amount of data. You cannot imagine a world without such data store where versatile information like details of person, organization, transaction performed, etc. are stored. This data can be used to extract valuable information and knowledge for the growth of the particular organization or improved activity. In the recent time, all aspects of information is available related to a customer. It ranges from customer name, its details about the purchase, his social connection, professional association, etc., This proves that, in current time data is the founding stone and vital element of any organization (Elragal, 2014).

The way Big Data is defined is changed against its aspect of application. In the recent time it is characterized as a collection of data elements whose size, speed, type and complexity is changed frequently (Belle, 2015). These frequent changes makes one to seek, adopt and invent new hardware and software mechanisms to manage, store, visualize and analyse these form of data.

The three Vs are Velocity, variety and volume, playing very important role in all various applications of such data. Healthcare is one of the prime user of this Big Data technology. In health care, data is widely spread among multiple health care systems, health insurers, researchers, government entities etc (Manyika, 2011). The data repositories are not always sophisticated enough which can provide platform of transparency for global data. As these kind of data have huge size, versatility in variety and rapid changing in nature, new type of data analytics, well-structured storage and accurate analysis methods are required. This huge amount of data then can be analysed properly and desired information can extracted from them.

Application of the Big Data technology in healthcare has large number of positive outcomes and such outcomes have life-saving phenomenon. Like other fields, in healthcare also, vast quantities of data and information is created/generated through digitization, automatic sensor data, etc. and then these mass have to consolidated and analysed by some specific technologies (Rehermann, n.d.).

The technological advancements have also inferred the way healthcare systems work. Treatment models, data capturing of population or a person, deciding the treatment once a disease is diagnosed, the model of diagnosis, etc. have changed drastically with the advent use of the recent technologies. This all changes are taking place based on the data collected of the same domain so that proper corrective and improved steps can incorporated in recent and newer technologies. Most of these changes are data driven so the healthcare domain also become conscious about the data collection and storage. For the physician who are treating their patients, they always eager to know as much as possible about his patient. This early stage of detection will help the doctors to decide mode of the treatment especially in case of some serious illness or disease. It is already proved that curing of such critical illnesses in early stage is more effective and less expensive as well.

When healthcare industry attempt to use the big data comprehensively, micro level analysis can be done for patient as huge amount of versatile data will be made available about the patient's history, way of treatment of other patients of same decease, other related parameters to cure this decease.

A tailored package of the data can be provided to doctors for better life-saving outcomes.

In past not only in healthcare, but in all industry gathering, storing and maintaining of data was very costly and time consuming too. Now in current time, there is availability of improved technology, it becomes very easy and providing very critical insight of data which can offer better understanding and usage of stored data.