Literature Study On Some Computational Healthcare Systems For Sustainability

SAHANA SRIDHAR
Final year student, BE(CSE) St.Joseph Institute of Technology, OMR Road, Chennai
Email : sahayesyes@gmail.com

Abstract: **Medical data released and shared through the cloud are very popular in practice, and information and knowledge bases can be enriched and shared through the cloud. The revolution presented by the cloud and big data can have a huge impact on the healthcare industry, and a new healthcare system is evolving. This is why we need to design a more appropriate health care system to meet the challenges presented by this revolution. The diversity of data sources requires a uniform standard of heterogeneous data management. On the one hand, due to the diversification of medical equipment, the data formats and the amount of data generated by various devices may be quite different, which requires that the system support data access by various medical devices to ensure high scalability and satisfy actual medical needs. On the other hand, the system needs to convert the received data into a unified standard to improve the efficiency of data storage, query, retrieval, processing, and analysis. This paper presents Literature *Study on Computational Healthcare Systems for sustainability*.**

Key words : **Medical Industry; Timeliness; Healthcare Systems; Sustainability; Scalability;**

INTRODUCTION

Today, we are facing a situation wherein we are flooded with tons of data from every aspect of our life such as social activities, science, work, health, etc. In a way, we can compare the present situation to a data deluge. The technological advances have helped us in generating more and more data, even to a level where it has become unmanageable with currently available technologies. This has led to the creation of the term 'big data' to describe data that is large and unmanageable. In order to meet our present and future social needs, we need to develop new strategies to organize this data and derive meaningful information. One such special social need is healthcare. Like every other industry, healthcare organizations are producing data at a tremendous rate that presents many advantages and challenges at the same time. The diversity of data content requires a unified programming interface for multiple data analysis modules. Analytical techniques have also been extended to require complex analysis for accommodating the four characteristics of big data in the medical field due to inconsistencies in the sources, structures, functional scenarios, and nature of health. The days of collecting data on electronic health records and other structured formats. Diversified medical data, including structured, semi structured and other unstructured data, represent one aspect making medical data both interesting and challenging. Based on different data structures, the system can efficiently deploy and analyze data online or offline, such as via stream processing, batch processing, iterative processing, and interactive query, therein reducing system complexity and improving development and access efficiency.

Defining big data

The 'big' part of big data is indicative of its large volume. In addition to volume, the big data description also includes velocity and variety. Velocity indicates the speed or rate of data collection and making it accessible for further analysis; while, variety remarks on the different types of organized and unorganized data that any firm or system can collect, such as transaction-level data, video, audio, text or log files. These three Vs have become the standard definition of big data. Although, other people have added several other Vs to this definition, the most accepted 4th V remains 'veracity'. The term "*big data*" has become extremely popular across the globe in recent years. Almost every sector of research, whether it relates to industry or academics, is generating and analyzing *big data* for various purposes. The most challenging task regarding this huge heap of data that can be organized and unorganized, is its management. Given the fact that big data is unmanageable using the traditional software, we need technically advanced applications and software that can utilize fast and cost-efficient high-end computational power for such tasks.

Implementation of artificial intelligence (AI)

Implementation of artificial intelligence (AI) algorithms and novel fusion algorithms would be necessary to make sense from this large amount of data. Indeed, it would be a great feat to achieve automated decision-making by the implementation of machine learning (ML) methods like neural networks and other AI techniques. However, in absence of appropriate software and hardware support, big data can be quite hazy. We need to develop better techniques to handle this 'endless sea' of data and

smart web applications for efficient analysis to gain workable insights. With proper storage and analytical tools in hand, the information and insights derived from big data can make the critical social infrastructure components and services (like healthcare, safety or transportation) more aware, interactive and efficient. In addition, visualization of big data in a user-friendly manner will be a critical factor for societal development.

Healthcare as a big-data repository

The health professionals belong to various health sectors like dentistry, medicine, midwifery, nursing, psychology, physiotherapy, and many others. Healthcare is required at several levels depending on the urgency of situation. Professionals serve it as the first point of consultation (for primary care), acute care requiring skilled professionals (secondary care), advanced medical investigation and treatment (tertiary care) and highly uncommon diagnostic or surgical procedures (quaternary care). At all these levels, the health professionals are responsible for different kinds of information such as patient's medical history (diagnosis and prescriptions related data), medical and clinical data (like data from imaging and laboratory examinations), and other private or personal medical data.

Wireless Communications and Mobile Computing

Simple analysis includes personal retail consumption records reflecting lifestyle habits that can be used to assess personal health risks and develop personalized health plans. Based on the physiological data collected by wearable devices, the user's health can be easily monitored and tracked. Personal emotion data can be collected through information posted on social networks and can be used for mental health measures and emotion calculations. Particularly for the rehabilitation of patients, doctors can adjust the treatment plan based on the patient's emotions.

The emotional perception of medical services

Adapter is a data node that provides access to system middleware, not simply the physical data link or the original data pre-processor and encryptor. In addition to cleaning up the data, removing redundancy, and compression, the pre-processing module also supports data format conversion. Depending on the type of data collected, the adapter uses a system-defined data standard for format con-version. The encryption module encrypts the pre-processed data to ensure security via hierarchical privacy protection. Unauthorized devices cannot decrypt packets even if they have access to the system.

Simple analysis

Distributed network storage systems adopt a scalable system architecture that utilizes multiple storage servers to share the storage load and uses the location server to locate and store information. This not only improves system reliability, availability, and access efficiency but also is easily expandable. The distributed storage architecture consists of three parts: the client, the metadata server, and the data server. The client is responsible for sending read and write requests, cache file metadata, and file data. The metadata server is responsible for managing the metadata and processing client requests and is the core component of the entire system. The data server is responsible for storing the file data to ensure the availability and integrity and the data. The benefits of this architecture are that both performance and capacity can be expanded simultaneously, and the system is highly scalable.

Distributed storage

Distributed storage is facing more complicated data needs, which can be divided into three categories. Unstructured data: unstructured data include all formats of office documents, text, images, audio, and video information. Structured data: structured data are stored in data relational libraries; one can use two-dimensional relational table structure representations. The structured data schema(schema, including attributes, data types, and the links among data) and the content is separate, and the data model needs tobe predefined. Semi-structured data: between unstructured data and structured data, HTML documents belong to the semi-structured data category. Such data are generally self-describing, and the biggest difference from structured datais that the schema structure and content of semi-structured data are mixed, with no obvious distinction and no schema structure that predefines the data.

Big Data in healthcare

Various public and private sector industries generate, store, and analyze big data with an aim to improve the services they provide. In the healthcare industry, various sources for big data include hospital records, medical records of patients, results of medical examinations, and devices that are a part of internet of things. Biomedical research also generates a significant portion of big data relevant to public healthcare. This data requires proper management and analysis in order to derive meaningful information. Otherwise, seeking solution by analyzing big data quickly becomes comparable to finding a needle in the haystack. There are various challenges associated with each step of handling big data which can only be surpassed by using high-end computing solutions for big data analysis. That is why, to provide relevant solutions for improving public health, healthcare providers are required to be fully equipped with appropriate infrastructure to systematically generate and analyze big data. An

efficient management, analysis, and interpretation of big data can change the game by opening new avenues for modern healthcare. That is exactly why various industries, including the healthcare industry, are taking vigorous steps to convert this potential into better services and financial advantages. With a strong integration of biomedical and healthcare data, modern healthcare organizations can possibly revolutionize the medical therapies and personalized medicine.

CONCLUSIONS

Medical data released and shared through the cloud are very popular in practice, and information and knowledge bases can be enriched and shared through the cloud. The revolution presented by the cloud and big data can have a huge impact on the healthcare industry, and a new healthcare system is evolving. This is why we need to design a more appropriate health care system to meet the challenges presented by this revolution. The diversity of data sources requires a uniform standard of heterogeneous data management. On the one hand, due to the diversification of medical equipment, the data formats and the amount of data generated by various devices may be quite different, which requires that the system support data access by various medical devices to ensure high scalability and satisfy actual medical needs. This paper has given details as literature *Study on Computational Healthcare Systems for sustainability*

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