'Research Journey' International Multidisciplinary E- Research Journal
Special Issue I – Emerging Trends & Issues in Research & Development
Global Impact Factor – 0.565 (2014) & 0.676 (2015)
ISSN : 2348-7143 (Online)
April-May-June - 2016

A REAL TIME MONITORING SYSTEM IN HEALTHCARE WITH HADOOP

Mrs. Komal V. Shinde
Dept. of Comp. Sci., M.S.G. College,
Malegaon Camp, Nashik
komalshinde199@gmail.com

Abstract

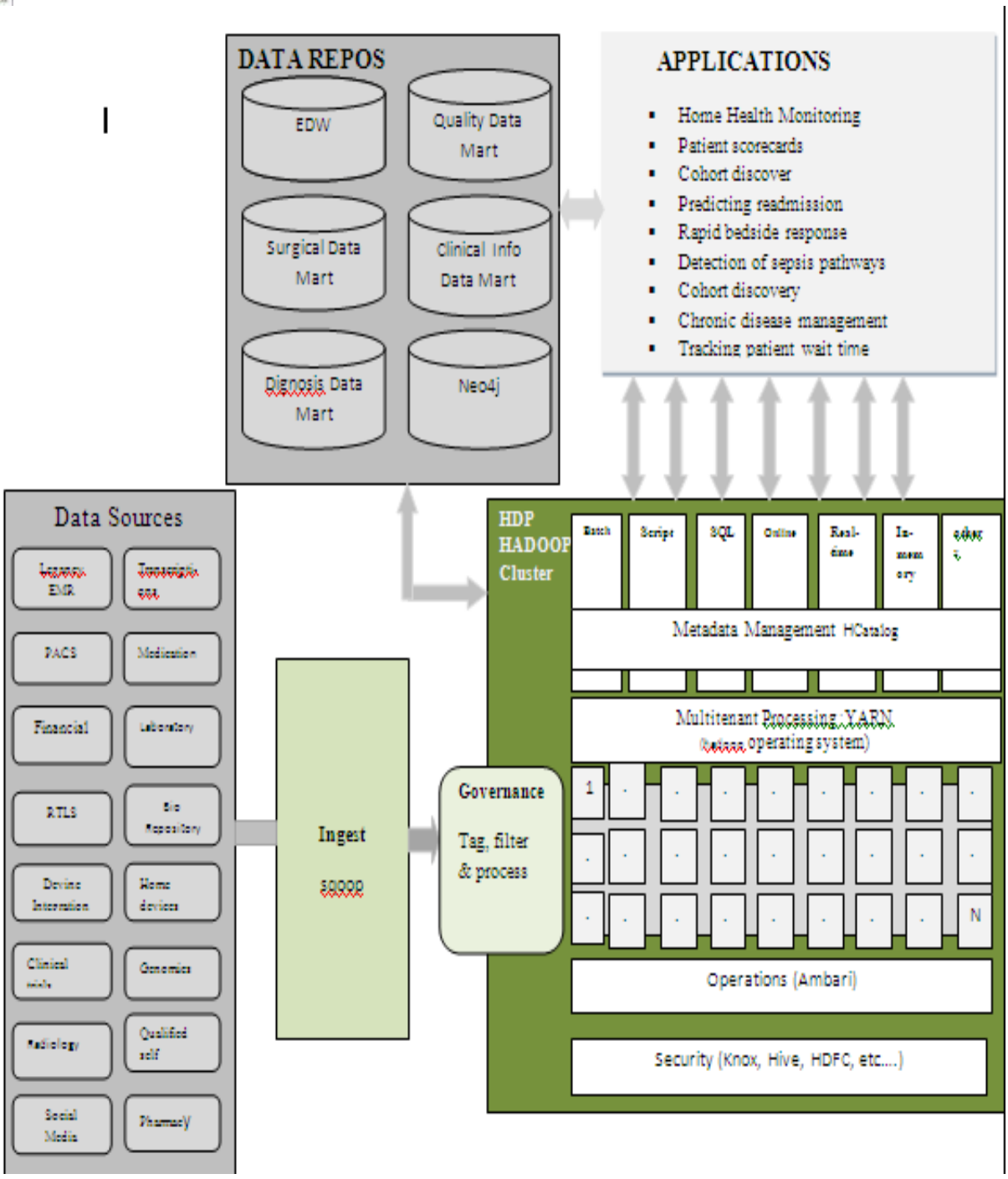
It is an attempt to describe the promise and potential of big data analytics in healthcare. The new wireless sensors can capture and transmit patient vitals at much higher frequencies, and these measurements of the sensors can feed into a HADOOP . The main purpose of this paper is to describe vital role in improving the quality and working of healthcare system, cost and time of the healthcare system by delivering right information to right people at right time. Having acknowledge that the data science can help in improving the dynamics of healthcare system using "Real Time Monitoring System"

Keywords: *HDFC (Hadoop Distributed File System)*

Introduction

HADOOP is nothing but basic conceptual structure for the purpose of data storing and providing the environment to running the application on group of suitability of hardware [1]. It supports to store the large volume of data for any kind of big data, what exactly is big data? A report delivered to the U.S. Congress defines big data as "large volumes of complex, high velocity and variable data that require modern techniques and technologies to enable the storage, capture, distribution, management and analysis of the information".

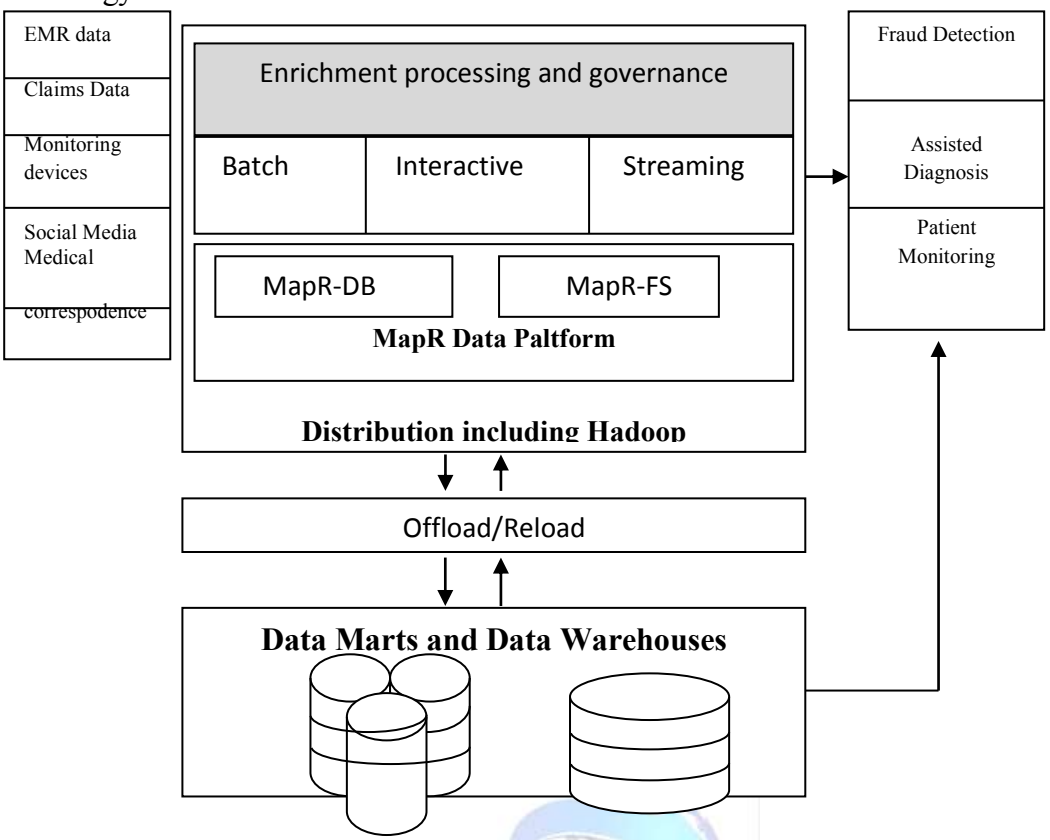
Massive data processing power and the unique power to handle virtually limitless simultaneous jobs or process. HADOOP's distributed computing model processes big data fast. Data and running application processing are defended against hardware failure. If a certain node goes down, the running jobs are automatically redirected to other nodes to make ensure that the distributed computing does not fail. Multiple copies of all data are stored automatically to each node in distributed database system. Unlike available traditional databases systems, we don't have to preprocess data before storing it. We have to store as much as data that we want and have to decide how to use it in future. The commitment of low-cost, available to use storage and processing has drawn many organizations to HADOOP. Yet, the questions remain like: Can HADOOP help with big data and analytics then how?[2].



Hadoop for Healthcare

The use of Hadoop is to Save Lives While Delivering More Efficient Care Difficult challenges face today's healthcare industry. Hospital administrators, technology and clinicians, providers and pharmaceutical researchers, have to make important decision often without sufficient accurate, transparent data.

We observed use cases where healthcare service provider will get the benefit of big data technology



The author using Hadoop already had a permission "that needed them to use at vital signs of patients" during their stay at the hospital. Before, a nurse or health care provider would take snapshots of the vital signs for every second and put them into the EMR. They did not have sufficient time to do that a lot, generally they have to done four times per day at most. "Researches wanted to see a whole history of each patient, a continuous curve of the vital signs of a admitted patient," in order to determine the patterns and condition of patient. That continuous storage of high frequency data generated by the sensor could be accessed easily with an SQL server and then storing it on HDFS.

Device or remote monitoring: It captures and analyze in real-time large volumes of fast-moving data from in-home and in-hospital devices, for safety monitoring and adverse event prediction.

Patient profile analytics: It apply advanced analytics to patient profiles (e.g., predictive modeling and segmentation) to identify individuals who would benefit from enterprising care or lifestyle changes, e.g those patients at risk of developing a specific disease (e.g., blood pressure) who would benefit from preventive care.

According to, areas in which increased data and analytics back down the greatest results include: pinpointing patients who are the greatest consumers of health resources or at the greatest imperil

for adverse outcomes; providing individuals with the information they require to make informed decisions and more effectively manage their own health as well as more easily adopt and track healthier behaviors; identifying treatments, processes and programs that do not deliver demonstrable benefits or cost too much; decreasing readmissions by identifying environmental or lifestyle factors that increase risk or trigger adverse adjusting treatment plans and events accordingly; improving outcomes by examining vital signs from at-home health monitors; managing inhabitant health by detecting vulnerabilities within patient populations during disease outbreaks or disasters; and bringing financial, operational , clinical and data together to analyze resource utilization productively and in real time. [4]

Like big data in healthcare system, the analytics related with large amount of data is described by three primary characteristics: volume, variety and velocity. Over time, health-related data will be created and gathered continuously, resulting in an incredible *volume* of data. The already intimidating volume of existing healthcare data includes radiology images, clinical trial data FDA submissions, personal medical records, human genetics and population data genomic sequences, etc. Newer forms of large data, such as biometric sensor readings, 3D imaging, are also fueling this exponential growth. Fortunately, advances in data management process, particularly cloud computing and virtualization, are facilitating the development of platforms for more effective storage, capture and manipulation of large volumes of data. Data is accumulated in real-time and at a rapid velocity and pace. The constant flow of new data accumulating at unprecedented rates presents new challenges. Just as the variety and volume of data that is collected and stored has changed, so too has the velocity at which it is generated and that is necessary for recovering, comparing, analyzing, and making decisions based on the output. Most of the healthcare data has been traditionally static x-ray films, scripts, and paper files. Velocity of mounting data increases with data that represents continuous monitoring, such as, blood pressure readings or multiple everyday diabetic glucose measurements or more continuous control on sugar level of a patient by using insulin pumps. Meanwhile, in many medical situations, operating room monitors for anesthesia, constant real-time data like trauma monitoring for blood pressure, bedside heart monitors, etc. can mean the difference between life and death.

Future applications of real-time monitoring data, such as detecting infections as early as possible, identifying them fleetly and applying the right treatments could reduce patient mortality and morbidity and even prevent hospital outbreaks. Already, real-time streaming data monitors new born child in the ICU, catching life-threatening infections earlier. The capability to perform real-time analytics against such high-volume data in motion and across all specialties would revolutionize healthcare.

Conclusion :

The decision making in healthcare system can be improved largely by using Big Data Technologies like Hadoop. Using Hadoop , health care providers can now process big data sets to see the evidences and arrive at right decision faster than before. In this paper I examined few use cases where health care provider will get the benefit of massive data technology. In the future we'll see the widespread implementation, rapid and use of big-volume data analytics across the healthcare industry and the healthcare organization. At Last, the several challenges highlighted above, must be addressed. As big data analytics becomes more conventional, issues such as safeguarding security, guaranteeing privacy, governance, establishing standards and, continually improving the tools and technologies will assemble attention.

References :

[1] https://en.wikipedia.org/wiki/Apache_Hadoop

[2] https://www.google.com

[3] http://cdn.oreillystatic.com

[4] S.Vikram Phaneendra & E.Madhusudhan Reddy, "Big Data- solutions for RDBMS problems- A Survey", 12th IEEE/IFIP Network Operations & Management Symposium, Osaka,Japan, Apr. 2013.

[5] https://www.apollohospitals.com

[6] Richard Proctor, "HDP for Healthcare Providers: Common Data Challenges", An article.

[7] http://hadoopilluminated.com/hadoop_illuminated/hadoop-illuminated.pdf

[8] Serge Blazhievsky, "Intorduction to Haddop, MapReduce and HDFS for Big Data Application", SNIA Committee, Sep. 2013.