

Big Data in Indian Healthcare Analytics towards Future Opportunities and Challenges

¹S. BHANU PRASAD RAO ²NANCHARLA VINAY

¹Assistant Professor, Computer Science and Engineering, Tirumala Engineering College, Keesara, Medchal District, Telangana State, India

²Assistant Professor, Computer Science and Engineering, Tirumala Engineering College, Keesara, Medchal District, Telangana State, India

ABSTRACT:

Healthcare industry is developing at an extremely good tempo as a result of its strengthening coverage, offerings and growing expenditure through public as nicely personal players. A Big data can unify all patient associated information to get a 360-degree view of the patient to investigate and are expecting outcomes. It is able to enhance medical practices, new drug improvement and fitness care financing system. It offers a variety of advantages consisting of early disorder detection, fraud detection and higher healthcare satisfactory and efficiency. The modern Indian Healthcare system is in need of an intensive reinvention. In India, growth in income tiers, growing older populace, growing health focus and changing mindset closer to preventive healthcare is predicted to enhance healthcare services demand in destiny. The huge growth of the quantity, pace, and kind of digital fitness statistics creates both manageability problems and possibilities for greater patient insights. Finding a manner to successfully manipulate huge Insights to subsequently "expect, personalize, and prevent" should cause early detection of potential issues, this means that more healthy human beings, in addition to fewer complications and admissions. This paper introduces the big data idea and traits, health care information and a few important issues of big data. Those troubles consist

of big data advantages, its applications and possibilities in clinical regions and health care. Methods and technology development about massive information are presented on this study. Big data challenges in scientific applications and health care also are mentioned.

I. Introduction

Big data is the data which exceeds the processing capability of the conventional data processing systems. Generally, the data is very huge, comes too fast, and doesn't fit with the model of conventional database architectures. Big data have six characteristics which can be demonstrated by "6Vs". Those are: Volume, Velocity, Veracity, Variety, Value, and Variability. A Volume is representation of data size which might in terabytes, petabytes and zettabytes. A Velocity represents data generation speed. A Variety is a representation of all types of data. A Value refers to the data value that the data adds to creating the knowledge. There may be some valuable information at some place within the data. Variability is a change in a data at the data processing and life cycle. Increasing the variety and variability will increase data attraction and potentiality in providing the unexpected, hidden and valuable information. Veracity includes two things:

first, Data Consistency (or) Data Certainty and data the second is trustworthiness. A Data may be in unclear with incompleteness, several ambiguities,

data deception and the uncertainty due to the data inconsistency and so on.

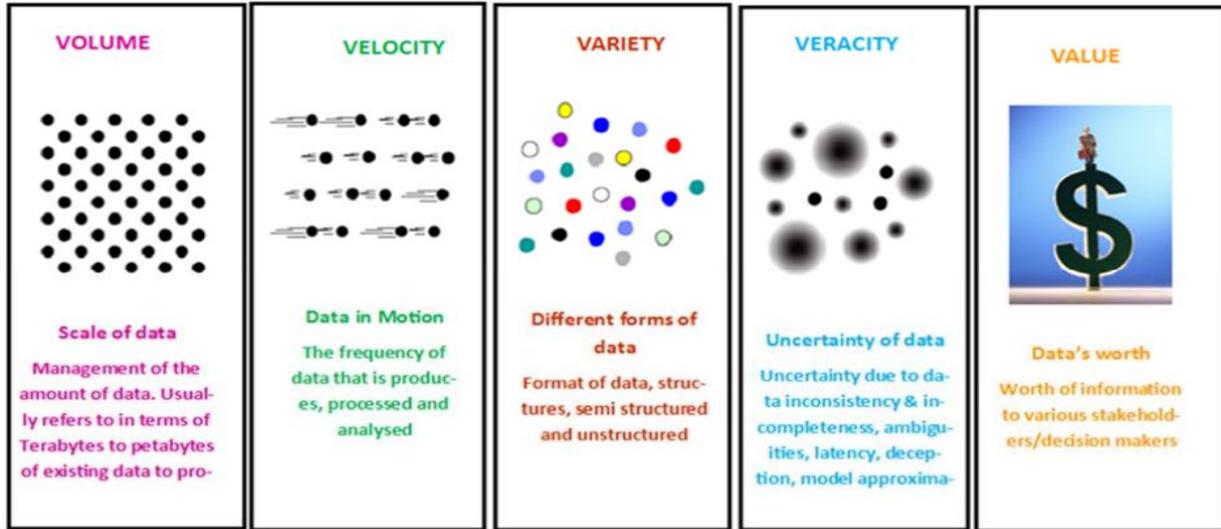


Fig. 1: Big Data Characteristics with 5V representation

II. Big Data in Healthcare

Big data in healthcare is generally electronic health data sets which are very large and complex and is hard to manage with traditional data management techniques and traditional software or hardware tools. Some of the health data is characterized by a need for the timeliness; as an example, a data generated by the wearable or by the implantable biometric sensors; a blood pressure or the heart rate is to be collected often and analyzed in the real-time. Data in healthcare can be classified as genomic data, clinical data, behavior data, patient sentiment data, health publication and clinical reference data and administrative, business and external data.

III. Opportunities and Improvements with Big Data in Indian Healthcare System

Maximum Indian Healthcare companies are now embarking on the analytics adventure. data control systems and EMRs have been integrated by positive tertiary care hospitals to create a vital repository of historic data in the form of data warehouses and finally, use it to mine data, to do research and analytics to make smarter selections for advanced satisfactory of healthcare. Big data Analytics is starting up many avenues and opportunities in Indian healthcare system. As proven in figure 2.



Fig. 2: Opportunities of Big data analytics in healthcare

i. Clinical Decision Support Systems

Big data analytics methods that scrutinize huge amounts of data, cause them to be comprehensible, do categorization and extract information from it. Those then expect effects or advise interventions and alternative remedies to doctors and sufferers on the factor of care. This will assist in making accurate and well timed decisions about proper analysis, remedies and prevention plans and for the elimination of mistakes. Clever Health India, a medical decision support system for cardiovascular diseases, is one such instance.

ii. Predict Spreading of epidemics

While the infectious disease outbreaks, information that is gathered via health organizations and government reporting institutes may not be handy for weeks, which can postpone early epidemiologic evaluation. Social media can be helpful to get it in near actual-time. Google confirmed that it's miles viable to tune the outbreak of Flu in United States and

Dengue fever in Brazil and India the use of not anything extra than archived searching queries. The notion at the back of this is to see whether an growth within the frequency of positive search phrases – consisting of headache or fever – correlates with the America's reputable Flu/Dengue data.

iii. Preventive Healthcare

In addition to the standard administrative and scientific data, incorporating extra information approximately the patient and his or her surroundings might also provide better expectancies and help target medicines to the proper sufferers. Their fitness provider can then prescribe powerful preventive motion plan to them.

iv. Fraud Management

In India, it is predicted that the number of fake medical insurance claims within the healthcare enterprise is about 15 per cent of overall claims and about 600 - 800 crores losses incurred on fraudulent claims yearly. Large records evaluation permits auditors and fraud examiners to research healthcare agency's big records to benefit perception into how well internal controls are running and to discover transactions that indicate fraudulent activity or the heightened chance of fraud in actual-time

v. Personalized Medicine

The combination of EMRs, clinical claims, movies, clinical photos, scanned documents, and physicians' notes permits corporations to create a wealthy, 360-degree view of each patient. Treatment can be prescribed based on interest reputation using mobile

smart phone Accelerometers of sufferers. Analysis on all of these collected facts will help determine the precise quantity and type of remedy that a character affected person could require, then similarly reducing healthcare fees. Greater personalized drugs that use affected person-specific information which include genomics and proteomics may be created based on the profiling of comparable patients and their responses to such strategies

vi. Telemedicine

With telemedicine, hospitals desire to lower the cost of patient care and growth the effectiveness of chronic ailment management in far off locations equal to the offerings rendered by way of the city hospitals. It collects all feasible affected person records to create thorough electronic fitness facts for every affected person. The Indian authorities have additionally issued suggestions on recommendations, requirements & Practices for Telemedicine in India.

IV. Challenges of Big Data Analytics

India being the second maximum populous country in the globe and having healthcare infrastructure which is overburdened with this ever-increasing population, there are many of demanding situations in implementation of big data analytics.

i. Digitization Problem

At present, in India, many healthcare organizations and their managements admire the benefits of electronic medical data but seldom use them. The cutting-edge drive for well-known health insurance in India highlights the importance of implementing

records generation as a method of reducing costs and improving performance in the healthcare subject. However, at present, only a few hospitals are retaining EMRs, particularly because of value, privacy problems, and the shortage of one compatible, simple-to-use infrastructure.

ii. Data Heterogeneity, Complexity and Incompleteness

Inferring information from complicated heterogeneous patient sources and leveraging the patient/records correlations in longitudinal data is a large task. To deal with scientific notes complete of grammatical mistakes, brief terms, abbreviations & misspellings is a tedious activity. Also to recognize those unstructured scientific notes in the right context is a large project.

iii. Data Interoperability

In healthcare, every other challenge is the fragmentation and dispersion of information most of the various stakeholders, inclusive of payers, carriers, labs and so forth. Payers, providers, research facilities and other constituents all have their own silos of information. Those are essentially difficult to combine because of concerns about privateness and propriety, the complicated and fragmented nature of the facts, in addition to the unique schemas and standards underlying the data and lack of metadata inside each silo

iv. High Investment Cost

Indian Healthcare businesses are wary of era integration due to the additional price burden

resulting from the requirement of IT infrastructure and technical expertise. Harnessing the electricity of big facts may be high-priced.

v. **Data Privacy and Security**

while the healthcare organizations harnesses the power of huge data, safety and privateness problems turn out to be important as emerging threats and vulnerabilities continue to grow. As information receives bigger, de-anonymity will become hard.

V. **Conclusion**

Healthcare is a information-rich domain. As more and more data is being collected, there will be growing demand for big data Analytics. Unraveling the “large data” related complexities can provide many insights approximately making the proper choices on the proper time for the patients using scientific choice help systems. efficiently utilizing the enormous healthcare information repositories can yield a few on the spot returns in phrases of Preventive Healthcare, Telemedicine, personalized medicine and Fraud management in order to drastically decrease healthcare costs. However, there exist huge challenges to be overcome by means of Indian Healthcare industry inclusive of Digitization, Heterogeneity, cost and get entry to of facts, organizing requirements and governance, information privateness and protection & system user-friendliness in Indian Healthcare enterprise. Those are good sized challenges as we try to attain effects comparable with (or better than) human specialists thru computerized strategies.

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Author Profiles:

Author 1:



S. Bhanu Prasad Rao, Assistant Professor, Computer Science and Engg., Tirumala Engineering College, Affiliated to JNTUH and Approved by AICTE, Bogaram, Near Keesara, Medchal District, Telangana State, India, PIN: 501301.

Email: prasadshapally86@gmail.com

Author 2:

Nancharla Vinay, Assistant Professor, Computer Science and Engg., Tirumala Engineering College, Affiliated to JNTUH and Approved by AICTE, Bogaram, Near Keesara, Medchal District, Telangana State, India, PIN: 501301.



Email: nvinay624@gmail.com