



NEW CHALLENGES AND OPPORTUNITIES IN HEALTHCARE ANALYTICS: NEED OF MODERN INDIA

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ABSTRACT

Data analytics in healthcare has become a big buzz word. However, it would be important to break down what exactly is meant by it. Traditionally, for most organizations, data analytics meant purchasing a Business Intelligence tool and creating reports. The impact of such tools was minimal as most healthcare data is both non-standard and unstructured (i.e. text, images) and data from multiple sources had to be combined to create value. With the progress made in Natural Language Processing, image recognition and speech analysis combined with the availability of large-scale computing power, the ability to convert this type of information into analyzable signals is now within reach. If one can aggregate information from multiple sources and build models that leverage these technologies, then real value creation is possible.

KEYWORDS: *Data analytics , big buzz word , healthcare data.*

INTRODUCTION

Even with healthcare analytics being at an early stage worldwide, Indian hospitals and insurers have the opportunity to leapfrog the Western world when it comes to truly leveraging its power.

For hospitals, healthcare analytics can impact multiple areas from customer acquisition to operational efficiency to clinical delivery. It can be the backbone of marketing teams to target and retain the right type of customers, help operations teams understand where the hospital truly excels in and where it needs to work on to achieve high-cost efficiencies. Unlike many software products that are essentially just data repositories and workflow managers, data analytics can enable a doctor to create a better outcome for the patient. Traditionally, most medical principles have been based on observations from a few hundred to a thousand people. The advent of digitization, abundant computing power and new age machine learning models, will enable the formulation of principles from observations from millions of people, creating the foundation for personalized medicine.

For insurers, there is a significant opportunity to leverage the power of data analytics to increase the coverage of middle class from the current 5% to 50%. Using the power of data analytics solutions, insurers will be able to understand disease propensity in detail and also fully model the cost of care needed to manage various conditions. This will enable the creation of insurance products that have a range of customizable features catering to the diverse needs of people, from those who need a “Nano policy” to those who need a “BMW policy” based on their preferences!

For the pharmaceutical sector, even though India is currently a generics market, there is immense potential to fundamentally rethink how real world evidence can power R&D, clinical trials, etc.



NEW CHALLENGES AHEAD WITH HEALTHCARE ANALYTICS IN MODERN INDIA

Before discussing healthcare analytics in India, we need to understand the challenges that are present in the Indian healthcare ecosystem. The cost of healthcare in India is increasing at 20% every year, which is more than double that of overall inflation. There is a shortage of 1.5 million doctors and 2 million Hospital beds. With health insurance, only around 5% of the middle class have health coverage, and catastrophic coverage is even lower.

If healthcare analytics needs to have an impact in India, then it has to tackle some of these fundamental issues. India being the second most populous country in the world and having healthcare infrastructure that is over-burdened with this ever-increasing population, there are a set of challenges in implementation of Big Data Analytics:

NEED OF DIGITIZATION

Currently, in India, many healthcare organizations and their managements appreciate the advantages of electronic medical records but seldom use them. The current drive for universal health coverage in India highlights the importance of implementing information technology as a means of cutting costs and improving efficiency in the healthcare field. But, at present, only a few hospital like, MAX Healthcare and SankaraNethralaya are maintaining EMRs, mainly because of cost, privacy issues, and the lack of one compatible, easy-to-use infrastructure.

Heterogeneity, Complexity and Divergence of data

Inferring knowledge from complex heterogeneous patient sources and leveraging the patient/data correlations in longitudinal records is a big challenge. To handle clinical notes full of grammatical errors, short phrases, abbreviations & misspellings is a tedious job. Also to understand these unstructured clinical notes in the right context is a big task.

Sharing of data

In healthcare, another challenge is the fragmentation and dispersion of data among the various stakeholders, including payers, providers, labs etc. Payers, providers, research centers and other constituents all have their own silos of data. These are fundamentally difficult to integrate because of concerns about privacy and propriety, the complex and fragmented nature of the data, as well as the different schemas and standards underlying the data and lack of metadata within each silo.

High investment Cost and Marketing Access

Indian Healthcare organizations are wary of technology integration due to the additional cost burden caused by the requirement of IT infrastructure and technical expertise. Harnessing the power of Big Data can be costly. While data analytics holds a lot of promise, it also faces some challenges in the Indian ecosystem. Firstly, the talent needed in organizations to leverage data analytics is in limited supply. So any analytical solution needs to account for this and have a truly world-class usability for business users and offer shrink-wrapped solutions that demand little by way of deployment efforts. Secondly, most healthcare organizations including hospitals spend less than 1% of their budget on software technologies as they have not seen serious business value generated from such initiatives in the past. This will slowly get reversed as they start seeing tangible value.

Establishing standards and Data governance

Health care data is rarely standardized. It is often fragmented or created in legacy IT systems with incompatible formats. Standards need to be defined and implemented to promote consistency in data across the healthcare system to eliminate discrepancies and increase the usefulness of data. Some of these standards (EHR/EMR) have been recommended by Indian Government, but until unless implementation of these become mandatory, it is very difficult to correlate this data.

Data Privacy & Data Security

While the healthcare industry harnesses the power of big data, security and privacy issues become crucial as emerging threats and vulnerabilities continue to grow. As data gets bigger, de-anonymity becomes difficult. Gosain and Chugh suggest using 3 important methods to guarantee privacy & safeguard security in Big Data - Data Anonymity, Notice and Consent and Differential Privacy.

Opportunity canvas with Healthcare Analytics in Modern India

Most Indian Healthcare organizations are now embarking on the analytics journey. Information management systems and EMRs have been integrated by certain tertiary care hospitals to create a central repository of historical data in the form of data warehouses and subsequently, use it to mine data, to do research and analytics to make smarter decisions for improved quality of healthcare. Big Data Analytics is opening up many avenues and opportunities in Indian healthcare system, these are:

Clinical Decision Support Systems

Big Data analytics technologies that scrutinize large amounts of data, make them understandable, do categorization and extract knowledge from it. These then predict outcomes or recommend interventions and alternative treatments to doctors and patients at the point of care. This will help in making correct and timely decisions about right diagnosis, treatments and prevention plans and for the elimination of errors. SMARTHealth India, a Clinical Decision Support System for cardiovascular diseases, is one such example. Duggal et al, attempts to study the problem of matching patient records from disparate systems and proposes a solution by using Big Data Analytic techniques like Fuzzy Matching algorithms & MapReduce for better clinical decision support.

Predict spreading of epidemic

When the infectious disease outbreaks, data which is collected through health institutions and government reporting institutes may not be available for weeks, which can delay early epidemiologic assessment. Social media can be helpful to get it in near real-time. Google showed that it is possible to track the outbreak of Flu in USA and Dengue fever in Brazil and India using nothing more than archived search queries. The notion behind this is to see whether an increase in the frequency of certain search terms – such as headache or fever – correlates with the country's official Flu/Dengue statistics. Global IT major IBM has already channeled its efforts with university researchers to use big data and related analytics capabilities to possibly predict the outbreak of deadly diseases such as Dengue fever and Malaria which are prevalent in India.

Preventive Healthcare

One of the earliest uses of big data to generate new insights has been around “predictive analytics”. In addition to the typical administrative and clinical information, incorporating additional information about the patient and his or her surroundings may give better expectations and help target medications to the right patients. Their health provider can then prescribe effective preventive action plan to them.

Telemedicine

With telemedicine, hospitals hope to lower the cost of patient care and increase the effectiveness of chronic disease management in remote locations equivalent to the services rendered by the city hospitals. It collects all possible patient information to create thorough Electronic Health Records (EHR's) for each patient. Many major hospitals (Apollo, AIIMS, NarayanaHrudayalaya, and Dr. BalabhaiNanavati Hospital) have already adopted telemedicine services and entered into a number of Public Private Partnerships. HP Company has introduced eHealth Centers wired for telehealth technologies and cloud-based electronic medical records and analytics and are designed to fit in a shipping container, making them easily portable to

rural parts of India. The Indian government has also issued recommendations on Guidelines, Standards & Practices for Telemedicine in India.

Personalized Medicine

The integration of EMRs, medical claims, videos, medical images, scanned documents, and physicians' notes enables organizations to create a rich, 360-degree view of each patient. Treatment can be prescribed based on activity recognition using Cell Phone Accelerometers of patients. Analysis on all of this collected data will help determine the exact amount and type of medicine that an individual patient would require, then further reducing healthcare costs. More personalized medicines that use patient-specific data such as genomics and proteomics can be created based on the profiling of similar patients and their responses to such approaches. According to National Biotechnology Development Strategy, 2014 by Dept. of Biotechnology, Govt. of India, genome-based prescription and treatment will be the top priority in next few years. One such initiative to study genomics data is the Indian Genome Variation (IGV) Consortium, a government-funded collaborative program among six laboratories of the Council of Scientific and Industrial Research (CSIR).

Healthcare Fraud Management

In India, it is estimated that the number of false health insurance claims in the healthcare industry is approximately 15 per cent of total claims and approximately INR 600 - 800 crores losses incurred on fraudulent claims annually. Big Data Analysis enables auditors and fraud examiners to analyze healthcare organization's huge data to gain insight into how well internal controls are operating and to identify transactions that indicate fraudulent activity or the heightened risk of fraud in real-time.

CONCLUSION

Thus, as in any nascent industry, the adoption of health care analytics will be gradual, beginning with early adopters and then to mass market. But there is no doubt that the field of health data analytics is one whose time has come and will create immense value to the entire ecosystem in the next decade. In coming years Big Data will create immense job opportunities for healthcare professionals, now its become need of an hour.

REFERENCES

1. Raghupathi W: Data Mining in Health Care. In Healthcare Informatics: Improving Efficiency and Productivity. Edited by Kudyba S. Taylor & Francis; 2010:211–223.
2. Burghard C: Big Data and Analytics Key to Accountable Care Success. IDC Health Insights; 2012.
3. Dembosky A: "Data Prescription for Better Healthcare." Financial Times, December 12, 2012, p. 19; 2012. Available from: <http://www.ft.com/intl/cms/s/2/55cbca5a-4333-11e2-aa8f-00144feabdc0.html#axzz2W9cuwajK>.
4. Feldman B, Martin EM, Skotnes T: "Big Data in Healthcare Hype and Hope." October 2012. Dr. Bonnie 360; 2012. <http://www.west-info.eu/files/big-data-inhealthcare.pdf>.
5. Fernandes L, O'Connor M, Weaver V: Big data, bigger outcomes. J AHIMA 2012:38–42.
6. IHTT: Transforming Health Care through Big Data Strategies for leveraging big data in the health care industry; 2013. <http://ihealthtran.com/wordpress/2013/03/ih%C2%B2-releases-big-data-research-reportdownload-today/>.
7. Frost & Sullivan: Drowning in Big Data? Reducing Information Technology Complexities and Costs for Healthcare Organizations. <http://www.emc.com/collateral/analyst-reports/frost-sullivan-reducing-information-technologycomplexities-ar.pdf>.
8. Bian J, Topaloglu U, Yu F, Yu F: Towards Large-scale Twitter Mining for Drugrelated Adverse Events. Maui, Hawaii: SHB; 2012.

9. Raghupathi W, Raghupathi V: An Overview of Health Analytics. Working paper; 2013.
10. Ikanow: Data Analytics for Healthcare: Creating Understanding from Big Data.
<http://info.ikanow.com/Portals/163225/docs/data-analytics-for-healthcare.pdf>.
11. Knowledgegent: Big Data and Healthcare Payers; 2013.
<http://knowledgegent.com/mediapage/insights/whitepaper/482>.
12. Explorys: Unlocking the Power of Big Data to Improve Healthcare for Everyone.
<https://www.explorys.com/docs/data-sheets/explorys-overview.pdf>.
13. IBM: IBM big data platform for healthcare.” Solutions Brief; 2012.
<http://public.dhe.ibm.com/common/ssi/ecm/en/ims14398usen/IMS14398USEN.PDF>.