

Analytics on Hospital Health Care-Data

Introduction:

Hospital data is increasing day by day as there is increase in the count of patients. With increase in the admission of patients with different type of illness and different type of treatment there is a need for managing huge data. Managing this huge amount of data is a challenging task in all aspects as from the hospital side where it requires a particular person to manage all this data and when there is a sudden rush of patients its difficult to collect, collaborate and manage these patients with the limited number of resources that is available in the hospital. For this reason, there is a need for a predictive analysis so that pre measures can be taken and there will be no shortage of hospital resources.

Literature Review:

[1] Large Scale Infrastructure for Health care analysis (2016 IEEE International Conference on Healthcare Informatics)

Proposed approach: In the UK, 65 million citizens have lifelong health records that can be used to examine patterns of disease, treatment and outcomes. Similarly, the real-world impact of interventions such as new drugs can be evaluated in these records. Such approaches need to solve issues around information governance, confidentiality, understanding data and provenance and developing methods for big data. A large-scale service that addresses the opportunities brought by the availability of large-scale e-health records. The service has been used to support 50 research projects in the UK across a wide range of scientific areas and can be seen as an exemplar for the developing field of health data analytics.

Advantages: Handling different types of data at the same time is possible which provides early access to treatment and checking the hospital resources if available.

Disadvantages: Error in the data collection may occur which may lead to false information and false prediction of future data analysis so there should be a accurate way of collect health records from the people and changes should be done with consent to that person.

[2] Optimizing Hospital Resources using Big Data Analytics with Standardized e-Clinical Pathways (2020 IEEE Intl Conf on Dependable, Autonomic and Secure Computing, Intl Conf on Pervasive Intelligence and Computing, Intl Conf on Cloud and Big Data Computing, Intl Conf on Cyber Science and Technology Congress)

Proposed approach: Resource optimization can reduce costs and improve healthcare outcomes. Optimization can even save the lives of patients when resulting, for example, in more efficient time management in hospitals. Optimized time utilization frees caregivers for treating more patients and frees hospital testing rooms/beds for the high volumes of patients. Without caregivers and rooms, some patients may die while waiting for their turns. The importance of automated and fully digitized electronic Clinical Pathways (e-CPs) in the field of hospital resource optimization. This is because the full digitization of CPs provides the rich data needed for optimization and enables physicians and healthcare administrators to have control over the “micro” CP data that is missing in other health information systems. After addressing our novel CP automation framework, we illustrate our contribution to optimizing hospital resources through three scenarios. In the first scenario, we show

how communicating the best CP practices can improve the efficiency of CPs and patient treatment, resulting in faster, lower-cost, and optimized healthcare provision for patients

Advantages:

- Reducing Length of Stay (LOS) in hospitals.
- Optimizing the use of resources.
- Reducing healthcare cost.
- Improving patient outcomes.
- Reducing treatment complications

Disadvantages:

There is a need for deep understanding of CPs which is lacking in some of the sectors in the hospital management which can be occurred using the spreading awareness about it and making changes in the overall structure of the hospital management.

[3] Real-time health data acquisition and geospatial monitoring: A visual analytics approach (2015 International Conference on Open-Source Systems and Technologies (ICOSST))

Proposed approach: Data acquisition systems help deal a large number of patients at hospitals, especially during an epidemic spread. The patient data can then be analysed in real-time to visually monitor disease spread and take preventive measures to circumvent it. This paper focuses on the development of a 3- tier HL-71 compliant web and mobile based data acquisition and monitoring system. The use of centralized and shareable database makes it feasible to store all the data at one inventory, as health data from the far-flung rural areas is collected primarily using mobile applications.

Advantages: As this is done by the mobile application So 80% of the people can use this project. Where this is reliable

Disadvantages: Where 20% of peoples are living in rural areas, they can't able to use mobile phones So they can't able to use mobile application

[4] Application of Analytics to Big Data in Healthcare (2016 32nd Southern Biomedical Engineering Conference)

Proposed approach: Big Data is generally characterized by the volume, velocity, variety and veracity of complex data. Many hospitals have applied analytics to big data from various sources including patient health records to achieve overall improvement in healthcare. Operationally, most of the pertinent data of patients are made available on demand so doctors can see how other treatments have worked globally and apply relevant results to facilitate better decision making and interventions.

Advantage: Big Data will contribute to quick and accurate diagnosis, appropriate treatment, reduced costs and improved overall healthcare quality.

Disadvantage: Those data need protection, and security risks can be demerits due to the lack of proper maintenance.

[5] Proposed Application of Big Data Analytics in Healthcare at Maharaja Yeshwantrao Hospital:(2016 3rd MEC International Conference on Big Data and Smart City)

Proposed Approach: M.Y hospital is the central India's largest government hospital. It generates large amount of heterogeneous data from different sources like patients health records, laboratory test result, electronic medical equipment, health insurance data, social media, drug research, genome research, clinical outcome, transaction and from Mahatma Gandhi Memorial medical college which is under MY hospital. To manage this data, data analytics may be used to make it useful for retrieval. Hence the concept of "big data" can be applied. Big data is characterized as extremely large data sets that can be analyzed computationally to find patterns, trends, and associations, visualization, querying, information privacy and predictive analytics on large wide spread collection of data. Big data analytics can be done using Hadoop which plays an effective role in performing meaningful real-time analysis on the large volume of this data to predict the emergency situations before it happens.

Advantage:

Clinical Treatments: Big data will allow efficient storage of both structured and unstructured healthcare data and by performing analytics on these data efficient and proper treatment can be given to patients and with reduced cost and time.

Administration: Big data will help to maintain all the transactional records, financials and will keep the track of EHRs data of patients, feedback and schedule of doctors and nurses and help administration to make decisions.

Disadvantage: Patients have to wait for long time in different queues at OPD, doctors sitting area, laboratory, medicine department etc. Sometimes patients lose their prescription slips, which makes difficult for doctors to treat them. As thousands of people come to this hospital, and sometimes there is a mismatch in their laboratory and health record which can be dangerous. Doctors have to treat thousands of people regularly without any past health record of an individual making it difficult to diagnose their problem which is a tedious job to perform without any error. This patient's treatment process is quit time consuming which in return discourages a daily wager to take treatment on time.

[6] A Research on Big Data Analytics in Healthcare Industry:

Proposed Approach: Big Data has changed the way we manage, analyze and leverage data in any industry. One of the most promising areas where it can be applied to make a change is healthcare. Healthcare analytics have the potential to reduce costs of treatment, predict outbreaks of epidemics, avoid preventable diseases and improve the quality of life in general. Average human lifespan is increasing along world population, which poses new challenges to today's treatment delivery methods. In this article, we would like to address the need of big data in health care industry, big data analytics advantages, big data applications and so on.

Advantages: Big data has been on its way of revolutionizing the ways by which people control, make analysis as well as leverage data regardless of any fields. Among those industries, the one that big data has made a big renovation is healthcare industry. In general, big data can help healthcare industry reduce the treatment price, predict the potential diseases, prevent serious diseases as well as advance the life quality for all people.

Disadvantage: One of the biggest hurdles standing in the way to use big data in medicine is how medical data is spread across many sources governed by different states, hospitals, and administrative departments. Integration of these data sources would require developing a new infrastructure where all data providers collaborate with each other. Equally important is implementing new online reporting software and business intelligence strategy. Healthcare needs to catch up with other industries that have already moved from standard regression-based methods to more future-oriented like predictive analytics, machine learning, and graph analytics.

[7] Block HR – A Block chain-based Healthcare Records Management Framework: Performance Evaluation and Comparison with Client/Server Architecture

Proposed Approach: Electronic Health Records (EHRs) are managed using a client-server architecture by healthcare which are providers retain the data stewardship. However, this approach suffers from security and privacy issues, a single point of failure, data fragmentation and vulnerability. The data replication, immutability, transparency, security and privacy features of block chain have a promising future in the healthcare domain addressing the existing issues. we propose Block HR, a healthcare records management framework for healthcare providers and patients enabling better prognosis/diagnosis. We analyze the effectiveness of Block HR in providing security and privacy compared to the client-server approach. We also evaluate the performance of Block HR versus the client-server approach. In this, we use a voting-based algorithm, Practical Byzantine Fault Tolerance (PBFT)

Advantage:

Block chain increases trust, security, transparency, and the traceability of data shared across a business network — and delivers cost savings with new efficiencies. Block chain for business uses a shared and immutable ledger that can only be accessed by members with permission.

Disadvantage:

Storing large records on the block chain, such as full electronic medical records or genetic data records, would be inefficient and costly. It is also difficult to query data within a block chain, limiting clinical, statistical and research uses of data. network participants, is a data privacy infringement.

[8] Heterogeneous Postsurgical Data Analytics for Predictive Modelling of Mortality Risks in Intensive Care Units

Proposed Approach: There is a dire need to go beyond current medical practices, and develop data-driven methods and tools that will enable and help (i) the handling of big data, (ii) the extraction of data-driven knowledge, (iii) the exploitation of acquired knowledge for optimizing clinical decisions. This present study focuses on the prediction of mortality rates in Intensive Care Units (ICU) using patient-specific healthcare recordings. It is worth mentioning that postsurgical monitoring in ICU leads to massive datasets with unique properties, e.g., variable heterogeneity, patient heterogeneity, and time synchronization. To cope with the challenges in ICU datasets, we developed the postsurgical decision support

system with a series of analytical tools, including data categorization, data pre-processing, feature extraction, feature selection, and predictive modelling.

Advantage:

Some of the benefits of Big Data healthcare that the industry has experienced are translated into terms of improved patient experience, prediction of epidemics, avoidance of preventable deaths, improvement of the quality of life, effective surveillance of public health, educated decision-making of policies, and more.

Disadvantage:

One of the major drawbacks in the application of big data in healthcare industry is the issue of lack of privacy. Application of big data technologies involves monitoring of patient's data, tracking of medical inventory and assets, organizing collected data, and visualization of data on the dashboard and the reports.