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Business Intelligence System for Healthcare Industry

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Abstract - *The growth in amount, diversity and pace of data has created new challenges and opportunities for healthcare contexts. To address these challenges various Business Intelligence System were developed. For administrative leaders, advisors, and experts, there is no longer a need to spend a huge amount of time in design and development of typical reports and charts, the whole solution can be completed through Business Intelligence software. This system generates organized Dashboards ,predicts future trends, creates reports and charts from the data that is produced by the hospitals. Dashboards provide at a glance views of patient related data like-patient history, remedies suggested, date of illness etc. Reports and Charts can help the hospitals to understand the patterns and occurrences of any disease which will help hospitals to provide specialized surgeons at any particular time period. Microbes are evolving with time just as we humans are, new diseases are spreading every now and then, thus it is important to predict how or which sections of humans could be affected.*

***Key Words*: Healthcare, Business Intelligence, Reports, Big Data, Prediction.**

1. INTRODUCTION

Healthcare data is one of the rapidly growing data that comprises of patient information, disease information etc. Each day clinics are collecting bulks of data inside their databases. Significant Information is required for administrative leaders in the organizations to make effective choices based on what is going on now and to forecast what will happen in the near future. The application of BI solutions within healthcare settings is still one of the debated issues among healthcare providers, experts and executive management's levels, where administrative leaders like to see high level of accumulated data to make strategic decisions. On the other hand, experts need to toil with the transactional data to build daily basis functioning and monitoring reports of optimal patient outcomes.Business Intelligence is a structured approach for preparing and using information to drive business activity and it is helpful in turning raw data into information that can be used to derive value. Though, healthcare organisations have a treasure of data accessible through numerous data sources, much of these data are partial or improper and thus often usable to assist in improving results and quality care delivery. Today, numerous healthcare organizations around the world, are challenged by pressure to cut costs, improve coordination and outcomes, provide more functionalities and services with fewer and be more patient centric.Succinctly, Business analytics is the organized use of data and associated business insights developed through applied analytical disciplines to drive fact-based decision making for planning, management, measurement and learning.

1.1 Business Intelligence

Business intelligence (BI) is a term which includes the strategies, processes, applications, information, products, technologies and technical architectures used to support the gathering, analysis, presentation and dissemination of business information.BI technologies are capable of managing large quantities of structured and sometimes unstructured data to help find, develop and otherwise produce new strategic business prospects [1]. The aim of BI is to allow for the easy analysis of these huge volumes of data. Finding new opportunities and applying an effective strategy based on insights can provide businesses with a reasonable market advantage and long-term stability.BI technologies deliver past, current and predictive views of business operations. Mutual functions of business intelligence technologies are reporting, online analytical processing, analytics, data mining, process mining, business performance management, text mining, predictive analytics and prescriptive analytics.

BI can be used to support a diverse range of business decisions ranging from functional to strategic. Basic operating choices include product positioning or pricing. Strategic business choices include priorities, aims and directions at the broadest level. In all circumstances, BI is utmost effective when it combines data derived from the market in which a firm operates (external data) with data from company sources internal to the business such as monetary and operations data (internal data) [2]. When joined, external and internal data can provide a more comprehensive picture which, in consequence, creates an

"intelligence" that cannot be derived by any particular set of data. Amongst countless uses, BI tools empower organizations to gain insight into fresh markets, evaluate demand and aptness of products and services for different market segments and gauge the impact of marketing efforts.

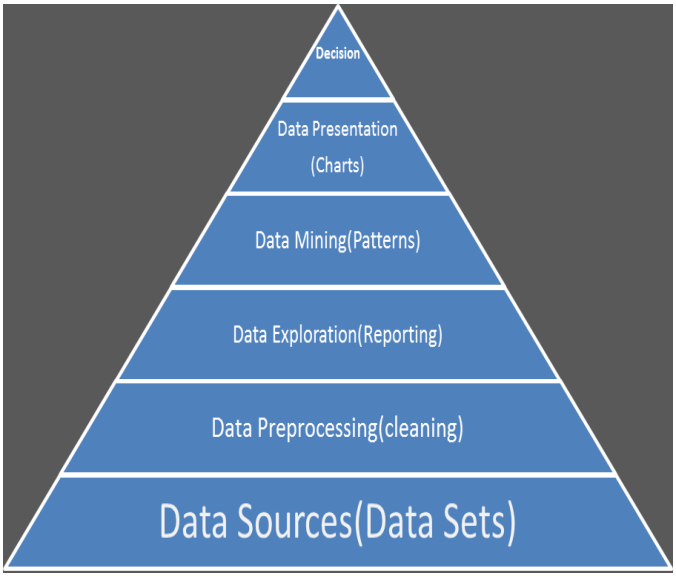

Figure 1 Business Intelligence Decision making Process

1.2 Big Data

Big Data and to a smaller extent, Business Intelligence technologies are comparatively new and still quickly developing. While they have been widely introduced in the commercial world, they are not extensively used in Indian health system. According to a recent report, 54% of top healthcare establishments around the globe use business analytics to guide strategy, 59% of these establishments perform product research and sales and 65% of the use business analytics solutions for financial and marketing development. BI can be thought of as getting the precise information to the right individuals at the right time and place to empower fact-based decisions [2]. It represents a structured approach of preparing and using information to drive business activity and it is helpful in turning raw data into information that can be used to derive value. Healthcare organizations, like all business entities, are data-intensive enterprises. Healthcare administrators require sufficient data and information management tools to make proper decisions. Clinicians evaluate patients' status, plan patients' care, administer suitable treatments, and educate patients and families, regarding clinical management of various circumstances. Primary-care physicians and care managers assess the health condition of patients and store it in databases.

2. EXISTING SYSTEM

Most of the Hospitals in India use Online Transaction Processing (OLTP) which is a class of information systems that assist and manage transaction-oriented applications, usually for data entry and retrieval transaction processing.
The term is somewhat confusing some understand a "transaction" in the perspective of computer or database transactions, while others describe it in terms of business or commercial transactions. OLTP has been used to refer to processing in which the system responds instantaneously to user requests. An automated teller machine for a bank is an instance of a commercial transaction processing application. Online transaction processing uses are high throughout and insert or update-concentrated in database management [3]. These applications are used simultaneously by thousands of users. The basic aims of OLTP applications are availability, speed, concurrency and recoverability. Reduced paper trails and the faster, more accurate prediction for profits and expenditures are both instances of how OLTP makes things simpler for businesses [4]. But, like numerous modern online information technology solutions, some systems require offline maintenance, which further shakes the cost–benefit examination of on line transaction processing system.

3. PROPOSED SYSTEM

Our System will combine various data sets that are produced in hospitals and will help identify, develop and otherwise create new strategic business opportunities.
The data is processed to produce dashboards for each and every patient .The Dashboard will provide quick and easy access to patient information like patient history, contact information, medical details, date of reporting etc.
There will be another component which will generate reports and charts. Reports will help Hospitals to analyze and take decisions, like which diseases are more common among a particular age group, when are diseases more likely to spread etc. This will help hospitals recruit specialists according to the need. Charts will represent the patterns or data found in a pictorial manner since pictures are more effective than words.
Our system will find patterns and using the algorithm, it will predict future trends like how many patients will be

reportedly suffer from a particular disease using the data that was mined from the database of that hospital.

4. ADVANTAGES

The advantages of the proposed system are as follows:

- Quick and Easy Access to Patient Information
- Automation-Most of the manual work like creating reports, charts etc. will be automated.
- Cost Reduction-Hospitals can save huge amount of money by deploying surgeons or specialists only when there are more chances of a particular disease to spread.
- Reducing the number of personnel required in Hospitals.
- Making the process easier and faster.

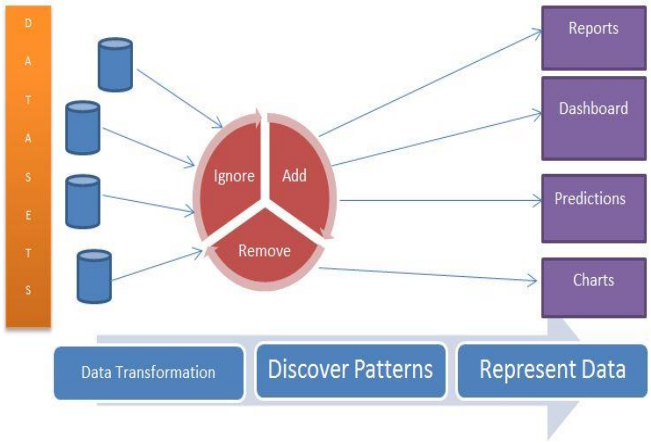

Figure 2 Diagram of BI System

3. CONCLUSIONS

In this paper, we proposed a new approach of applying Business Intelligence which is easy to use and versatile. The Data is mined and used for various purposes like Prediction, Reports etc. The Data is stored in databases by Hospital staff manually and the rest of the processes (reporting, prediction, dashboards and charts) happen automatically. The proposed system saves time, manpower and cost. Many healthcare organizations struggle with the lack of manipulation of data collected through non-integrated OLTP systems which have been used for decision making and data mining. For successful healthcare organization it is vital to endow the staff and management with data analysis and mining of data present in databases based on critical thinking and information management tools for strategic decision making. Decision support tools such as data mart, OLAP and data mining techniques can support on constructing a solid foundation for clinical data warehouse.

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