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Effective use of Bigdata and Social Media in–Neonatal Intensive Care Unit

[1]T. A. Vijayalakshmi, [2]Dr.V. Kumar (HOD/CSE,Knowledge Institute of Technology)[3] J. Gokulraj (AP/CSE,Knowledge Institute of Technology, Salem).,[4] A. Malathy

***Abstract* -Big data in neonatal intensive care unit is a recent tread which is based on data visualization and connecting it to social media helps in enhancing the health care applications. New trends in the medical field in using big data helps in converting huge volume of raw data in to meaningful information. The main intension of this paper is to analyze huge data and presents the information to the healthcare professionals (doctors and nurses) in a meaningful format. Ideas can be exchanged by health care professionals using social media so that complex decision canbe made effectively.**

Keywords:Big data, neonatal intensive care unit, social media

BIG DATA

Traditional architecture and infrastructure are unable to pound terabyte and petabyte of data.Mining millions of row to fetch the required information is a challenging task

DATA VISUALIZATION

One picture is equivalent to thousand words. Data can be presented in a picture format visual data takes lots of better understanding and makes the data to right shape. Visualization crunch large volumes of data extremely quickly and it is a better way to analyze the data.

Data visualization makes data to actionable analysis and has deeper insights to make the data more actionable and interactive, also provides meaningful results for the data. For decision making purpose data needs to be accurate and should be in a presentable way. So visualization is a valuable tool for making auto chart to provide a quick view of large amount of data.

Visualization helps the non-technical and the business people to understand the data more accurately to make sense. By using this visual interpretation, existence of similarities can be completely controlled.

EFFECTIVE USE OF BIG DATA IN NEONATAL INTENSIVE CARE UNIT

In hospitals premature birth rate has become a significant problem. Developed country like Canada has the average death rate of 75% to 85% of infants. NIC is an intensive care unit for new born/premature and infants NICU stands for Neonatal Intensive Care Unit. Most of the expenses in health care sector the cost are around 20 to 30%. Compared to other units the NICU has the longest stay.

Handling premature/infant needs many clinical comparison cases, previous similar cases history from various sources. Many complications such as brain damage, infection in internal organs. These problems get solved as the infant gets older and the organs get stronger.

Figure 1: Child in Intensive care unit

NIC is an inclusive environment where supports are provided by various health care professionals. They provide information by various forms such as charts, quantitative information such as tools to handle, things to note, policies and procedures. By using Big Data there is a significant change in handling large volume of data, which is knowing the root cause that gives information for online analysis purpose whichleverage the performance of the entire health care sector.

HANDLING PROBLEM

Different medical equipmentis used in monitoring the neonatal infants. These patients are assisted by artificial verifications and infusion purpose that is by mechanical devices. Reading is taken every second and is periodically maintained by health care professionals. Collected information's are converted into actionable information. It creates alerts for care givers which indicate the potential risk of the patients.

ECG recordings are taken around 1000 per second to make actionable information in the form of waves. Heart rates, lungs rates are taken by attaching the ECG equipment's to the patient's body. Each neurological functionis converted into wave forms which manipulates tens of millions of data per patient for each day. Sensors

sense the Blood Oxygen saturation readings from patient's foot and it produces 86,400 readings per patients per day.

Smart infusion pumps (SIP) plays a major role in big data problem. It generates 60 various types per ten seconds. Upto 13 SIP's can be connected to every premature babywho results 39 GB of data per month. NICU resources/facilities are available only for few years due to financial crisis. Certain equipmenthas the capacity to support real time in order to decide.

REAL TIME CHALLENGES

System can able to roll back approximately is equal to 7000 times per hour which is equal to the heartbeat of newborn. But the manual systems are able to use the data. For around 15 years medical conditions has drastic improvement in finding the potential risk of various diseases including (Cardio Vascular brain damage, death of brain tissues). Medical devices capture all the required signals that are stored, analyzed and used as guidelines for new treatments. These guideline protocols are used in various hospitals by different health care professionals in different locations.

HEALTH CARE SYSTEMS

A platform is created to analyze health care issues and it has been used as a reference for different health care professionals at different locations. One such health care system is Artemiswhich was first initially implemented in Toronto sick kid's hospital. This platform continuously provides data for various health care professionals for analyzing and for diagnosing new diseases and its treatments.

This online health analysis platform stores the original information along with the newly formulated analytics. Based on the necessity data is extracted and tailored to support the health care professionals. Artemis store raw and generated (derived or analyzed data) of several infants. This system monitors the blood rate, heart rate derived signals.

Actually it supports several infant patients and this system is connected with the cloud to store information and spot readings are recorded each minute. The implementation of Artemis helps in diagnosing problems, compare with similar problems and be able to identify new patterns, so that diseases are detected earlier and preventive measures are taken right away.

REGULATORY LICENSING PROCEDURE

System developers and people who make the policies should develop guidelines to stream line the physiological data. The collected data can be used for medical research only if correct security and privacy acts are implemented.

BIG DATA TRENDS

Because of the effective use of large volume of NICU data with multiple patients in several locations, it helps to improve the health care sector more efficiently and effectively. It mainly helps in monitoring patients remotely which helps the chronic patients.

MAINTAIN CONFIDENTIALITY

As several health care professionals are handling the patient's data, patient's privacy and confidentiality should be protected for research purpose if the data are delegated to research projects.

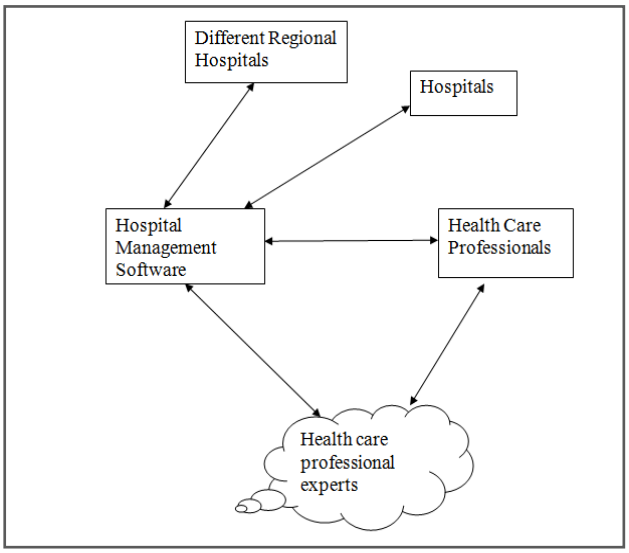

Figure 2: Hospital Management and Social Network

E-HEALTH CARE

Social media plays a major role in connecting people by sharing the information. Health care is one of the potential areas to get benefited from the social media.

SOCIAL MEDIA AND SUB –DOMAIN

By participating in precise domain, health care professionals are interconnected with health care experts.

Areas of sub domains are,

- Clinical observation
- Patient history
- Similar history where to get professional training
- How to handle this unique case
- Providing tips for home case and personalized care.

DEMERITS

In spite of all these benefits fear of open and unauthenticated access is a major issue. When confidentiality and authentication principles are maintained, it is one of the exuberant source to get advice from experts with this trust the significant importance of sharing information through social networks can never be avoided.

It provides a special and active contribution and the effective use of technologies for particular case can be obtained. The outcome is that improved or enhanced architecture of existing health care system. As constant feedbacks are obtained, which helps the system to enhance, based on new treatments for new diseases. Once updated, several health care professionals can access the information at different location.

E-HEALTH CARE UPDATES

General awareness and preventive acts can be discussed through social media and get updated in the health care system for effective use.

ONLINE COMMUNITY

Through social media, online communication contribute a lot in handling the article situation in different ways, This work has implications for several health care sector to promote awareness and preventive act.

CONCLUSION

Use of social media in NICU has great impact in research and education. Real time scenarios and analysis helps the health care professionals to make progress in their area. Complex decisions can be made by analyzing the data obtained from experts through social media and online community. This collaborative work helps the health care professionals in treating their patients.

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