A Case Analysis on Involvement of Big Data during Natural Disaster and Pandemics and its Uses in the Health Care Sector

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ABSTRACT

Big data is an upcoming technology and requires utmost care for an efficient and smooth implementation of the technology. In case of healthcare the most challenging part of big data is the privacy, data security, handling large volume of medical imaging data and data leakage. It can be useful to this sector when big data is made structured, relevant, smart and accessible and the managers should give importance to the strategic and business value of big data technology rather than only concentrating at the technological aspect of the implementation. The use of big data in natural disasters and pandemics helps to understand and make better decision with fast processing of the data that are collected through various sources such as social media, sensors and other internet activities. This paper tries to focus on effective involvement of Big Data in natural disaster and pandemic and also identify the current and future use of Big Data in health care sector. The paper identifies the critical aspects which are used for Big data implementation and describe ways to handle the challenges related to it.

KEYWORDS: Big Data, Machine Learning, Health Care, Pandemic and Natural Disaster

Background of study

Digital Data has been growing significantly with the introduction of internet, cloud computing, smart phones and other devices. There are approximately 11 billion devices connected to the internet and IDC made a prediction that by 2025 the total data in worldwide will accumulate up to 180 Zettabytes, it is growing in an enormous rate in every organization (Siddiqui. A. A. and Dr. Qureshi. R., 2017). With the growing implementation of technologies in organizations it helps the data to be processed faster and to get more efficient result that may not have been achieved without implementing such advanced technological tools, for instance online application tools such as Google trend helps in the prediction of spread of diseases like flu and dengue, which helps the authorities to analyze the situation and gain valuable information (Senthilkumar et al. 2018). Wal-Marts imports approximately 2.5 petabytes of data every hour into the database and Facebook is getting loaded with 250 million of photos and 900 million of objects every day. Due to the enormous growth of data in every organization and to get valuable insight from this data as the analysis of this data can help in the sale forecasting, disease diagnosis, economic analysis, business management etc., therefore explications are essential to increase the efficiency of processing this data. Big data enables organization to store and manage large amount of data with high processing speed to get valuable insight from this data. Implementation of big data helps organization in cost cutting, according to McKinsey & company report in 2013 states that using big data there is a potential of reducing health care expenses from 450 billion to 300 billion (Senthilkumar et al. 2018) Implementing big data technologies in organizations have numerous potentials like security which in return helps in increasing profit as in financial firms due to the unplanned data collection since decades has led to the better understanding of money movement, avoiding theft and improve customer service therefore, helping in the firm's growth as well. There are also instances where an organization

adapt a technology but requires upgrading due to the advancement in technologies for improved efficiency, for example FraudMiner a model used for detecting fraud activities and other network intrusions was later introduced with LINGO clustering technique for enhanced performance for further reducing false alarm rate. With the big data revolution there is a growing need of adapting big data as clients would prefer firms with these technologies for better result that would be beneficial for making profits and other amendments.

Introduction

The growing popularity of smartphones and internet devices will lead to the accumulation of large number of data every day, for managing and storing this data that is being produced on a daily basis the use of big data technologies will be beneficial. There is even a growing need for the implementation of big data as clients requires companies that runs efficiently and process data faster with the demand that can be achieved with big data. Big data not only addresses the storage issue but even the issues related to accessibility, distribution and effective presentation of visual presentation that can be crucial for disaster management.

Big data has become a crucial element in communication which complements the conventional exchange of intentional and explicit messages such as communicators talking through a voice connection and even an announcement in the form of text message that is delivered to the citizen as an early warning of the approaching natural disaster. It is also crucial for analyzing the communication made by the public during the time of a disaster in the form of messages and contents shared through social media networks for getting a better understanding of the situation as people during these situations might be sharing contents and messages reaching out for help or reporting their conditions to their loved ones. Big data technologies such as big data infoveillance method is used in the infodemiology domain of the eHealth to acquire high quality information in the form of surveillance or monitoring purpose as well as to acquire health information and misinformation, this method can be useful for the surveillance of diseases. Other technologies that will be useful are smart cities that can provide vast population surveillance, socialization and healthy lifestyle and to provide quick and efficient response during emergencies and disease outbreaks. Today the healthcare data is used logically for supporting improved health care transmission. Big data helps by calculating and processing these data diagonally, therefore increasing the efficiency of analyzing these data and subsequently utilizing these data to make

improvement in healthcare. Analyzing these data helps the authority to make better decision regarding the proper treatment that should be provided by detecting the patterns involved in these data and furthermore tracking the outcome. Big data in health care refers to the collection of large data from diverse sources of healthcare foundations, managing, storing, analyzing, visualizing and getting valuable information from these data to make a better decision. Big data even helps to predict the outbreak of a disease by analyzing the medical records as many countries' public health systems are providing electronic patient records with advanced medical imaging media. Through the implementation of big data the management gets to keep up with the needs and trends in the healthcare establishments. Big data also provides opportunities for epidemiologists, physicians and health experts to make a better data-driven judgement that will help to improve the patient care eventually. Various big data methods helps in improving the decision making such as pathway analysis which is mostly used in high quality genome-scale data with the help of tools like Pathway-express and GSEA. In pharmaceutical big data is used in all phases of pharmaceutical development and drug discovery

Review of literature

Big data is technology used to process a large quantity of data in diverse formats from different sources to provide results faster and efficiently. This paper reflects on how big data is used as an online information retriever for infoveillance. Infoveillance is a method inside infodemiology domain of eHealth which identifies information and misinformation, knowledge translation gap as well as high quality information. Big data in infodemiology field helps in the surveillance of disease. Zoonoses is an infectious disease spread between human and animals happens due to the contact between both which needs public health response. Big data infoveillance could help the RIVM meet the challenges in the prevention of the outbreak. WSN big data surveillance with simple training can be used easily. It was seen that large amount of data collected had lot of noise in it and it was less efficient in the lower socio-economic classes as some don't use WSN or search HRI and lack of uniformity of different WSN applications to geolocate different individual were some disadvantages. It was seen that WSN query-based system was beneficial in Netherlands for zoonosis outbreak however the inadequate data on the outbreak and influenza of English makes it harder for data mining which is crucial for WSN infoveillance. Though it can be applicable it depends on the practical consideration and adequate data mining. The system is very useful

for the early detection but many initial steps have to be made by the stakeholders (Kenter et al. 2013). Augustine. D. P. (2014) studies indicate with the rise of enormous amount of data in all sector companies are opting for big data analytics for enhanced performance and productivity to increase their income and to stay in competition. The distributed processing of outset data groups across groups of system is managed by a simple computer model Apache Hadoop Framework. The library is designed in a way that failures can be detected in the application layers itself. This can be very useful in health care because of less failure prone model. Low cost and high-quality medical care with wide range of treatment has enrolled many patients in India yet there are many that can't still afford these services according to some studies. Therefore, advance in technology in medical sector is crucial for India for improving the health scenario. Though digitalizing of medical records has been enforced by government but due to there not being standardization of common medical terms it is hard to maintain digitalized medical records in India as it should be prepared with utmost care. By analyzing big data, the health care can get lot of value from it and for it to be efficient using Hadoop for organizing and given better solution. For instance, Hardonworks Data Platform is application in healthcare that use Big data and Hadoop for better integrity, completeness and flexibility. Hadoop gives solution to the piling up of medical images to segregate and extract the right information for the right diagnosis e.g., HIPI. Bates et al. (2014) study focuses on U.S Healthcare industry and the healthcare industry has been criticized for the high-cost treatment, where there are reforms such as Affordable Care Act i.e. supposed to take care of this issue, for many decades they have been criticized for the high value treatment. With the adoption of HER (Electronic Health Reports) into the systems there are numerous ways to contain this high cost and increase the efficiency. Many other industries have adopted big data for a high efficiency and faster processing system that benefit them in the long run. Predictive analytics in big data is one to look forward for the health care in US by integrating multiple data from various sources as it can provide outcomes these applications are useful for the patient as many outcomes are associated with harm, expensive or both for the patient. In order to reduce the high cost on the care for High-cost patients various measures have to be implemented as 5 % of the patients constitute for 50 % of the health care spending in us. Therefore, measures such as analytic measures for finding these high-cost patients and collecting diverse data (mental health, other issues etc.) helps to improve quality of

prediction and which patients will be most beneficial, which interventions can increase the care and subsequently accurate model for the prediction and successful implementation of these measures can reduce the cost. These analytics can be programed for specific problems according to the patient so that the system not only identifies high risk patients but also the low-risk patients.

Applying big data in five levers will help to reduce the national health care expenditure, first lever helps to determines which treatment is best for the patient, second lever help to enhancing efficiency and quality of the operation, third lever help to analyzing and creating efficiency around medical procedures, fourth lever help to improve future drug and treatment option by analyzing data from patients monitoring for chronic illness and finally fifth lever help to identify individuals benefiting from proactive care or lifestyle. In case of payment big data helps to implement automated system for fraud detection and accuracy of claims (Chluski. A. and Ziora. L. 2015). Wang et al. (2015) study shows that in this time of data explosion, set of data can be large and complex that it becomes complex and difficult to process using traditional database management therefore implementing big data is necessary in healthcare industry. Some challenges like inadequate integration of healthcare technologies and system and inefficient way of handling healthcare information have been a leading cause for transforming IT value efficiently in healthcare and also over expense and over time spend for both patient and medical staff in US. Implementing Big data can be an efficient way to increase the patient experience and organizational performance. In the earlier days data was stored in hard copies but the trend has changed to digitalization, the data in healthcare is differentiated into patient behavior and sentiment data, pharmaceutical and R&D data, clinical data etc. healthcare organization is using big data to extract complete info to get the right decision. As big data helps to reduce cost, complete information about the patient etc. however the challenge that healthcare organization possess is that data can be both structured and unstructured, data is more complex e.g., EMR's the data provide complete info, but the data is hard to process, variety of data e.g., data is shattered in different sources making it hard to extract the right info. In this paper we can see that since data is shattered in different location and stored in different formats they found a solution where a common platform is used to convert all the format data into one i.e. .html. different methods were used like filtering the data to get necessary data and storing this filtered data. Harnessing big data i.e., converting

data into information, extracting its meaning and making right decision allows making better information-based decision. Knowledge Discovery from Healthcare Text (KDHT) helps the organization to notify people about the necessary treat according to the analysis, disease that affect certain age group can be notified and prediction can be done (Ahammad et al. 2016). Siddiqui. A. A. and Dr. Qureshi. R. (2017) study indicates that the process of big data in healthcare industry is divided into five processes Data Acquisition, Data storage, Data Management, Data Analytics, Data Visualization and Report. Data Acquisition the data is categorized into primary sources (e.g., CPOE etc.) and secondary sources (laboratories etc.). Electronic health report, image processing, social media and smart phones are some important sources of this data. In Data storage as the amount of data increases it is important to store and secure this data. Cloud computing is a promising and powerful technology to store all this data. Investing in Cloud computing makes sense as this compromises of all the data of the patients which are vulnerable and key to the organization. Data management helps in the cleaning of the scrap data, data mining, governance, organizing and retrieval. Data visualizing helps to represent the data in the format of pictorial or graphical for better understanding of complex data and decision making. Big data can be applied almost everywhere in the healthcare industry such as in 'Omics where the application is to realize the strategies of the diseases and increase the specifications of treatment, in the insurance industry, medical device manufacturing and design, pharmaceuticals and for personalized patient care.

The major sources for big data in pandemic and natural disaster are satellite imagery and videos from UAVs-which help to give better understanding of structures affected by natural disaster and the extent, LiDAR- shows the ground state after a natural disaster(expensive to implement and UAVs are capable to carry them), IOT and sensor web- WSN technology with UAVs help rescue team to communicate with the population that has been affected by the natural disaster, social media, mobile GPS- to analyze the movement of the people and help in containing and to give preventive measures. Machine learning algorithm adapt and learn the problem without relying on statistical assumption about data distribution. Disaster management will be more efficient if the data collected are of high quality as the data is increasing with a lot of images and video. For a better disaster there should be efficient data collection, aggregation, information extraction, visualization and efficient distribution. The growth of data and requirement for an efficient distribution

makes the development of cyber infrastructure very demanding(Yu et al. 2018). Athanasis et al. (2018) study focuses on the aspect that during a natural disaster there are various data that can't be collected such as the sudden changes of wind, collapse of building after earthquake etc. for collecting these real time data social media can be very useful. Social media data can be utilized in various aspect before the event of disaster it can be used to send precaution and early warning. During the event it can be used to collect the location of the people for evacuation purpose and inform citizens of the real time threats. Though there are various advantage even disadvantages follow these data as it is enormous and diverse. Therefore, segregating valuable data and reliable sources makes it harder. Big data technologies can improve these situations by making the process faster and efficient. The result from this case study show that social media data can be used for collecting valuable information as well as be a useful communication channel for the population that is affected by the disaster. We see that these system works successfully with implementation of big data for huge volume, diverse and faster processing of data for an efficient result during the emergency. Kaur et al. (2018) study indicates big data is useful in healthcare industry as nowadays it's important to digitalize the data for better treatment and quality of the treatment as compared to the traditional methods. Data such as Electronic health report(EHR), patient's diagnosis report, medicine record, medical images etc. are useful for this process. The analysis provided by big data can help to improve and increase the efficiency of the treatment and also improve the four major pillar of quality healthcare that are , Patient Centric Care which helps to reduce the drug dosage given to the patient in the early stage by giving evidence based on the patients' disease diagnosis report. Also helps to reduce rate for patient. Predictive Analysis of Disease which helps the healthcare professionals to predict the viral disorder in the early stage before spreading through live analysis. Real time patient monitoring this done by the government on a regular basis to check and eliminate the hospitals that are not setup in regulation with the norms and suitable for all patients and finally improving the treatment methods. Big data also helps in the early prediction of long-term disease which in turn can increase the lifespan of the patient. One of the challenges that are faced by the industry is the security and privacy of the medical data collected and for optimal and secure healthcare system there are four layers Data source, Data Storage, Security and machine learning based application layer. The first layer is responsible for keeping clinical records,

operational data etc. the second layer helps to store different types of data in the form of data warehouse or data files and also helps to optimize data. The third layer helps in increasing the security of the data and finally the fifth layer helps to improve the decision making with the help of predictive model made using the help of big data which also gives an insight into the data. Senthilkumar et al. (2018) study points out the process of big data in healthcare industry is divided into five processes Data Acquisition, Data storage, Data Management, Data Analytics, Data Visualization and Report. Data Acquisition the data is categorized into primary sources (e.g., CPOE etc.) and secondary sources (laboratories etc.). Electronic health report, image processing, social media and smart phones are some important sources of this data. In Data storage as the amount of data increases it is important to store and secure this data. Cloud computing is a promising and powerful technology to store all this data. Investing in Cloud computing makes sense as this compromises of all the data of the patients which are vulnerable and key to the organization. Data management helps in the cleaning of the scrap data, data mining, governance, organizing and retrieval. Tools used are Apache Ambari and HCatlog. The data of the patient records and other related information are very important for the organization therefore retrieval, organizing, governance and security of the data plays an important role. Data analytics is the processing of raw data into information. It classified into Descriptive analysis which looks into the past performance based on historical data, Diagnostic analysis which predict the root cause of the problem by looking into the historical data, predictive analysis it helps to predict what might happens in the future by analyzing real time and historical data and finally predictive analysis helps to give possible outcomes before the decision is made by syncing big data. Data visualizing helps to represent the data in the format of pictorial or graphical for better understanding of complex data and decision making. Big data can be applied almost everywhere in the healthcare industry such as in 'Omics where the application is to realize the strategies of the diseases and increase the specifications of treatment, in the insurance industry, medical device manufacturing and design, pharmaceuticals and for personalized patient care.

The main challenges faced are data modeling, data ingestion, data visualization using the existing tools. Security tools should be easily integrated with the enterprise security tools, integration of big data technology with existing enterprise solution, big data cluster management and monitoring, ability to reuse application and scripts etc. are some of the major

challenges of big data in healthcare. Big data analytics helps in the prediction of heart attack using IOT and Hadoop technologies, Brain disease prediction with the help of data mining algorithms conditions that reveal to Parkinson's disease voice data set is recorded, using Hive and R analyzing diabetics where it is used as a predictive model for further assistance and investigation, tuberculosis prediction, infectious disease outbreak, diagnosis of chronic kidney disease and HIV/aids prediction where smart devices enabled with big data is used to monitor and enable our treatment. Big data applications are also used in bioinformatics where it helps to present an encyclopedia application on the developed data in the field of medical record management. Future prospect of this applications is in genetic applications, applications related to social media where syncing social media data with patient records achieve many more heights, E-hospital E-antibiotic and identical case recovery functions (Das et al. 2018). Wang et al. (2018) study suggests that the increasing amount of various data in different format from different source is an issue for the traditional data management capabilities. Big data analysis helps to fill this gap for the healthcare managers to deal with the surge in clinical data that supports evidence based medical practice. This also helps in the efficiency, quality and cost cutting of up to $300 million annually. PBV(Practiced based view) helps researchers and practitioners to get a better understanding of IT tools interacting with different elements of practice. Adopting PBV helps to show us a complete picture of how big data analysis can be used to increase the business value. And also shows which practices are good for better performance. Bromiley and Rau's PBV shows how different performances are displayed in firm's execution of different practices that are made easy by explanatory factors. IT enabled transformation practices helps in transforming big data analytics capabilities into intermediate outcomes. It is defined as the sequential changes that begin with operational improvement and internal integration through IT functionalities and then through business redesign activities to transform IT capabilities into competitive advantage and finance performance. A large body of research has displayed those big data analytics is a powerful tool for transforming business within an organization. A case study in an Arline company Watson et al. found that some practices induced by real time warehousing and business intelligence such as developing strategies etc. has improved the profitability to great extent. Big data analytics can also help in IT infrastructure, operational and benefits.

Han et al. (2019) explains natural disaster like tropical cyclones have caused huge suffering as well as economical loses around the world. Since 2000 the damage caused by this tropical cyclone in US has been increasing, therefore it possesses danger to the coastal area due to the hurricane and humans have been migrating from the coastal areas in US and due to this it is important to know the migration of this people in this evacuation zone to reduce traffic congestion, casualties and economic damage. Using big data, it is possible to determine the spatiotemporal patterns of movement of these people during the evacuation period which the traditional method couldn't. Studies shows that twitter data and other social media data was utilized to measure the population change etc. during evacuation period which was groundbreaking. Though the study behind human movement was limited it is crucial as evacuation zone is the most affected during emergency, so the study provide better understanding, better planning of evacuations etc. Hurricane Mathews millions of evacuations and death of many people in the coastal areas like Florida, South Carolina, Georgia and North Carolina. Due to the existence of geotag social data like twitter data helps us to understand spatial movement of humans with the data collected from GPS enabled smartphones. Utilizing programming interference of Twitter researchers are able to retrieve location of people with coordinates, some in the form Tag location with a GPS enabled phone. By analyzing patterns of the frequency of tweets such as daily posts from inside and outside of Evacuation Zones by Evacuation Zone Residents (EZR) shows the movement of people from the evacuation zone during the evacuation period. Wu et al. (2019) indicates Flood disaster has become a challenging issue, the difficulty of managing flood disaster, flood disaster vulnerability has led to this. The observation data integrated with machine learning leads to a huge possibility for big data. For instance, the use of big data in rainstorms, floods, urban waterlogging risk assessment etc. this is due to the increased source of data collecting platform and internet connected devices from where this data can be retrieved. Zhengzhou is a city in the north central Henan Province China. It is flat terrain with small elevation and abnormal monsoon activity making it prone to flood disaster and one of the intensive flood control towns. It has suffered from heavy rainstorms more than 15 times since 2006 causing 30 million economic losses. Most of the data were collected from text data i.e., Weibo, WeChat, emails etc. according to the data floods and rainstorms were caused by frequent and short rainstorms in the city. When heavy rainfall is experienced the more the ratio

of the building the more damage it endures and subsequently the losses . Building in the city has a paved surfaced and impervious area. When rain of same intensity is witnessed throughout the Zhengzhou city the district in the downtown endures more damage compared with others due to more water accumulation. North part of the city is new with less risk due to the lesser population. From the study it is seen that 30% of the city is prone to high risk.

The process of making new projects become much faster with the help of big data analytics involved. It helps to increase the customer satisfaction by collecting all the data required and hence analyzing big data we realize the current satisfaction of the customer also the past. And can predict the outcome in the future. Forbes studies have shown that 48 % of the markers use big data to do in depth analysis on the customers behavior and in this 36% of the specialist use data mining tool to develop client marketing strategies as new insights are available using this method. The use of big data helps to predict the reaction of the customers on the offers that has been put out by the industry, also integrating both online and offline communication with it. Adapting big data technologies help the organization to have an upper hand over the ones that use the traditional method as it is more efficient, fast and can process huge amount of data. Adaptation of big data solution into an organization takes a lot of initial decision and measures as with the adaptation there comes new security threats and privacy issue that must be taken into consideration. This due to vast amount of data that is being processed and this opens the organization to more security concerns. It was seen that for a smooth big data implementation the top management has to have good precision on the security and privacy information and also for good security planning with the assessment that has been done on the digital transformation. It was also seen that highly skilled person was need for the implementation due to the variety of the data. Also, BDS will have to go through privacy and security related regulations (Salleh. K. A. and Janczewski. L., 2019). The collected data provide numerous possibilities to predict an early outbreak. For example, in the recent pandemic outbreak Covid-19. Some computerized tools help us to visualize the spread of virus in real time. Also, the data collected from social media and other online activities help us to put together early story of the outbreak. Some authors have found various use of non-classical datasets, one of such use understands the spread of the virus in respect to healthcare seeking behavior by people, health literacy and utilization of health resource. Other authors have found that by using

subset selection method, new suspected and confirmed cases can be detected 6 to 9 days and 10 days earlier respectively. Negative feelings were spread in online discussion site and social media like twitter according to some research. Some ongoing research is done to find early radiological predictors of pathogens which will be helpful for the treatment of the Covid-19 patients and management. Big data can also help in finding a treatment for a virus like Covid-19 even though currently it's lacking but possible. Some major factors for this are using already existing broad spectrum anti-viral drug, possibility of modifying the drug and even using available pharmaceutics for drug repositioning purposes. Some tools were developed in China with the help of big data to contain the spread of virus during the period of Chinese lunar year, which was promising, and they have integrated classical data with advanced technology which helped them to find people at risk. In the end the thing to keep in mind during pandemic resources are scarce and can be quickly analyzed which increase the want for more data (Bragazzi et al. 2020). Jia et al. (2020) focuses on disease outbreaks like Covid-19 and for spread of virus analyzing of data were necessary to make effective preventive measures. With the paced development of information technologies like Internet of things(IOT), social media and cloud computing it made easy for the people to communicate, shop, interact etc. but also helped in analyzing the spread of virus, mode of spread and the next stage of spread etc. For achieving this purpose many tools and techniques are used one such is visual analysis technology with this technology it is possible to analyze massive dataset and enable investigators to get a better picture and support for efficient decision making. Visualization is mainly achieved through Geographical Information System (GIS). By linking big data with GIS enables authorities and individuals to get better understanding of spatial patterns and relationship. At present all countries use visual analysis of big data for visualizing key sectors like hotspot, epidemic distribution etc. For e.g.: google maps use interactive digital maps and a virtual earth for epidemiological data. One problem that covid-19 faced is if people came in close contact with infected people. Big data graph database enables us to search for close contact to clarify the infection process and the path of transmission. Even mobile data can be analyzed to find potential infected patients. Government utilizes Natural Language Processing(NLP) by applying deep learning for automatic text classification of sensitive information, reports, news, documents etc. this data can be collected from internet and social media to monitor

public opinions, avoid rumors, detect early warning, public sentiment analysis which are some useful resources for the government. Challenges to big data are privacy, security, data reliability and miscalculation of big data. Gerybaite. A. and Aurucci. P. (2020) suggests that due to the emergence of Ebola, SARS, Zika and now Covid-19 pandemic many organizations started to invest in big data due to the widespread of technology to prevent, manage and predict these outbreaks. For instance, hospitals in Canada are known for early adaptation of big data they use tools like GPHIN for analyzing newspaper and other communication for looking for outbreaks and potential risks and communicate to the people in charge. With the emergence of new data like in social media, internet and email new big data applications were also introduced like FluTracking that used crowdsourcing system that captured symptoms voluntarily from the people that give feedback rapidly for early disease infection outbreak. With the diverse data available on early prediction and management of outbreaks, machine learning has improved the analysis. Unsupervised tools were used for outbreak detection and supervised tools were used for hotspot detection. In epidemiology machine learning integrated with casual techniques has helped in prediction and discovering pandemics. In epidemiology due to the diverse and variety of data it can be related to the three V's of big data i.e., velocity, variety and volume. Due to the analyzation of mass data by Google Flu Trend it was seen as the problem shifted from lack of data (believed historically) to excess data where it is now able to refer to a particular individual which couldn't have been done before. Variety of data makes it hard to determine whether the data is sufficiently anonymized so that it won't provide information that might disclose personal information. Velocity of the data comes in makes it prone to cyberattack as malware might be hidden in that huge load of data and might pass through the firewall. GDPR helps in the protection of the patient data and helps in the free movement of the data.

Marine big data technology helps the marine by giving new ideas and solutions for marine disaster. For instance, the analysis acoustic remote sensing data helps to obtain distribution of species and biological commodities in the ocean. The research of the management of big data storage, analysis, query etc. plays a significant role in the ecosystem, human society etc. therefore making it crucial for the efficiency of the research. Ocean data helps in the prediction, early warning and better decision making in many fields such as climate, ecology and disaster. Ocean covers significant portion of the earth and

human understood the importance the ocean plays in the prediction of climate etc. with remote sensing data, field survey data etc. therefore there has been a significant improvement in the data collected from the marine. Hence the increase in the quantity of ocean data is more than other sectors. The enhanced ocean big data helps in the fusion and personal retrieval, visualizing data in multi-dimensional and improved decision making are some of the important factors. The main importance is also given to the diversification and quantity of data that paves a way to the ocean big data. The core has high value as the scientific researchers around the world gives huge importance to the value and potential of the data. It helps to provide the trajectory of typhoons through the ocean which helps in the early predictions and warnings. China is one of the most affected by marine disaster as natural disaster which causes issue to the development of its coastal areas (Chen et al. 2020). Khanra et al. (2020) with the growing data in healthcare there is a lot of opportunity for big data analysis such as medical diagnosis, community healthcare, hospital monitoring, patient care etc.

Conclusion

The requirement of big data is inevitable now in most of the industries. This is able to bring revolution in industry by giving new ways of acquiring, analyzing, deciding and improving the system and processes of organization. Natural Disaster and pandemics are the situations which can be analyzed, predicted and handled in more effective manner through big data. The study reveals that the use of big data is extremely useful for such extreme situations and organisations. Health care sector require to be upgraded frequently and big data is capable to deal with these new technology. Though, necessary involvement and training of people along with alignment of systems and structures of organization with big data is difficult. But doing this requires people to be more skilled in technology which will be helpful for the effective functioning of health care and disaster management. The inclusion of Big-data will surely help in managing disaster situations.

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