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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

NALAIYATHIRAN PROJECT

TITLE : ANALYTICS FOR HOSPITAL'S HEALTH-CARE DATA

DOMAIN : DATA ANALYTICS

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INDUSTRY MENTOR : Prof. SHIVAM SHIVARE

PROJECT MEMBERS :

REGISTER NO	NAME	ROLE
19P136	SUDARSANAN K	LEADER
19P127	SAM ALVIN I	MEMBER
19P118	MUTHUKUMAR T	MEMBER
19P101	AJITHKUMAR B M	MEMBER

ANALYTICS FOR HOSPITAL'S HEALTH-CARE DATA

LITERATURE SURVEY

1. TITLE: The use of Big Data Analytics in healthcare

AUTHOR: Kornelia Batko and Andrzej Slezak

YEAR OF PUBLICATION: 2022

SUMMARY:

In the literature, there is a lot of research showing what opportunities can be offered to companies by big data analysis and what data can be analyzed. However, there are few studies showing how data analysis in the area of healthcare is performed, what data is used by medical facilities and what analyses and in which areas they carry out. This paper aims to fill this gap by presenting the results of research carried out in medical facilities in Poland. The goal is to analyze the possibilities of using Big Data Analytics in healthcare, especially in Polish conditions. In particular, the paper is aimed at determining what data is processed by medical facilities in Poland, what analyses they perform and in what areas, and how they assess their analytical maturity. In order to achieve this goal, a critical analysis of the literature was performed, and the direct research was based on a research questionnaire conducted on a sample of 217 medical facilities in Poland. It was hypothesized that medical facilities in Poland are working on both structured and unstructured data and moving towards data-based healthcare and its benefits.

2. TITLE: A Framework for Data Analytics-Based Healthcare Systems

AUTHOR: V. Munesswaran, P. Nagaraj

YEAR OF PUBLICATION: 2021

SUMMARY:

In this modern techno-world, the term data is unavoidable and certainly, nothing is possible without its usage. The trends about how to analyse the data are the need of the hour. Data analytics is becoming a future escalating tool of all industries including medicine, robotics, etc. This article briefly explains how data analytics is used in healthcare systems. Health care is the process of maintaining and improving the health of an individual by preventing, diagnosing and treating the diseases, illness and other physical and mental imbalances in people. Data analytics is classified into four types and they are descriptive, diagnostic, predictive and prescriptive analysis. Health care makes use of prescriptive analysis to arrive at the best results and make better decisions. Big data plays a major role in data analytics. It helps the data analysts to collect data from the patients and store them efficiently. After the completion of this whole article, the reader will be able to get the collective idea about health care analytics.

3.TITLE: Role of big data analytics capability in developing integrated hospital supply chains and operational flexibility

AUTHOR: Wantao Yu, Gen Zhao, Yongtao Song

YEAR OF PUBLICATION: 2021

SUMMARY:

Despite increasing research interest in big data analytics, exploring its important role in implementing supply chain management practices in healthcare organisations is still one of the major challenges for both academics and practitioners. We propose a research model theoretically grounded on organizational [information processing theory](#) (OIPT) to investigate the roles of big data analytics capability (BDAC) in developing hospital supply chain integration (SCI) and operational flexibility. The results from our analysis of survey data from a sample of 105 senior executives from the Chinese hospitals reveal that BDAC has a significant impact on three dimensions of hospital SCI: inter-functional integration, hospital-patient integration, and hospital-supplier integration; and that hospital-patient integration and hospital-supplier integration fully mediate the relationship between inter-functional integration and operational flexibility. These findings extend and validate OIPT within the context of big data-driven hospital supply chains, while also providing useful and timely guidance to healthcare practitioners in developing data-driven SCI for better operational flexibility, especially to respond to the unprecedented disruption caused by the COVID-19 outbreak.

4.TITLE: A systematic perspective on the applications of big data analytics in healthcare management

AUTHOR: Sachin S. Kamble, Angappa Gunasekaran, Milind Goswami & Jaswant Manda

YEAR OF PUBLICATION: 2019

SUMMARY:

The exponential growth in the data collected in the form of electronic health records, registries, or wearable sensors has bought a big data revolution in the health industry. A large amount of information is required to be extracted from this substantially available data that provides numerous benefits such as improved quality of life, disease diagnosis, treatment and healthcare service delivery system. The big data generated in the healthcare is characterized by large volume, heterogeneity and speed. The other issues associated with the healthcare big data include non-uniform data, large number of variables, and need for real-time data analysis. In this paper, we examine the existing literature in all the databases within the ISI Web of Science with the purpose of reviewing the current research and develop a new agenda. Total 91 papers, classified in

five research categories namely, general healthcare, clinical diagnosis and research, service delivery system, disease transmission and prevention, and health insurance were reviewed. Reviewing past work is focused on identifying areas where big data analytics (BDA) is being applied in healthcare management. The outcome of the review is a proposed framework on BDA capability and its impact on healthcare organization performance.

5.TITLE: Impact of hospital size on healthcare information system effectiveness: evidence from healthcare data analytics

AUTHOR: Liuliu Fu

YEAR OF PUBLICATION: 2022

SUMMARY:

With the rapid development of information technology, the increasing use of mobile digital devices and efforts from the whole society, the healthcare information systems (HISs) are moving towards a new era. However, there is still a lack of clear understanding of the benefits of HIS at the hospital level and the influential factors for HIS effectiveness. In this study, we propose a research framework to explain how HIS implementation improves hospital performance. Our results reinforce the positive effect of HIS on hospital performance. In particular, we found that HIS implementation increases both the cost and revenue of the hospitals, but the increasing effect in revenue is much bigger than the increasing effect in cost. We also found that although both small and big hospitals benefit from the implementation of HIS, the effect of size is different. Size has a positive effect on hospital performance for small hospitals but has a negative effect on big hospitals. This indicates that the competitive advantage of economies of scale disappears for big hospitals because the level of information transparency becomes lower and transaction costs become higher as size increases.

6.TITLE: Implementation of Big Data in Hospital Using Cluster Analytics

AUTHOR: Evarististis Didik Madyatmadja, etc.

YEAR OF PUBLICATION: 2021

SUMMARY:

Technology is needed to develop rapidly, including in the health sector. Any industry and any countries, big data technology has become a significant database where the data or information to generate can be used in medicine, one of which is applied in hospitals, clinics and the private sector. Big data is evolutionary and software in a suitable environment is being developed again. Health care data drives big data, for example data on patients with heart failure and with this data, authors can use data analytic tools to detect this so that it can be anticipated so that it can reduce the death rate due to this. The problem is that many hospitals have not applied technology to detect their health, and seeing from the times the technological era is increasingly advanced, including in the field of hospitals. To get this solution, use clustering

analytics with method K-means using rapid miner studio. Hopefully this analytics that can help research in medical field to do a prediction for heart failure symptoms.

7.TITLE: Big Data Analytics in Healthcare

AUTHOR: Sohali Imran, Tariq Mahmood, Ahsan Morshed, Timos Sellis

YEAR OF PUBLICATION: 2021

SUMMARY:

The advent of healthcare information management systems (HIMSS) continues to produce large volumes of healthcare data for patient care and compliance and regulatory requirements at a global scale. Analysis of this big data allows for boundless potential outcomes for discovering knowledge. Big data analytics (BDA) in healthcare can, for instance, help determine causes of diseases, generate effective diagnoses, enhance QoS guarantees by increasing efficiency of the healthcare delivery and effectiveness and viability of treatments, generate accurate predictions of readmissions, enhance clinical care, and pinpoint opportunities for cost savings. However, BDA implementations in any domain are generally complicated and resource-intensive with a high failure rate and no roadmap or success strategies to guide the practitioners. In this paper, we present a comprehensive roadmap to derive insights from BDA in the healthcare (patient care) domain, based on the results of a systematic literature review. We initially determine big data characteristics for healthcare and then review BDA applications to healthcare in academic research focusing particularly on NoSQL databases. We also identify the limitations and challenges of these applications and justify the potential of NoSQL databases to address these challenges and further enhance BDA healthcare research. We then propose and describe a state-of-the-art BDA architecture called Med-BDA for healthcare domain which solves all current BDA challenges and is based on the latest zeta big data paradigm. We also present success strategies to ensure the working of Med-BDA along with outlining the major benefits of BDA applications to healthcare. Finally, we compare our work with other related literature reviews across twelve hallmark features to justify the novelty and importance of our work. The aforementioned contributions of our work are collectively unique and clearly present a roadmap for clinical administrators, practitioners and professionals to successfully implement BDA initiatives in their organizations.

TABLE OF ARTICLES

S. No	TITLE	AUTHOR	YEAR	ADVANTAGES/DISADVANTAGES
1	Smart Healthcare System using big data analytics	Chinmay Chakraborty	2021	Lots of big data is unstructured. High cost to store more data.
2	Analysis of Research in healthcare Data Analytics	Mohammad Alkhatib, Amir Talaei-Khoei	2016	It helps in improving Healthcare and reduce the cost.
3	Concurrence of big data analysis and healthcare	R Shiva Shankar, J Rajanikanth, V.V.Sivaramaraju, K VSSR Murthy	2018	It needs to be analyzed for longer duration for longer duration to leverage its benefits.
4	Big data analytics in Healthcare Medical Image Processing from Big Data Point of view.	Daniel A, et, al.	2015	Delayed enhanced MRI has been used for exact assessment of myocardial infarction scar.
5	Development of the health information analytics dashboard using big data analytics	Anisatul Afifah, Krisostomus Nova Rahmanto	2020	Health information dashboard can improve the ability of health service facilities.

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1. D. M. Wonmack, R. Kennedy and B. Bria, "Current practices in clinical analytics: a hospital survey report", in: Nursing Informatics Proceedings of the International Congress on Nursing Information.
2. M. Torvati, R. Hill, A. Anjum, S. Y. Zhu, and L. Liu, Big-Data Analytics and Cloud Computing: Theory Algorithms and Applications, Switzerland: Springer International Publishing, 2015
3. S. Misra, S.K. Saha, and C. Mazumdar, "Performance Comparison of Hadoop Based Tools with Commercial ETL Tools-A Case Study," in: Big Data Analytics. Proceedings of the Second International Conference, BDA, 2013, pp. 176-184.
4. A. F. Simpao, L. M. AhImada, J. A. Galvez, M. A. Rehman, "A Review of Analytics and Clinical Informatics in Health Care," J Med Syst, 2014, pp. 38-45.
5. C. Lee, Belajar Microsoft Excel Step-By-Step, Jakarta: PT Elex Media Komputindo, 2016

