

ANALYTICS FOR HOSPITALS'

HEALTH-CARE DATA

IDEATION PHASE

LITERATURE SURVEY

Date	07 OCTOBER 2022
Team ID	PNT2022TMID47568
Project Name	Project - Analytics for Hospitals' Health-care data
Maximum Marks	4 Marks

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ABSTRACT :

The current study performs a systematic literature review (SLR) to synthesise prior research on the applicability of big data analytics (BDA) in healthcare. The SLR examines the outcomes of 41 studies, and presents them in a comprehensive framework. The findings from this study suggest that applications of BDA in healthcare can be observed from five perspectives, namely, health awareness among the general public, interactions among stakeholders in the healthcare ecosystem, hospital management practices, treatment of specific medical conditions, and technology in healthcare service delivery. This SLR recommends actionable future research agendas for scholars and valuable implications for theory and practice.

INTRODUCTION:

The healthcare industry historically has generated large amounts of data, driven by record keeping, compliance & regulatory requirements, and patient care. While most data is stored in hard copy form, the current trend is toward rapid digitization of these large amounts of data. Driven by mandatory requirements and the potential to improve the quality of healthcare delivery meanwhile reducing the costs, these massive quantities of data (known as 'big data') hold the promise of supporting a wide range of medical and healthcare functions, to derive previously untapped intelligence and insights from data to address many new and important questions. Within the health sector, it provides stakeholders with new insights that have the potential to advance personalized care, improve patient outcomes and avoid unnecessary costs. By definition, big data in healthcare refers to electronic health

data sets so large and complex that they are difficult (or impossible) to manage with traditional software and/or hardware; nor can they be easily managed with traditional or common data management tools and methods. Big data in healthcare is overwhelming not only because of its volume but also because of the diversity of data types and the speed at which it must be managed. It includes clinical data and clinical decision support systems (physician's written notes and prescriptions, medical imaging, laboratory, pharmacy, insurance, and other administrative data); patient data in electronic patient records (EPRs); machine generated/sensor data, such as from monitoring vital signs; social media posts, including Twitter feeds (so-called tweets), blogs, status updates on Facebook and other platforms, and web pages; and less patient-specific information, including emergency care data, news feeds, and articles in medical journal. For the big data scientist, there is, amongst this vast amount and array of data, opportunity. By discovering associations and understanding patterns and trends within the data, big data analytics has the potential to improve care, save lives and lower costs. Thus, big data analytics applications in healthcare take advantage of the explosion in data to extract insights for making better informed decisions.

Analytics when applied in the context of big data is the process of examining large amounts of data, from a variety of data sources and in different formats, to deliver insights that can enable decisions in real or near real time. Various analytical concepts such as data mining, natural language processing, artificial intelligence and predictive analytics can be

employed to analyze, contextualize and visualize the data. Big data analytical approaches can be employed to recognize inherent patterns, correlations and anomalies which can be discovered as a result of integrating vast amounts of data from different data sets. This paper provides an overview of big data analytics in healthcare as it is emerging as a discipline. First, we define and discuss the definition of big data and characteristics of big data analytics in healthcare. Then we describe the types of big data in healthcare. Third, we provide examples of big data analytics in healthcare. Fourth, the challenges are identified. Lastly, we offer conclusions and future directions.

PROBLEM STATEMENT:

Biometrics devices can take unique information about you from your eye, or your hand prints, or your thumb prints and use it to identify you. This information can be used to obtain the valuable healthcare information. The personal health monitoring of each individual is considered very important because of rise in health problems in today's world. The increasing stressful lifestyle is taking maximum toll on the public health. With the ever increasing queues at hospitals and ever increasing number of patients, the doctor fees have sky-rocketed which is affecting especially those patients who cannot afford the fee or who are not suffering from major ailments but get to know so only after paying a hefty fee to the doctor. The researchers and surveys often demonstrate that most of the major health ailments are the result of careless attitude towards the minor health ailments. Majority of these issues can be solved by just following a good diet, proper sleep pattern and regular exercising. But how does a patient know

what diet is good or what exercise he/she should follow and more importantly whether the plan that he is following is working effectively for him. The absence of such a mechanism makes the task of patient a difficulty, thus landing him with an option either to go to the doctor that means heavy fee or ignore the ailment that is more dangerous.

Moreover the increase in patients has also led to the decrease in the relative number of doctors per patient which results in vicious cycle where ignored or delayed diagnostics of an ailment makes the patient more dependent on doctor's check-up. But is it necessary that every time the user faces some issue or requires advice, that are not that serious, like somebody wants to get rid of some extra fat or somebody wants to improve his/her stamina, he/she is required to go to doctor?

Well, though it is advisable to visit the doctor whenever possible, but as discussed above if due to unavailability of specialist due to some reason, the Health Monitoring Devices offer an effective alternative. These days it is advisable to each individual to monitor and maintain good health by using biometric health monitoring devices and keep modifying their diet so as to improve their health stats. Thus there is a need for software that utilizes the data available from the device, uploads it to the website, gets feedback from the doctors via internet and show health reports. Doctor should be able to get data anytime he wants for analysis.

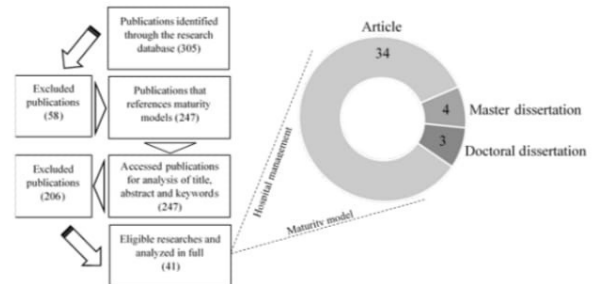
The biometric health devices can record the various data like metabolism rate, sleep hour, sedentary activity while being in contact with the user and this data from user can be used by physicians to recommend any changes to user's routine. Our project attempts to use the

information obtained using such devices to give the detailed analysis of health of a patient/individual that can help in getting a prompt and timely advice from a doctor. Currently healthcare monitoring is extensively doctor depending. Our System is basically designed for those customers who can selfmonitor their health indicators to check the progress that they are making through a diet plan change or exercise routine modification. An option will also be provided to customer to send the report to the doctor for expert advice in case the customer feels he/she is not completely satisfied by the diet routine, sleep hours or any other general habit he is acquiring. Different types of health indicators would be used for the analysis.

RESEARCH METHOD:

From a qualitative approach, we used the bibliographic research, which according to Van den Akker et al. (2006), is a technique frequently used in exploratory or descriptive studies, cases in which the proposed object of study is little studied and implies an orderly set of procedures for finding solutions attentive to the object of study. The bibliographical analysis occurred through doctoral dissertations, master dissertations and scientific / academic papers that were published on the theme of hospital management maturity models. To cover the largest possible number of publications, we do not consider the credibility of journals, the number of citations

and the impact factor on our research scope. The present study uses Web of Science, Scopus, Spell, Scielo and Brazilian Digital Library of Theses and Dissertations [BDTD] platforms, considered reliable platforms for accessing scientific publications, for gathering the publications, and the appropriate EndNote tool used to generate the desired information. Data were collected in national and international journals during the year 2019, using the following key words in Portuguese and English: “Maturity Model” and “Hospital Management”. The result set consisted of 305 publications (dissertations and scientific papers) published from January 2005 till December 2019 that made up the corpus of analysis of the survey. The criterion for selecting the duration of the research time was based on limited knowledge before 2005.



Initially, a set of results was obtained using different keywords in the searched databases. From the results obtained, only researches referred to maturity models were analyzed. The researches that did not refer to maturity models

have been eliminated. This procedure reduced the number of potentially irrelevant research in databases. Subsequently, the results have been revised based on the titles, abstracts and keywords, classified in two ways: (i) checking whether the document meets the criteria for inclusion in the study; and (ii) are related to maturity and hospital management models. From this process, a final sample of 41 surveys was reached. Of these, 82.93% are dispersed in a wide range of articles; 7.32% are doctoral dissertation and 9.76% master dissertation. These publications were read in full, generating a short description, to assess its focus on models of maturity and hospital management, and the relevance to the research questions.

FUTURE SCOPE:

The current study intended to address four research questions related to the application of BDA in healthcare. These questions have been answered following a standard protocol for reviewing resources from key databases. The prior literature on the application of BDA in healthcare has focused on five main themes, namely health awareness, stakeholders of the healthcare ecosystem, hospital management practices, specific medical conditions, and healthcare service delivery through technology use. The study has identified the gaps in the

existing literature and provided an actionable research agenda for future research on the utilisation of big data in the healthcare sector. However, despite the significant contributions of this current study, it suffers from three main limitations: first, book chapters, magazine articles, and thesis studies have been excluded from the scope of this study; second, journal articles and conference studies not available in English were not considered; third, studies not available in the four databases were not reviewed unless they appeared in the forward and backward searches.

CONCLUSION:

This thesis, reviewed different perspectives of empathy in psychology, medical and design fields and analyzed two case studies by interviewing empathy experts. The criteria from VOA of Cagan and Vogel, was applied to analyze the empathic approach of each product to make the comparison of a product designed with an empathic process and one without it. As a result of the study, I proposed six guidelines that could resolve the challenges and realize the opportunities of an empathic approach for new product development. Design has not got a chance to play a lot in the world of science. Designers are seen as not significant because of that connection to subjectivity and emotions.

Now, there is a new value of what we do. Improving healthcare is critical, healthcare situations put us in our most vulnerable state and empathy is a bridge that connects that state with the sciences and introduces it to the lives of real people in a very meaningful way. Users and consumers are demanding less complexity in their products. They want products to integrate not to have a stigma and to blend in, they are now looking for products that connect with them. There are many demands and a lot of these expectations are being pushed by the user, where in the past there has not been like that. That is what keeps us agile. Designers find that many clients expect that you already understand the user, even when the technology is brand new. And because we are living in an empathic economy, technology is not enough. Even if that technology sells, if the product doesn't lead to bonding, the chances of that product to succeed are low.