

## **Literature Review**

### **Analytics for Hospitals Health Care Data Project**

1.

#### **AUTHORS:**

Lidong Wang, Cheryl Ann Alexander

#### **ABSTRACT:**

Big Data analytics can improve patient outcomes, advance and personalize care, improve provider relationships with patients, and reduce medical spending. This paper introduces healthcare data, big data in healthcare systems, and applications and advantages of Big Data analytics in healthcare. We also present the technological progress of big data in healthcare, such as cloud computing and stream processing. Challenges of Big Data analytics in healthcare systems are also discussed.

2.

#### **AUTHORS:**

Mohammad Ahmad Alkhatib, Amir Talaei-Khoei, Amir Hossein Ghapanchi

#### **ABSTRACT:**

The main aim of this paper is to provide a deep analysis on the research field of healthcare data analytics, as well as highlighting some of guidelines and gaps in previous studies. This study has focused on searching relevant papers about healthcare analytics by searching in seven popular databases such as google scholar and springer using specific keywords, in order to understand

the healthcare topic and conduct our literature review. The paper has listed some data analytics tools and techniques that have been used to improve healthcare performance in many areas such as: medical operations, reports, decision making, and prediction and prevention system. Moreover, the systematic review has showed an interesting demographic of fields of publication, research approaches, as well as outlined some of the possible reasons and issues associated with healthcare data analytics, based on geographical distribution theme. The main aim of this paper is to provide a deep analysis on the research field of healthcare data analytics., as well as highlighting some of guidelines and gaps in previous studies. This study has focused on searching relevant papers about healthcare analytics by searching in seven popular databases such as google scholar and springer using specific keywords, in order to understand the healthcare topic and conduct our literature review. The paper has listed some data analytics tools and techniques that have been used to improve healthcare performance in many areas such as: medical operations, reports, decision making, and prediction and prevention system. Moreover, the systematic review has showed an interesting demographic of fields of publication, research approaches, as well as outlined some of the possible reasons and issues associated with healthcare data analytics, based on geographical distribution theme. The main aim of this paper is to provide a deep analysis on the research field of healthcare data analytics., as well as highlighting some of guidelines

and gaps in previous studies. This study has focused on searching relevant papers about healthcare analytics by searching in seven popular databases such as google scholar and springer using specific keywords, in order to understand the healthcare topic and conduct our literature review. The paper has listed some data analytics tools and techniques that have been used to improve healthcare performance in many areas such as: medical operations, reports, decision making, and prediction and prevention system. Moreover, the systematic review has showed an interesting demographic of fields of publication, research approaches, as well as outlined some of the possible reasons and issues associated with healthcare data analytics, based on geographical distribution theme.

3.

#### **AUTHORS:**

[João Vidal de Carvalho](#), [Álvaro Rocha](#), [António Abreu](#)

#### **ABSTRACT:**

In the last five decades, maturity models have been introduced as reference frameworks for Information System (IS) management in organizations within different industries. In the healthcare domain, maturity models have also been used to address a wide variety of challenges and the high demand for hospital IS (HIS) implementations. The increasing volume of data, is exceeded the ability of health organizations to process it for improving clinical and financial efficiencies and quality of care. It is believed that careful and attentive use of Data Analytics (DA) in healthcare can transform data into knowledge that can improve patient outcomes and operational efficiency. A maturity model in this conjuncture, is a way of identifying strengths and weaknesses of the HIS maturity and thus, find a way for improvement and evolution. This paper presents a proposal to measure Hospitals Information Systems maturity with regard to DA. The outcome of this paper is a maturity model, which includes six stages of HIS growth and maturity progression.

4.

**AUTHORS:**

[Pijush Kanti Dutta Pramanik](#), [Saurabh Pal](#)

**ABSTRACT:**

Big Data has unlocked a new opening in healthcare. Thanks to the considerable benefits and opportunities, it has attracted the momentous attention of all the stakeholders in the healthcare industry. This chapter aims to provide an overall but thorough understanding of healthcare Big Data. The chapter covers all the ten 'V's of healthcare Big Data as well as different healthcare data analytics including predictive and prescriptive analytics. The obvious advantages of implementing Big Data technologies in healthcare are meticulously described. The application areas and a good number of practical use cases are also discussed. Handling Big Data always remains a big challenge. The chapter identifies all the possible challenges in realising the benefits of healthcare Big Data. The chapter also presents a brief survey of the tools and platforms, architectures, and commercial infrastructures for healthcare Big Data.

5.

**AUTHORS:**

J.Archenaa and E.A.Mary Anita

**ABSTRACT:**

This paper gives an insight of how we can uncover additional value from the data generated by healthcare and government. Large amount of heterogeneous data is generated by these agencies. But without proper data analytics methods these data became useless. Big Data Analytics using Hadoop plays an effective role in performing meaningful real-time analysis on the huge volume of data and able to predict the emergency situations before it happens. It describes about the big data use cases in healthcare and government.

The healthcare industry has generated large amount of data generated from record keeping, compliance and patient related data. In today's digital world, it is mandatory that these data should be digitized. To improve the quality of healthcare by minimizing the costs, it's necessary that large volume of data generated should be analysed effectively to answer new challenges. Similarly government also generates petabytes of data every day. It requires a technology that helps to perform a real time analysis on the enormous data set. This will help the government to provide value added services to the citizens. Big data analytics helps in discovering valuable decisions by understanding the data patterns and the relationship between them with the help of machine learning algorithms(1). This paper provides an overview of big data analytics in healthcare and government systems. It describes about big data generated by these systems, data characteristics, security issues in handling big data and how big data analytics helps to gain a meaningful insight on these data set.

**6.**

**AUTHOR:**

Ajit Kumar Roy

**ABSTRACT:**

Big data is created every day by the interactions of billions of people using computers, GPS devices, cell phones, sensors and medical devices, data-intensive areas such as atmospheric science, genome research and , astronomical studies. Today big data opens huge opportunities to those who can use it effectively. Now realizing the great importance of big data, many analytical companies are engaged in finding hidden information in big data. According to internet experts the present technological advances to collect and analyze massive sets of data is likely to lead to revolutionary changes in business, and society. Till date a lot of work has been done on the tools, software, platforms, analytics etc. applied to big data. Many organizations are giving attention in big data analytics for development, education, disaster management, health care, and natural resource management for benefit of society. Therefore, it is attempted to compile and document the real use cases, benefits, advantages, impact and future challenges of big data. UN Global Pulse has

worked on several research projects in collaboration with public and private partners demonstrating the beneficial effect of analytics from monitoring early indicators of unemployment hikes to tracking fluctuations of commodity prices before they are recorded in official statistics. According to thought leaders big data is already showing the potential in areas as genetic mapping and personalized e-commerce. The unprecedented growth in processing power and software technologies such as Hadoop, are allowing organizations “to make decisions that simply could not be made before” having profound impact. Its influence is felt in business planning, research, sales, production and elsewhere. These are considered as new industrial revolution. Scientists used to decode human DNA in minutes, find cures for cancer, accurately predict human behaviour, optimise marketing efforts, prevent diseases and foil terrorist attacks, utilising big data. Finally, concerns about privacy expressed by experts cannot be ignored. As many companies use our private information. The presentation is focused on how Big Data Analytics impact health care and Society.

## **7.**

### **AUTHORS:**

Eleanor M. Rees,  
Emily S. Nightingale,  
Yalda Jafari.

### **ABSTRACT:**

The COVID-19 pandemic has placed an unprecedented strain on health systems, with rapidly increasing demand for healthcare in hospitals and intensive care units (ICUs) worldwide. As the pandemic escalates, determining the resulting needs for healthcare resources (beds, staff, equipment) has become a key priority for many countries. Projecting future demand requires estimates of how long patients with COVID-19 need different levels of hospital care.

We performed a systematic review of early evidence on length of stay (LoS) of patients with COVID-19 in hospital and in ICU. We subsequently developed a method to generate LoS distributions which combines summary statistics reported in multiple studies, accounting for differences in sample sizes. Applying this approach, we

provide distributions for total hospital and ICU LoS from studies in China and elsewhere, for use by the community.

We identified 52 studies, the majority from China (46/52). Median hospital LoS ranged from 4 to 53 days within China, and 4 to 21 days outside of China, across 45 studies. ICU LoS was reported by eight studies—four each within and outside China—with median values ranging from 6 to 12 and 4 to 19 days, respectively. Our summary distributions have a median hospital LoS of 14 (IQR 10–19) days for China, compared with 5 (IQR 3–9) days outside of China. For ICU, the summary distributions are more similar (median (IQR) of 8 (5–13) days for China and 7 (4–11) days outside of China). There was a visible difference by discharge status, with patients who were discharged alive having longer LoS than those who died during their admission, but no trend associated with study date.

Patients with COVID-19 in China appeared to remain in hospital for longer than elsewhere. This may be explained by differences in criteria for admission and discharge between countries, and different timing within the pandemic. In the absence of local data, the combined summary LoS distributions provided here can be used to model bed demands for contingency planning and then updated, with the novel method presented here, as more studies with aggregated statistics emerge outside China.