

Chapter 20

Usage and Analysis of Big Data in E-Health Domain

Sushruta Mishra

C. V. Raman College of Engineering, India

Hrudaya Kumar Tripathy

KIIT University, India

Brojo Kishore Mishra

 <https://orcid.org/0000-0002-7836-052X>

C. V. Raman College of Engineering, India

Soumya Sahoo

C. V. Raman College of Engineering, India

ABSTRACT

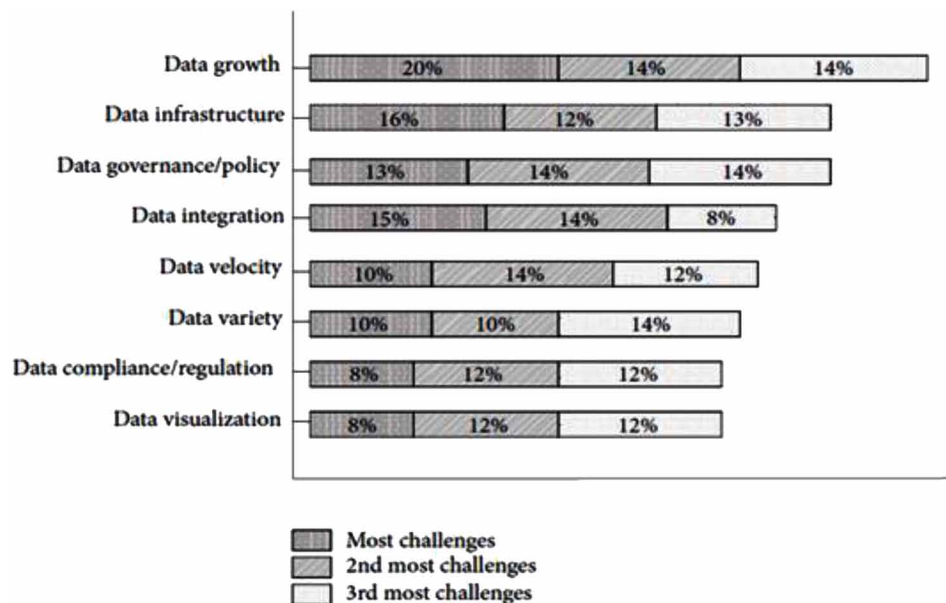
Big data analytics is a growth area with the potential to provide useful insight in healthcare. Big Data can unify all patient related data to get a 360-degree view of the patient to analyze and predict outcomes. It can improve clinical practices, new drug development and health care financing process. It offers a lot of benefits such as early disease detection, fraud detection and better healthcare quality and efficiency. This chapter introduces the Big Data concept and characteristics, health care data and some major issues of Big Data. These issues include Big Data benefits, its applications and opportunities in medical areas and health care. Methods and technology progress about Big Data are presented in this study. Big Data challenges in medical applications and health care are also discussed. While many dimensions of big data still present issues in its use and adoption, such as managing the volume, variety, velocity, veracity, and value, the accuracy, integrity, and semantic interpretation are of greater concern in clinical application.

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INTRODUCTION

Over the past 20 years, data has increased in a large scale in various fields. According to a report from International Data Corporation (IDC), in 2011, the overall created and copied data volume in the world was 1.8ZB ($\approx 1021B$), which increased by nearly nine times within five years (Gantz, J. & Reinsel, D. 2011). This figure will double at least every two years in the near future. Under the explosive increase of global data, the term of big data is mainly used to describe enormous datasets. Compared with traditional datasets, big data typically includes masses of unstructured data that need more real-time analysis. Recently, industries become interested in the high potential of big data, and many government agencies announced major plans to accelerate big data research and applications (Fact sheet 2012). In addition, issues on big data are often covered in public media, such as The Economist (Cukier, K. 2010, Drowning in numbers 2011), New York Times (Lohr, S. 2012) and National Public Radio (Yuki, N. 2011). Two premier scientific journals, Nature and Science, also opened special columns to discuss the challenges and impacts of big data (Big data 2008, Special online collection 2011). The era of big data has come beyond all doubt (Manyika, J. et al. 2011). The current international population exceeds 7.2 billion (Worldometers 2014), and over 2 billion of these people are connected to the Internet. Furthermore, 5 billion individuals are using various mobile devices, according to McKinsey (2013). As a result of this technological revolution, these millions of people are generating tremendous amounts of data through the increased use of such devices. In particular, remote sensors continuously produce much heterogeneous data that are either structured or unstructured. This data is known as Big Data (Che, D., et al. 2013). Figure 1. groups the critical issues in Big Data into three categories based on the commonality of the challenge.

Figure 1. Challenges in Big Data



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