Chapter 39
Big Data and Enterprise Applications

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ABSTRACT

Today, a company continues its activities in a highly competitive environment regardless of the sector in which it operates. An important point has been emphasized in many developments by experienced managers and academics which have been released to the public. From marketing to finance, human resource management, auditing and planning, all business processes have entered an incredible innovative process. One of the topics in this process is big data. When cumulative data are not used, they cannot transcend being huge piles of garbage. However, it is not possible to analyze such large, complex, and dynamic data via conventional methods. At this point, the concept of big data has emerged. In this study, after the explanation and definition of the concept, a vast literature review was conducted in order to present the relationship of big data with IoT, big data-related topics, and academic researches on big data. Afterwards, real-life enterprise applications were exemplified from various industries.

INTRODUCTION

In his published book: *The Scholar and the Future of the Research Library*[1] in 1944, Fremont Rider; a librarian in Wesleyan University; estimated that the size of the U.S. university libraries were doubling every sixteen years and with this rate of growth, the Library of Yale University would have nearly 200 million volumes which would require more than 10 thousand kilometers of shelves, with around six thousand working staff by the year 2040 (Press, 2013).

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In 1975 The Ministry of Posts and Telecommunications in Japan conducted a project called "Information Flow Census", in order to track the volume of information flowing in Japan. The study presented "amount of words" as the consolidative unit of measurement. The results found out that information supplied was increasing much faster than information demanded (Hilbert, 2012). Similarly, in 1981 The Hungarian Central Statistics Office started a research initiation to call on the information industries of the country (Hilbert, 2012).

Then in 1983 Pool published a paper; *Tracking the Flow of Information* (Pool, 1983) which explored the growth trends in communications media industry from 1960 to 1977. In the period of research, much of the growth observed in the information flow was because of the growth in broadcasting.

The quantity of data gradually became an important problem. In his very influencing study *Saving All the Bits* (Denning, 1990) Denning (1990) pointed out that the imperative to save all the data forced them into such a difficult situation that the rate and volume of information flow submerged their networks, storage infrastructures and information retrieval systems, just as the human comprehension capacity. So, some type of machines or methods should be developed in order to reduce the amount of data that must be saved, and the risk of losing hidden discoveries in a broad database could be reduced (Press, 2013).

By the penetration and the exponential growth of internet, the concerns on data processing became an important topic for all related stakeholders. In 1997, Lesk published a paper with the aim of calculating the volume of the current data and its future all over the world (Lesk, 1997); where correspondingly Cox and Ellsworth (1997) named the data processing concern as "the problem of big data" (Cox & Ellsworth, 1997). It was the first article in the ACM Digital Library which used the term "big data", although the quantity of the data was not comparable with the one, we deal with currently (Press, 2013).

The main purpose of the above-mentioned examples is to find an answer to the very head question: How do we deal with and benefit from that much, fast-growing and diverse data?

The human being has started to generate value from cumulative data which has become ginormous stacks just as producing energy from garbage mountains of municipal dump sites of cities, which pile up over years. In the recent decades, with the outbreak of data in all courses of all activities, humanity has faced a new global threat, which was called the "Information gap". Non-analyzed and irrational data could be expressed as "black information holes", which call many unexpected, poorly explained events (Zugurovsky & Zaychenko, 2019).

Communication has been one of the key aspects of humanity since ancient times. During last several decades we have witnessed considerable changes in communication and information technology (Sarma, Borah, & Dutta, 2016). Social networks generate huge volume of data at any time. Similarly, mobile devices generate data, like instant messages, voice calling, video conferencing, GPS. Also, sensor technologies like, satellites, GPS, radars generate huge data by measuring other sorts of data (Titimus, 2016). The consistent increase in the volume of data gathered by organizations because of the increase of data in social media, Internet of Things (IoT) and multimedia platforms. (Madakam, Ramaswamy, & Tripathi, 2015). The amount of generated data in everywhere, every day is really huge. It is important to analyze this huge volume of data in order to benefit from it. Hence, there is need for more complicated and smart computing techniques (Sarma, Borah, & Dutta, 2016). In data analysis field, conventional methods previously used to explore the data sets have become unable to cope with the recent data type and at this point the new concept has emerged: Big Data.

Even though having numerous definitions, big data can be qualified as *"the data that exceeds the processing capacity of conventional database systems"*. Chapman (2018) specifies the most important reasons of using big data as; time saving, better real-time analytics, modernized data storage methods,

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