

Core Principles and Applications of Big Data Analytics

Manoj Chowdary Vattikuti

Independent Researcher

Accepted and Published: 2014

[Vol 6, No 6 \(2014\): TLHS](#)

manojchowdaryvattikuti@gmail.com

Abstract

In the age of exponential data growth, decision-makers face the challenge of leveraging vast and complex datasets that surpass the capabilities of traditional data management tools. Big Data Analytics emerges as a transformative solution, employing advanced techniques to extract actionable insights, value, and knowledge from these extensive datasets. This study explores the foundational concepts of big data, the challenges associated with its management, and the innovative analytical approaches that enable effective utilization. The paper emphasizes the importance of Big Data Analytics in driving informed decision-making and unlocking new opportunities across various domains.

Keyword: Big data , Data analysis, Information, companies

Introduction

Imagine a world without data backup; when all the details of a person or a job are lost, it can be documented when each transaction is completed or when each page is used. As a result, companies lose the ability to extract valuable information and knowledge, conduct in-depth analysis, and offer new opportunities and benefits [1-5]. Data is an essential part of our life and the ability to store and access. The data has become an important task. Names, addresses, available products, purchases and access to assigned personnel are essential for day-to-day continuity.

Imagine for a second that we were transposed into the karmic world of Earl. With more methods of storing and collecting data, such data is readily available. Every second, more and more data is being generated, stored and analyzed to extract value [6-7]. Also, data storage has become cheaper, so companies have to store more and more data. There has been a significant increase in the use of digital storage and a decrease in its cost over the past twenty years. It eliminates the need to delete previous data, augment associated metadata, or store data, which is a standard practice against data loss and backup storage. Also, businesses and individuals have more technologies and devices that generate and capture more data in different categories. Nowadays, the user can get a desktop computer, laptop, Smartphone, tablet and many more, because each device contains a considerable amount of precious data. The large amount of data must be appropriately analyzed and relevant information obtained. Big Data Analytics is an advanced technical process for big data analysis.

Big data

The term "big data" has recently been used to refer to very large data sets [8]. To work with traditional database management tools, Databases are more significant than the storage software and tools commonly used in the past to capture, store, manage and process data [8]. Big data refers to databases measured in terabytes and above and is so complicated and broad that it cannot be used effectively in conventional systems. Large data sets are a continually evolving target, currently containing a few dozen terabytes for several petabytes of data in a database. As a result, taking, storing, locating, sharing, analyzing and viewing photos can be a daunting task [7,9]. Today, companies are exploring detailed data to uncover unknown facts.

The data science model derives valuable visions from web data and practice in general of data science. The role of data science is to meet the challenges of processing huge amounts of data at one time. Big data consists of structured, unstructured and semi-structures data which is developed by large enterprises. Big data helps in extracting new data generated from mobile social media and internet websites. Data science gives productive information from different emerging areas of computer science like cloud computing, databases and information integration, web information access and information retrieval and knowledge representation.

Big data analysis helps us to know the information related to consumers that's the reason you get message about your interest and sent information, bank is able to know about the loss of their debt. This is all will be tracked through big data analysis. Data analytics approach helps in know all the information from your mobile data or computer data and even from your Aadhar data. Company come to know about the customer satisfaction conclusion. All the cases work with big data analytics. Big data analysis directly relates to the customer. Companies prefer to do online selling these days as they can get huge data to access in future from Big data. To find the right status of brand, demand Big data analysis helps a lot. Big data is the study of numbers which helps in reaching from analysis to conclusion. It can be done in the form of Petabytes or Exabytes. It has lakhs or crores of information about the people like their address, mobile number, social media details, customer contacts from the web. The numbers are of structured data but somehow incomplete and it becomes difficult to reach at the conclusion. It helps in knowing information about business activities to come to know about some trends and some other productive information which was somehow not possible with numbers [8].

Big data was basically associated with three main concepts that is volume, variety and velocity. While handling big data it may doesn't observe and track exactly what happens. Thus, Big data includes data with varieties that surpass the competence of redundant software to practice within a suitable time and value.

Beginning of big data

Random access memory accounting machine for data processing first presented by IBM in September 1956. It was the world's first storage product. Telecom companies used this machine to know information about the customer satisfaction not through the analysis. In India, NASSCOM done partnership with Blue Ocean Market Intelligence had prepared report states that the Big data was at present in 62 Arab Indian rupees. It was estimated earlier that by 2014, Big data will be more than double as it happens so also. Many ideas can be generated through Big data and it will help in change management. Big Data analysis delivers new updated information with any type of new data that help in make future goal decisions and strategies. It is important to use for consumer point as it helps in increasing the number of customers [1-5].

Big data processing

To process big data, you also need cloud and physical devices. Today, thanks to technological advancements, we can add cloud computing and artificial intelligence to the world of big data processing. With all of these improvements, manual entries can be minimized and automated.

Data analysis refers to the quantity and standardization of methods for obtaining valuable information from the data. This includes many processes, including the analysis and classification of data, as well as the analysis of different formats, relationships and connections and the collection of other valuable information.

Today, almost every business is a data-driven business that initiates a data-driven approach to collect additional data related to customers, markets, and businesses [6] . This data is then compiled, stored, analyzed and used to understand and extract valuable information.

What is the difference with Big Data today?

As data grows exponentially, businesses must constantly expand their infrastructure to maximize the economic value of data [5]. In the early years of Big Data (2008), when Hadoop was first recognized by large companies, developing an efficient production system was very expensive and inefficient [4]. You need to have the right people and the right software technology with the

right data processing tools and the speed of inbound requests to use big data. Working simultaneously is a daunting task and many big data projects fail [9].

In 2013, the idea of an enterprise cloud for analytics became popular with Amazon Web Services (AWS) and some Silicon Valley companies (VMware, Microsoft, and IBM) as companies use the cloud computing to exploit emerging business solutions. By the time AWS announced sales of around \$ 5 billion this year, the world was already starting to notice.

For businesses large and small, with immediate access to infrastructure and advanced technologies with just a few clicks the cloud has become a change in the market today. This allows data management teams and developers to fully manage the site, which is no longer a barrier [6-8]. Going back to the previous concept of Big Data 4V, the cloud provides an excellent infrastructure that helps companies grow beyond existing systems:

- Size - Information grows and has a valuable expiration date as low cost cloud storage allows businesses to manage huge amounts of data without having to worry about one thing or all.
- Diversity - The need for unstructured data analytics is increasing, resulting in the need for a different framework such as deep learning about processing. Temporary cloud servers allow businesses to repeatedly test different large data drives against the same data.
- Speed - The complexity of analysis problems requires several steps (eg, IT learning in IT resources is estimated at 80% EDL), which cloud companies can scale up / down as needed.

Big Data Properties

The technological structures analyze and tools over time to develop ideas that open up new sources of value, quantity, distribution, diversity and commercial value of data. Big Data has three main characteristics: size, type and speed. The size of the data is its size and volume. Speed refers to the speed at which data is transferred or generated. Finally, diversity includes different formats and types of data, different types of applications and methods of data analysis.

Characteristics of big data:

The main characteristic of Big Data is the amount of data. Big data can be measured in terabytes or bytes, as well as the number of records, transactions, tables, or files. The factor that make big data so significant is that it comes from a variety of sources, including posts, clicks, and social media [8]. Using these sources for analysis means that generally structured data is now associated with unstructured data such as human text and language and semi-structured data such

as XML or RSS feeds. There is also data that is difficult to categorize because it comes from audio, video, and other devices. Also, multidimensional data can be extracted from a database to add historical context to big data. So with Big Data, diversity is the same thing. Additionally, big data can be described as speed. It is the frequency of data generation or the frequency of data distribution. One of the most prominent Big Data is real-time data feeds from websites.

New type of distinction: high-level versus low-level.

High-level data science: It deals with decision making rather than data munging. It involves architecture and accessing the right summarized data (usually via dashboards, Excel repositories populated daily, or email alerts automatically received in your mailbox) to detect anomalies or opportunities, first correct problems, mainly identify root causes, or fine-tune business processes (marketing campaigns, pricing, inventory). This role is assigned to a decision-maker, director or executive with strong analytic acumen and good judgment.

Low-level data science: This type of process refers to technical and involves the design and implementation/automation of business optimization processes, using modern, scalable, robust algorithms. For a general view, designing an ad matching algorithm that helps Google make more money, while at the same time focusing on ad relevancy to keep users in the long term. Some people think that data science is low-level data science only, but that's not the case. Here note that low-level data science is too low-level programming what high-level data science is too high-level programming. Likely low-level layer is more technical and more complex, it's the layer on which the high-level rests. But the high-level layer needs different skills, including business acumen, leadership and domain expertise.

Big data in current decade:

In recent decades, a distinct development in data technology and the data age has made it possible to obtain a wealth of data from a variety of sources, such as the expansion of informal correspondence, connectivity and online business applications. The data here is standardized, semi-structured and dispersed. Big data is an integral part of our custom database systems that cannot handle complex and irregular data and measure the data associated with it. To express the amount of data, speed, fairness, and aggregation are huge. The translation we use to provide the type of data is that it is used everywhere to improve, decompose, create and transform businesses through understanding. Large data packets and innovations can be obtained by displaying open

configurations in NoSQL databases with reasonable data types for individual models. Problems arise when many reasonable improvements are made by processing big data; for example, the fundamentals of asset allocation and profit requirements. Until late, database systems were driven by Hadoop-based software.

Big Data and Business Intelligence Analysis

Business Intelligence is sometimes called the first 4 stages of descriptive diagnosis and the 4 stages of Big Data [5]. BI is often hosted on a database where the data is organized in a very natural way, and only explain what happened, "what, where, how" (example: 10 different stores offer the same advertising service, no store sells shoes to others). This data is often used to report and collect information on trends and common interactions based on recent events.

Big data analysis goes even further as technology can access structured and irregular data sets (such as user behavior or images). Big Data Analytics tools can combine this data with historical information to determine the likelihood of an event based on past experiences [7].

Big data online and offline

Data age niches are common in data technology niches and can be classified into two categories online and offline.

Online data is a type of data that is continuously generated by computers. For example, the live video data, money transfer. Continue to run, swallow, generate and transfer data to assist online payment applications and customers. Always keep in mind that data erosion must be insignificant and data transmission must be as fast as that indicated in customer preferences.

Offline data is a type of data contained in a static data plan that is commonly used offline to separate big data technologies with an access device or technology. The extended data used by some companies was produced late. Following the rules, personal data is wholly exceptional and immutable in online systems with the intention that these systems do not affect or apply to any customer. Restricted computer access requires significant data technologies to perform sophisticated estimates. Current progress in significant offline data technologies has focused on data transfer or the range of technologies that can be used to control extensive data [8-9].

Flexible and adaptable

Although it is not fully labeled as a failure of RTPMS systems, it is considered a custom database component for data and production, in an attempt to grow enough to oversee units, tools and updates inventory update. Whether or not the database has been upgraded, we should take advantage of the lengthy offline configuration process. The latest update of the framework is related to its unknown quality, which is inevitable due to the current speed of data, which increases after some time, and customizable systems must gradually record extensive data.

Recommend

Short-circuiting is a technique for dividing data into different tables in RTPMS and using the table as acceptable as mentioned. Evaluation is not an issue with big data technologies because databases are created so that standard article servers can access them. Cassandra, MongoType and Reds are the most used essential databases.

Complex properties and dominant management

Since standard database systems use fewer device servers, and more data technologies use controlled servers instead of clusters, IT information traffic is more attractive than large IT particles.

Tesco

The largest retailer in the world can generate a responsibility that appears from Big Data. In 1995, I issued a shopping card called Club Card to customers. The card is used to test the purchasing behavior, products and superiors of customers.

Depending on the model, the data from the purchase trucks will make it possible to verify whether an item can be delivered quickly or by leaving or near the store. Due to customer data not supported by the Club Card, Tesco's understanding of customer decisions and preferences is gradually and directly increasing. These slides include personalized rewards or night plans based on data collected from personal cards.

Big data is used in many ways, for example, to talk about food and products. Tesco is receiving barometric order data from the region and hopes to provide us with links to stores for future meals. By conducting new experiments, the best amount of space allocated ends up being acceptable forts.

In the industry, food must be thrown away. Business efficiency is an essential factor to consider. Witness the data produced by each refrigerator by the border office.

Tesco reaches the best data to reduce its bills to 25 million each year. For example, Irish cold sensors measure the temperature of defensive reinforcements and gather 70 million pieces of data each year.

BIG DATA USAGE

Big data helps companies to make decision for progressive manner. Big data helps to analyse the companies to know what customer wants exactly. The bankers will get to know about the details of the loans sanctioned, amount of loans recovered, bank status and customer bank balance all because of Big data. For supply chain management, big data analysis to know the need and interest of the customers, also with the principle of artificial intelligence, the applications have been expanded [10-16]. Big data helps in processing data for particular subject related to text, audio-video, and data which help in decision making in a right way. Companies who are working with the big data analysis –

- Heckyl
- Sigmoid Analytics
- Flutura Indix
- Crayon Data
- Germin8
- Aureus Analytics
- Dataswft
- C360
- Metaome
- Frrole
- Bridgei2i
- Formcept
- PromptCloud

ADVANTAGES OF BIG DATA

Big Data have following advantages:

- Big data helps in improving business processes by helping and gaining huge competitive advantage. Big data help in optimizing big data which can result in improvement of certain facts of business operations to deal with current process and information.
- Big data helps in fraud detection by implementation of machine learning. It helps bank and other financial institutions to detect frauds and save the customers by any fraudulence activities.
- Big data helps to improve customer service by capturing huge data of information from many sources and then manage customer service by a customer relationship management that is CRM with the help of social media and then analyse taste and preferences on the basis of data collected and then with the help of big data they able to create experiences which are more personal, accurate and responsive.

DISADVANTAGES OF BIG DATA

- Big data have huge data information through which some cyber criminals may stole the data and misuse it. Many examples have been seen earlier specially in financial institution where attackers misused the data and stolen lot many money and done fraud transaction. Though, companies are using GDPR to maintain with big data
- Big data required technical expertise to deal with technical proficiency for that IT experts and data scientists are paid highly to handle the big data and help in smooth functioning of it. It can increase the cost of business by paying high level income for Big data scientist and experts.

Conclusions

Data analysis is one of the most important aspects of moving forward with some of the biggest and best companies today. Companies that can turn data into information and information into intelligence will be in a more competitive world in the future. For example, Uber disrupted taxi operations and affected hotel operations on Airbnb. These two systems leverage the enormous

power of their analytical mindset for deep data. Therefore, the best way for any organization to get dirty is to have a clear data-driven approach and use the power of Big Data using transformative data analysis techniques.

REFERENCE

1. Duponchel, L. (2011). Exploring hyperspectral imaging data sets with topological data analysis. *Analytica Chimica Acta*, 1000, 123–131.
2. Jamshidi, A., Faghih-Roohi, S., Hajizadeh, S., Núñez, A., Babuska, R., Dollevoet, R., Li, Z., & Schutter, B. (2012). A Big Data Analysis Approach for Rail Failure Risk Assessment. *Risk Analysis*, 37(8), 1495–1507. <https://doi.org/10.1111/risa.12836>
3. Jamshidi, A., Faghih-Roohi, S., Hajizadeh, S., Núñez, A., Babuska, R., Dollevoet, R., Li, Z., & Schutter, B. (2012). A Big Data Analysis Approach for Rail Failure Risk Assessment. *Risk Analysis*, 37(8), 1495–1507. <https://doi.org/10.1111/risa.12836>
4. Juuso Esko K. (2013). Smart Adaptive Big Data Analysis with Advanced Deep Learning. *Open Engineering (Warsaw)*, 8(1), 403–416.
5. Kamilaris, A., Kartakoullis, & Prenafeta-Boldú (2013). A review on the practice of big data analysis in agriculture. *Computers and Electronics in Agriculture*, 143(C), 23–37.
6. Kruschke, J., & Liddell, K. (2012). Bayesian data analysis for newcomers. *Psychonomic Bulletin & Review*, 25(1), 155–177.
7. Li, X., Wang, L., Lian, Z., & Qin, X. (2012). Migration-Based Online CPSCN Big Data Analysis in Data Centers. *IEEE Access*, 6, 19270–19277.
8. Roh, S. (2013). Big Data Analysis of Public Acceptance of Nuclear Power in Korea. *Nuclear Engineering and Technology*, 49(4), 850–854.
9. Schramm, S. (2012). Data analysis meets quantum physics. *Nature*, 550(7676), 339–340. <https://doi.org/10.1038/550339a>
10. Thorstad, R., & Wolff, P. (2013). A big data analysis of the relationship between future thinking and decision-making. *Proceedings of the National Academy of Sciences of the United States of America*, 115(8),
11. Wang Zhuo, & Saedudin Rd Rohmat. (2014). A new algorithm for real economy benefit evaluation based on big data analysis. *Open Physics*, 16(1), 967–977.

12. Wang, Kewei, Wang, Wenji, & Li, Mang. (2014). A brief procedure for big data analysis of gene expression. *Animal Models and Experimental Medicine*, 1(3), 189–193.

THESE