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A Comprehensive Study of Various Big Data Analytic Techniques and its Benefits

Lata V. Upadhyay[1], Dr. Dipti H. Domadiya[2]
[1]*Assistant Professor, M.V.M. College of Com., Mgt. & I.T., Rajkot*
[2]*Associate Professor, National Computer College, Jamnagar*

Abstract: ***Analytics plays significant role in all areas in when making decisions based on particular facts. Big Data analytics has currently arisen as a vital research area because of the admiration of the Internet and the arrival of the different web technologies. Additionally, the widespread use of social media applications has presented both numerous opportunities and difficulties for scholars and practitioners. The combination of users' background information and everyday activity results in the enormous amount of data that is generated by users of social media sites. This huge volume of generated data called Big Data which has been intensively examined presently. A review of the current works is accessible to acquire an extensive perception of the Big Data analytics research area. Furthermore, this study also discusses potential benefits of Big Data analytics techniques as well as their quality features.***

Keywords: Big Data, Big Data Analytics, Prescriptive Analytics, Predictive Analytics, Diagnostic Analytics, Descriptive Analytics, Benefits, Real-time, Decision-making.

I. INTRODUCTION

The term Big Data is used to illustrate the expansion and the accessibility of enormous amount of structured, semi-structured and unstructured data. Big Data is data of high volume and high variety being produced or generated at high velocity which cannot be stored, managed, processed or analyzed using the existing traditional software tools, techniques and architectures [1]. It has the potentiality to construct suitable calculations by forecasting, administrative systems, and business models based on the existing customer experiences. Social media are computer mediated technology that facilitates the criteria and sharing information's, ideas, carrier interest, and other expressions via network [2]. Using advanced analytics techniques such as text analytics, machine learning, predictive analytics, data mining, statistics, and natural language processing, businesses can analyze previously untapped data sources to gain new insights resulting in significantly better and faster decisions [3].

II. BIG DATA ANALYTICS

Big Data analytics refers to the procedure of gathering, analyzing, and organizing huge data sets to find out different outlines and other valuable information. Big Data analytics is a set of tools and technologies that necessitate new forms of combination to reveal huge concealed values from big datasets that are diverse from the more complex, usual ones, and of a huge enormous size. It primarily focuses on cracking old problems or new problems in effective and better ways. Example of Big Data Analytics are big online business website like Flipkart, Snapdeal uses Facebook or Gmail data to view the customer information or behavior [4]. The main aim of the Big Data analytic is to facilitate organization to build enhanced future prediction, business decision, and analysis huge numbers of dealings that finished in organization and revise the form of data that business is used. The Figure – 1 describes four types of analytics which can be used to gain valuable insights from the data:

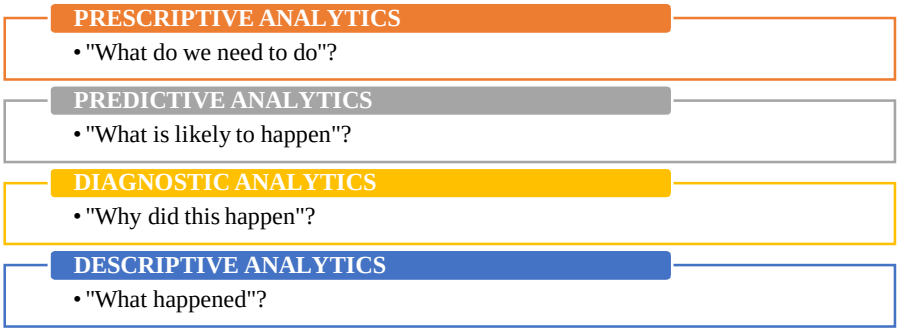

Figure – 1: Big Data Analytics

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A. Prescriptive Analytics

Prescriptive analysis tells us how to act. The optimal solution to the relevant problem with a set of limitations is discovered using prescriptive analytics. The evolving technology, drives outside predictive and descriptive models by commending one or more sequences of action and displays the potential result of each decision. Prescriptive analytics prescribes an action which the business decision-maker can take and act [3]. This analytics use a mixture of tools and techniques such as algorithms, business rules, computational modelling procedures and machine learning. It is relatively complex to manage and implement, and most businesses are not however using them in their regular course of work. When applied properly, it is sure to have a huge impression on decision making and on the business's bottom line. Higher companies are effectively using prescriptive analytics to enhance scheduling, inventory, and production in the supply chain to make definite that are providing the right products at the accurate time and enhancing the customer knowledge.

B. Predictive Analytics

Predictive type of analytics help to predict future or what might be happen [4]. The aim of predictive analytics is not to inform you what will occur in the future. Based exclusively on the data of past events, predictive analytics can only predict what may occur in the future. The nature of all predictive analytics is probabilistic. Companies can use predictive analytics to gain actionable insights based on data and predictions on the possibility of a future event. Predictive analytics uses statistical data and is meant for making predictions for future scope based on the data. It's crucial to keep in mind that no statistical technique can absolutely "predict" the future. For predictive analytics, both structured and unstructured data are required. Without their integration and analysis, a complete picture cannot be obtained [1]. This analytics include a range of techniques that forecast future outcomes based on current and historical data. In practice, predictive analytics seek to capture relationships and uncover patterns in data.

C. Diagnostic Analytics

Diagnostic Analytics is an advanced analytics that portrays the causes of events and behaviors. It examines the data to find out why the events have occurred. They can be used by companies to have an insight into their employees and solve complex workforce issues [6]. This analysis tells us why something happened. In this type look at past and analyze the situation what happen in past and why it happen and how we can overcome this situation [4]. Diagnostic analytics is the method of using data to decide the correlations and cause of trends between variables. It can be seen as the logical progression following the use of descriptive analytics to find trends. This analysis can be completed with statistical software, manually, or using an algorithm.

D. Descriptive Analytics

Descriptive analytics is connected with business intelligence and is based on historical data [1]. It describes what is happening currently and prediction near future [4]. Companies like call centers and music files are the major sources which generate a huge volume of audio data. Different type of information can be extracted from this data to help predictive and descriptive analytics [5]. Descriptive analytics are useful because they allow us to learn details of past behaviors, and understand how they might influence future outcomes. More than 80% of business analytics especially social analytics are descriptive [3]. Generally this analytics are reports that offer past insights concerning the organization's finance, operations, sales, production, customers, and inventory. When an organization needs to know what is evaluate, describe, and happening various aspects of the business, descriptive statistics are utilized.

III.BENEFITS OF BIG DATA ANALYTICS

Big Data analytics is a process of examining diverse and huge data sets to discover correlations, insights and patterns that can be applied for making knowledgeable business decisions. Here are some essential benefits of Big Data analytics represented in Figure – 2:

A. Improved decision-making

The capability to continuously examine data assists organizations build faster and better decisions, such as supply chain and cost optimization. Big Data analytics facilitates businesses to extract valuable visions from massive amounts of data. By examining trends and patterns, organizations can mark data-driven decisions that are established on proof rather than guesswork or intuition. Organizations can access a huge amount of data and explore great variety sources of data to expand new actions and insights.

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Meaningful insights can be extracted by correlating such information with customer demographics to make better decisions for product price and placement, deals and offers, making combos, staffing, product promotion strategies and layout optimization. The customer group's buying behaviour, group size, group's demographics and the buying behaviour of individual members of the group can also be analyse [1].

Figure – 2: Benefits of Big Data Analytics

B. Real-time Insights

Big Data is often available in real-time and the rate at which it grows is very high [3]. Businesses can study this data to produce insights about individual customer behaviors, preferences, market trends, and business operations. The analysis presents the capability to optimize retails pricing and selections that are customized to a customer's likes and dislikes. A next-generation merchant will be capable to follow the performance of individual customers from update their preferences, model their likely behavior and Internet click streams in real time.

C. Better Customer Understanding

Businesses may better understand their customers by analyzing vast amounts of customer data. By analyzing text data we can identify which type of product customer most like [4]. Organizations can better target their services, products, and marketing activities to specific customer segments by segmenting their client base based on their preferences, behavior, and demographics. This improves customer retention and satisfaction.

D. Enhanced Operational Efficiency

Big Data analytics can classify bottlenecks and inefficiencies in business procedures. By evaluating data connected to actions, organizations can enhance reduce costs, workflows, and improve productivity. Flexible data storage and processing tools can facilitate businesses save costs in analyzing and storing huge amounts of data. Tracking analytics also supports businesses discover ways to work more capably to cut expenses wherever feasible. Discover insights and patterns that help you recognize do organizations more resourcefully. The analytics was used to guide self-adaptation based on real-time streaming of operational data. A smart navigation system was used for experimentation, where navigation was done using data collected, such as car sensors and traffic estimation [6].

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E. Improved Risk Management

Organizations can recognize risks by evaluating developing solutions and data patterns for handling those risks. Whether an organization is looking to bring about major changes in sales, marketing, uncovering new revenue opportunities, improve customer service, optimize operational efficiency, reduce risk, or drive other business results, big data is the new oil which will fuel the fire [3]. Big Data analytics can help businesses mitigate and identify risks more efficiently. By investigating historic data, organizations can recognize indicators and patterns of potential fraud, risks, or irregularities. This lets them to take practical procedures to prevent or reduce possible losses.

F. Personalized Marketing and Customer Experience

Big Data analytics facilitates businesses to produce deliver customized experiences and personalized marketing campaigns to individual customers. By exploring customer information, businesses can predict their needs, understand customer preferences, and deliver targeted marketing offers and messages. Data-driven algorithms assist promotional efforts such as targeted advertisements which are responsible to increase customer liking by delivering a better customer understanding.

G. Innovation and Product Development

Most companies have an unprecedented amount of information on the attitudes and behaviors of their customers [3]. Marketing and developing new services, brands or products are much easier as soon as data gathered from customers' wants and needs. Many of these will be companies, which observe large information flows of data about products, services, buyers, suppliers, consumer preferences and intent, which can be captured and analyzed [3]. Big Data analytics can fuel invention and create product expansion. By evaluating customer feedback, competitor data, and market trends organizations can find reveal unmet customer needs, new opportunities, and develop innovative services and products. Leaders with forward thought across all sectors should begin aggressively to build their organizations' Big Data capabilities

H. Competitive Advantage

The analytics process, including the deployment and use of Big Data analytics tools, can help companies improve operational efficiency, drive new revenue and gain competitive advantages over business rivals [3]. By applying data-driven understandings, organizations can recognize new income streams, enhance their actions, and supply superior services and products related to their competitors. In short, Big Data analytics enables businesses to convert raw data into valuable perceptions, leading to enhanced decision-making, operational competence, risk management, customer understanding, competitive advantage and innovation.

IV. CONCLUSIONS

Big Data has important information which if removed completely can build a large diversity to business expansions. In this paper, Big Data analytics techniques such as Prescriptive Analytics, Predictive Analytics, Diagnostic Analytics, and Descriptive Analytics etc. have been reviewed. Furthermore, the benefits of analytical techniques in terms of Improved decision-making, Real-time insights, Better customer understanding, Enhanced operational efficiency, Improved risk management, Personalized marketing and customer experience, Innovation and product development, and Competitive advantage etc. have also been discussed. By knowing how to efficiently evaluate the business assessment of social activities, businesses can expand significant insights that let them to promote and improve their services and products. Thus, this review will be used to create a usability enhancement model for Big Data to extract maximum useful information from these data.

V. FUTURE WORK

The major focus of the review was to describe various techniques of Big Data analytics. We propose to work in this area in future and come up with better approaches to Big Data analytics using unstructured data. This is the essential area of research. It will encourage researchers for discovering facts from the large amount of data accessible in diverse forms in different areas.

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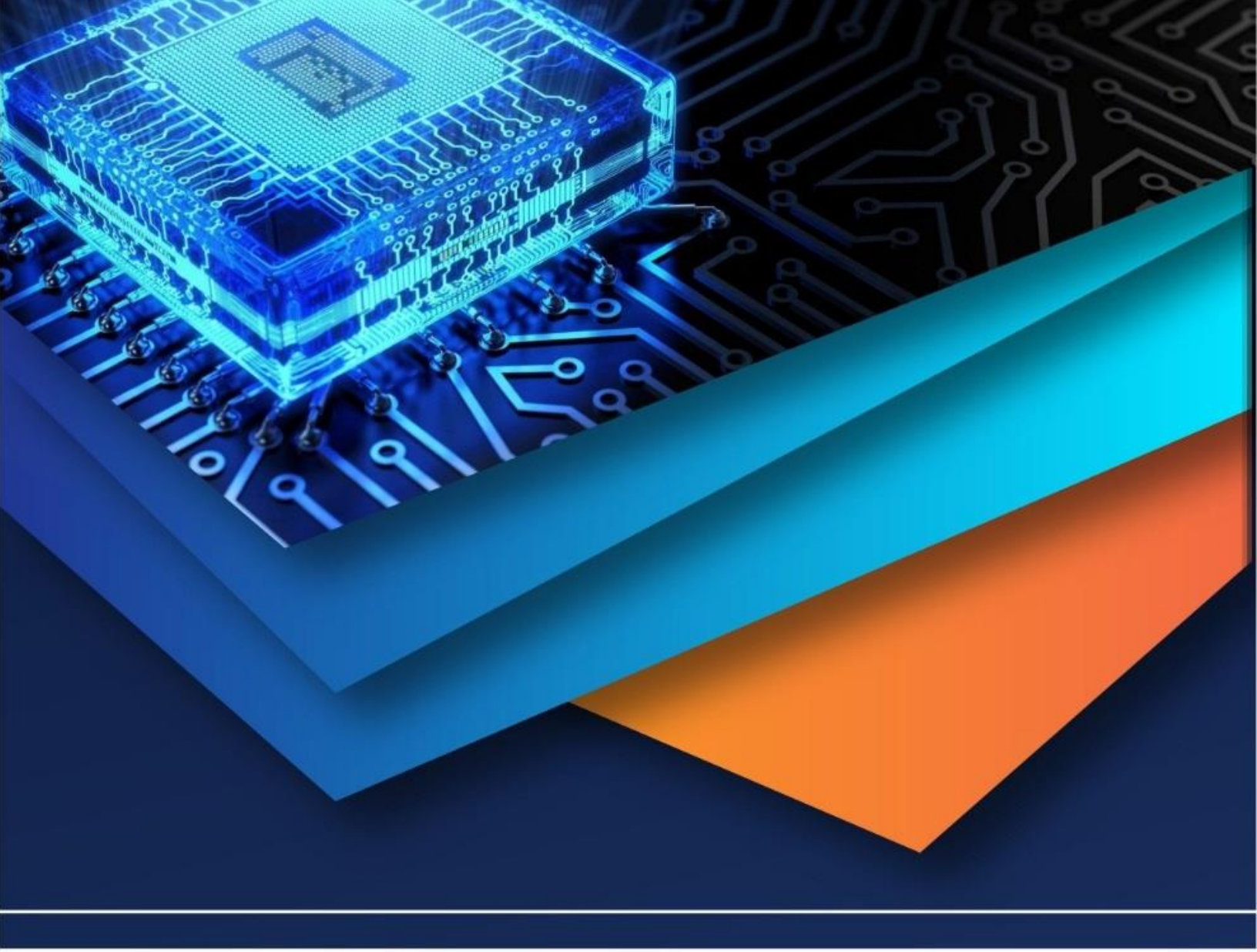

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