

Why Data Analytics is so Important in this Contemporary World?

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Abstract— Data Analytics has brought a paradigm shift in how data is stored and managed for referral and processing of reports and decision making purposes. This article focuses on what is data analytics, its applications and how the fusion of different fields like social and economics, business intelligence and research, are taking data analytics to a whole new level with big-data technologies. At the same time, we will discuss about the challenges faced by enterprises in a data driven model.

Keywords— big data, data analytics, descriptive analytics, predictive analytics, prescriptive analytics

1. INTRODUCTION

Technology today has done wonders for almost all the domains including transportation and warehousing, health care, finance and insurance, marketing, oil and gas, government agencies, travel, education and so on. Data forms an integral part of any organization or enterprise. In present day scenario, management of data poses a major challenge which is generated easily and at a very high rate. Problems are arising due to overwhelming increase in the quantity of data in diverse forms and Data Analysis offers an effective solution to this problem.

“Data Analytics is the process of examining data sets in order to draw conclusions about the information they contain, increasingly with the aid of specialized systems and software [1].” It is a step wise process and cannot be done in one go. It involves identifying data, acquiring it, sorting it for easy handling, strategically building it, analyzing it to

create meaning and finally presenting it in a form understandable by the users. One has to be very patient while dealing with substantial volume of data.

Data works as a raw material for business owners and is an indispensable economic input which can be used to refine decision making and create a new form of economic value. This paper aims at contributing towards the awareness on data handling, need of new technologies to be discovered and analyzed, need for new and better algorithms and faster data management through new applications. Paper also discusses how various enterprises are using data to boost economy as well as the challenges faced by them in a data operated model.

2. WHAT IS DATA ANALYTICS?

According to the definition “Data Analytics is a multidisciplinary blend of huge amount of structured or unstructured data, advanced algorithms and modern-day technology used to solve complex problems in real-time using analytics.” It is the science of surveying unprocessed data used to draw conclusions with the given information. It involves applying high-level algorithms and methodologies to attain sagacity.

Here is how various websites like Amazon, Netflix use data in innovative ways. They make customer's experience better by providing them with personalized

recommendation system based on predictive analytics.

Amazon uses Big Data to track customer's every action and analyzes which items were purchased previously, what is in your wish-list and what do you search the most. Now based on this data it predicts what products you are likely to buy, when you might buy them and where (at which place) you might need them. This form of web analytics helps them enhance customer service, decrease delivery time, increase profits, establish customer loyalty and in turn contribute in growth of the business [8]. Netflix too works on a similar ideology; it recommends movies based on what you have watched earlier or what you are searching for [9]. They have designed a culture of analytics which is growing every moment.

3. PROCESS CYCLE OF DATA

In this section, the step-wise procedure including business understanding, data acquisition and understanding, modeling, deployment and customer acceptance is shown. Each and every step in vital and contributes significantly towards the final data product which varies according to the area of implementation.

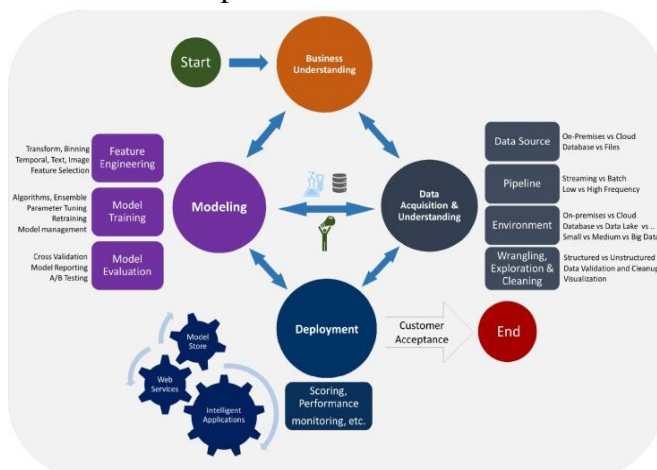


Fig. 1 Data Science Lifecycle

It shows that cycle does not end at the final product but also includes monitoring the product performance and its acceptance in the market.

This lifecycle depicts how various different fields of data science are interconnected and work simultaneously for example- in the second step of data science lifecycle i.e. data acquisition and understanding, we are mining data, sorting it, checking its sources; all this work is department specific [11].

4. TYPES OF DATA ANALYTICS

Analytics offers solutions that can be predictive, descriptive or prescriptive.

'Predictive analytics' is a branch of advanced analytics that make use of data and mathematical theory to make predictions about future or other unknown events. It comprises of a variety of statistical techniques that analyze past and present facts to forecast trends with an appreciable level of credibility. Here are some examples where predictive analytics is used [3]:

- Forecast prices of stocks
- Estimate value of real state
- Identify possible fraudulent transactions for investigation
- Recommend products based on buying patterns

'Descriptive analytics' is explication of historical data which helps to unravel the behavior and trends in data over time. It is the simplest form of analytics which requires minimal to no coding at all and makes the data compact. Here are some examples [4]:

- Cash flow analysis
- Sales and revenue reports
- Performance analysis

'Prescriptive analytics' is comparatively a new field which showcases viable solutions to a problem and the impact of considering a solution on future trend. It is still evolving and has limited applications for example [4]:

- Google's self-driving is a perfect example as it analyzes the

environment and decides the direction to take based on data

Data Analytics can also be divided into qualitative and quantitative data analysis. Qualitative data analysis is a non-statistical approach of gaining in-depth description of hidden reasons and motivations. It focuses on non-numerical data like images, text, videos and audios while quantitative allows generalization of results. Quantitative approach analyzes numerical data which can be compared or measured statistically and seeks out explanatory laws [1] [10].

5. BIG DATA: WHAT AND WHY?

The definition of Big Data, given by Gartner is, "Big data is high-volume, and high-velocity and/or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation [5][15]."

Big data does not define how big the data is. In this ever so fast moving world, the amount of data taken to be Big Data is increasing every second. Also, advancement in technology contributes significantly to this increase in data through social media channel (like Whatsapp, Facebook, Twitter and so on), multi-media data, data input through various omnichannels and so on [14].

Applications of Big Data:

- 1) Big Data for finance sector: Retail banks, credit card companies, private consultancy firms, wealth management advisories, insurance firms and investment banks use big data for their financial services. These firms have huge volumes of data present in various different systems which they tackle with the help of big data. Thus big data is used in a number of ways like:
 - Customer analytics,

- Fraud analytics,
- Operational analytics,
- Compliance analytics

- 2) Big Data in communications: With the help of big data, masses of customer generated data and machine-generated data is collected, combined and analyzed on a daily basis. With better management, telecommunication service providers gain new subscribers, retain old customers and expand within current user bases.
- 3) Big Data for retail: This is basically customer behavior analytics which keep tracks of customer's movements. It uses operational and supply chain analysis to deal with customer transaction data, social media, card details, loyalty program data and disparate data sources [2].

6. SCOPE AND CHALLENGES

6.1 Applications

Data Analytics is a vast ocean of opportunities.

- Healthcare: The main challenge for hospitals with cost pressures tightens is to treat as many patients as they can efficiently, keeping in mind the improvement of the quality of care. Instrument and machine data is being used increasingly to track as well as optimize patient flow, treatment, and equipment used in the hospitals [2].
- Digital Advertisements: Data Analytics aims at targeted advertising and re-targets them. It helps in understanding the audience better and judge their requirements.

- **Travel:** Airline and railway ticket booking and planning, predicting the price of tickets can be done with advent of data analytics. It helps gain insights into customer's preferences and desires. There is option for personalized travel recommendations using social media data and tracking the various websites you visit.
- **Gaming:** Data Analytics helps various game companies gain insight into the likes, the relationships, and the dislikes of the users. It creates an online medium of exchanging tons of data.
- **Fraud and Risk Detection:** There are various computerized tests that detect fraud. Banks and credit card companies analyze withdrawal and spending patterns to prevent fraud and identity theft [2]. The major challenge is that fraudulent transactions are camouflaged into vast data-sets.
- **Energy Management:** Most firms are using data analytics for energy management, including smart-grid management, energy optimization, energy distribution, and building automation in utility companies. The application here is centered on the controlling and monitoring of network devices, dispatch crews, and manage service outages. It aids in better understanding of systems and detecting faults [2].
- **Business Uses:** Business of any sort can't work without data be it banks, manufacturing industries or multi-national companies like Amazon, Google [2]. The opportunities associated with data and analysis in different organizations have helped generate significant interest in BI&A, which is often referred to as

the techniques, technologies, systems, practices, methodologies, and applications that analyze critical business data to help an enterprise better understand its business and market and make timely business decisions [12].

6.2 Challenges

Various challenges are encountered while handling data; these can be minimized to an extent but cannot be ignored completely.

- Managing such huge amount of data is a cumbersome task and poor data handling can often lead to data loss, incorrect data interpretation, false data generation and error in final results.
- We are well aware of the fact that enormous data is generated every second and dealing with this data generation becomes very difficult as well as keeping a track of incoming and outgoing data in itself is ponderous.
- Another challenge is lack of skilled people, less people who correctly understand Big Data Analysis or have basic knowledge of data science and related fields which deteriorates the quality of data generated.
- Also, there is a high risk of exposing data (also data stealing) to criminal activities, client's security and privacy can be compromised if data is not handled appropriately. We can't ignore the possibility of cyber-attacks which can lead to not only immense data loss but also give rise to malicious activities like espionage and blackmailing.
- As the demand for Data Science and Analytics (DSA) workers grow,

this growth puts pressure on the supply of DSA talent to grow in turn [7].

6.3 Future Prospects

Future of Data Analytics is certainly bright as it is one of the most in-demand jobs in the market. It is constantly changing the present day business situations and how data is handled at every step.

Data Science and Analytics jobs have higher pay scale and demand for skilled professionals is increasing rapidly. Annual demand for the fast-growing new roles of data scientist, data developers, and data engineers will reach nearly 700,000 by 2020 [6].

7. CONCLUSIONS

Data Science and Analytics are no longer just buzzwords- they are essential day-to-day life and business tools. The Age of Big Data has transformed the way we view and manage data and helped us improve query performance. Also, data is no more regarded as static or stale rather can be reused to provide new services and for purpose of innovation. The traditional tools and skills that had been utilized are now being replaced by skills such as analytical aptitude, strategic and operational decision making, advanced analysis, database development and various others.

With our increasing daily life dependency on data and its related services has opened up various new fields and jobs like product analyst, statistician, industrial analyst, business analyst, data architect, project strategist and many more. Undoubtedly, data is the new wealth of an organization and those who effectively and efficiently manage it will only emerge victorious in digital economy [13].

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