

Data analytics vs. Business analytics vs. Data science vs. Big data

Four terms, Data analytics, Business Analytics, Data Science & Big data have engulfed the tech-word in the blink of an eye. These domains are differentiated by a few fine lines lying at their core. And that is why you are probably here. To know the essential differences in-depth about these 'data-driven' domains.

In this post, we will take a close look at what these four terms are and how they are different from each other.

At the end of this post, you'll be able to know;

- 1. The definitions of Data Analytics, Business Analytics, Data Science and Big Data**
- 2. The essential differences between these four terms**
- 3. Core-technical applications of Data Analytics, Business Analytics, Data Science & Big Data**
- 4. Technologies being employed in all these domains**
- 5. Scope for professionals in each domain**
- 6. Future potential of these four domains**

Buckle up! We are rolling...

Data analytics vs. Business analytics vs. Data science vs. Big data.

1. Data analytics

It seems that every major company and business enterprise is using this term now and then. Data analytics is powering numerous organizations to understand their industry game deeply. 'Forbes' recently forecasted that the data analytics market would cross US\$ 200 billion by 2020. Therefore, It must be a highly potent data-driven technology! Let us explore it, beginning with understanding what data-analytics is.

a. What is data-analytics?

Data-analytics is the extraction of insights and patterns from the historical-data (Already available) or real-time data (Instant analysis of flowing data) to derive inferences and observations, that aid in strategic decision making. Data-analytics is handled through specifically engineered information-systems. These information-systems are based on machine learning programs.

Data-analytics is majorly employed by businesses for making ‘informed business decisions’ relating to their product/service, market analysis, gaining insights into customer behavior and forecasting the most likely results for their actions. This domain is also exploited by the scientific community to test and validate their hypothesis and scientific models. This domain can be bifurcated into;

- **Quantitative data analytics:** Involving the statistical computation of numerical data and quantifiable variables. The quantitative analytics focuses on the graphical representation of critical statistics to drive decision making. For example, forecasting sales of a product based on previous or real-time data.
- **Qualitative data analytics:** The qualitative data-analytics focuses majorly on the interpretation of non-numerical data. This includes but is not limited to images, text, audio & video analysis. Analysis of non-numerical data is primarily used for behavioral and trend analysis. For example, analysis of Facebook posts to figure out people’s interest in a certain product or service.

B. Applications of data analytics

These are the core industry applications of data-analytics.

- **Clickstream analytics:** By analyzing the number and pattern of clicks on a website, data analytics help in optimizing it for better user experience and improved conversion rates.
- **Product/Service R&D:** Qualitative and quantitative analysis of preferences and opinions of people can be helpful in crafting a new product or formulating a new service. Data analysis is often done on people’s social media posts and feedbacks left by them to do so.
- **Fraud detection:** Systems designed to analyze real-time transactions can firewall an organization against online frauds. This is done using the data verifying/analysis algorithms ran by organizations to safeguard their interests.
- **Risk management:** Financial sector organizations are always at risk to lose their investment. Whether it is lending loans, investing in businesses or evaluating an asset. Data analytics makes it easier to filter out the risky options and go for the worthy ones!

C. Technologies powering data analytics

We must now take a look at the technologies powering data analytics today. These are as follows;

- **Databases:** Data-analysis, of course, requires 'data' right. Databases like NoSQL, Hadoop, MongoDB, MySQL, etc. are used by the organizations for gathering structured datasets for analysis.
- **Languages:** R, Python, SAS, and SQL are popular languages for engineering data analytics algorithms and programs.
- **Predictive analytics:** Spotting patterns and relations between multiple variable factors in a business can yield useful information. Like, when the temperature drops below 2-degree Celsius, check-ins at the local ice-cream parlors increase by 4 percent. Similar trends can be used to 'predict' or forecast an outcome based on such relational patterns for businesses.

The above-mentioned tools and techniques are just to give you an idea of what data-analytics is. The list is not exhaustive at all. Let us now take a peek in the world of data analytics professionals.

D. Professionals in data analytics

This part is crucial to figure out the key differences between professionals and their job roles in the similar-seeming fields. However, some of these titles can be used as a 'misnomer' concerning business analytics, Big data, and data science. Here they are.

- **Data analyst:** A data analyst is someone who performs data cleansing, data structuring and data handling techniques for the organization. He/she is responsible for the maintenance of database and its architecture.
- **Advanced analytics professional:** An Advanced analytics professional is responsible for 'Predictive analysis' and assessment using the data. They may also run simulations and 'prescriptive analytics.'
- **Data engineer:** A data engineer is a professional that works behind the scenes on 'Data warehousing' solutions. A data engineer has a deep knowledge of databases like Hadoop, MongoDB, etc. They are well versed with tools like MapReduce, Pig, Hive, etc. A data engineer sources and prepares the data for loading into the organization's database.
- **Database administrator:** A database admin is responsible for operations, maintenance and monitoring of the organization's databases. This position is a crucial one considering that administrator handles the most valuable asset a company has, i.e., the data.

The above list features crucial professional roles revolving around data analytics. Remember, these roles may also overlap (In nature) with the roles in other three domains, i.e., Big data, Business Analytics and Data science. Let us now take a quick look at what the future holds for Data analytics.

E. Future of data analytics

Industries in various domains are already exploiting the power of data analytics to their advantage. Analyzing the historical data and high-velocity real-time data allows the business and other impactful organizations to identify correlations and patterns between factors, usually hidden from the human eye. This potent feature of data analytics has led it to evolve into various niches. For example, according to the [IDC, the banking sector will see the fastest spending growth](#) by 2020. Other sectors too will seek an exponential growth as the forecast for [investments in data analytics solutions is expected to touch annual growth rate of 11.7 percent](#). Those seeking to make a career in this field can be optimistic, as the [demand for data analytics professionals will peak to 28 percent by 2020](#).

2. Business analytics

You are bright enough and might have already correlated business analytics with data analytics. You may have figured out that 'Data analytics' is a broader domain. Business analytics is a specific niche focused on IT infrastructure according to the business needs. On the other hand, data analytics has a wider focus on computer science, mathematics & statistics including IT architectures. It must be noted that business analytics is also listed as a 'sub-domain' of data analytics.

a. What is business analytics?

Business analytics (or BA) is the data-driven analytics for making business and enterprise related decisions. Business analytics involves extraction of insights and patterns from the sales, marketing, surveys and predictive data. This analysis can be done on the historical as well as real-time data.

The business analysis includes explicit usage of explanatory and statistical analysis for **'Predictive modeling.'** Predictive modeling is nothing but a process based on 'classification' type machine learning (ML) models to 'predict' the likelihood for an event to occur. Enterprises use it to their advantage, for example, like forecasting the number of sales or spotting the purchase preferences and trends of people under a specific demographic profile (Based on their age, sex, nationality, income, etc.). Note that the applications of BA are similar to DA (Data analytics).

Only, the focus here is to drive the business growth and adding value to the company and the customers.

B. Applications of business analytics

BA is specifically employed by corporates to boost their growth. **Following are the applications of business analytics.**

- **Sales forecasting/Predictive analytics:** Thanks to data analytics, enterprises can now forecast the sales of their products/services by real-time and historical data. Organizations like Amazon, Facebook, Flipkart, etc. constantly analyze the historical records to predict the sales of specific products in the future. These companies also use real-time analysis, like surveys, feedbacks and live transactions to monitor the popularity of certain products/services according to the demography.
- **Behavioral analytics:** This is another crucial application of business analytics to grow organizations. Behavior analytics is used to extract insights into customer preferences, opinions, and loyalty through online polls, surveys, feedbacks, and responses. This might include 'sentiment surveys' to know what customers think about a brand, product or a service. Behavioral analytics can also include knowing 'what guides a customer online?' and the influencing factors that affect their decision making.
- **Recommendation engines:** Businesses are grateful to have this BA application. Recommendation engines are often integrated into e-commerce websites and search engines to optimize a customer's 'purchase' preferences. For example, if you buy a chair from Amazon, the engine will recommend you a, say, cushion or other relevant items.
- **Supply-chain optimization:** BA is not only limited to marketing and sales but also focuses on optimizing an enterprise's processes and operations. Supply-chain and logistics management is one such key area. Business analytics can optimize the process by, say, forecasting the inventory requirements or shortening the 'lead-time' for a product (From manufacturing stage to consumption stage).
- **Industry-specific applications:** For example, BA is being used in the talent sourcing and recruitment, areas of healthcare, telecommunication, etc.

C. Technologies driving Business analytics

These are the technologies powering business analytics solutions.

- **Data warehousing:** Collection points of large structured datasets are known as data warehouses. Commonly referred as Enterprise Data warehouse (EDW), these IT systems store historical data of the company and its transactions, customer base, etc. They can

also handle real-time high-velocity data but are not usually preferred for that. Example, a company's sales data.

- **Cloud-data platforms:** These are a crucial part of business analytics and are being widely employed by the enterprises today. Cloud-data platforms allow data storage via the 'nodes' (or participant computers in a network) distributed across the globe. The data, therefore, is readily accessible, has no failure point and can be processed by pooling in the computing power. Another important feature of the cloud-networks is Machine Learning (ML). ML is used by the enterprises to model algorithms for predictive analytics. Examples include Microsoft Azure cloud, Google cloud, and Amazon Web services.
- **Dashboards:** Organizations employing BA systems use 'dashboards' for visual analysis of the data. Dashboards allow for a real-time analysis of the statistics by the data scientists to draw inferences and pinpoint crucial information.
- **Deep learning:** It is a subset of machine learning. Deep learning aids in the creation of algorithmic models that allows the enterprises to automate business processes. For example, 'Product recommendation' engines that we saw above.

D. Professionals in business analytics

The field of business analytics is being driven by these professional roles. Take a look.

- **Research analyst:** A business research analyst is responsible for conducting marketing research, product/service penetration and forecasting the enterprise's performance shortly. Research analysts often use historical data to identify 'insights' and trends for listing the critical observations. They are usually placed in the marketing domain.
- **Business analyst/Visual analyst:** A business analyst is a professional that is supposed to drive business growth. Unlike a research analyst's role which is based on research, a business analyst is supposed to formulate 'actionable' points for decision making. Business analysts are usually placed in sales domain.
- **Research & development analyst:** Loaded with the responsibility of improving a product/service, an R&D analyst uses quantitative analysis to do so. For example, to launch a new version for software, the R&D analyst will conduct surveys for the user interface, features, etc. to know the best ones to be included in the new version.
- **Management analyst:** A management analyst focuses on enterprise management and its efficient operation. They use data from various 'in-house' sources (Like supply-chain management, employees data, etc.) to make them more efficient.

The above list is not limited and can be expanded. It should be noticed that the job roles listed above may be similar to the job roles in other data-driven fields. However, the difference comes in when we consider the 'objectives' and 'responsibilities' of the roles.

E. Future of Business analytics

As the enterprises grow in number and size, Business analytics will drive them forward. Not only being limited to sales and marketing domains, but for efficient customer interaction, and spotting 'gaps' and 'scope' in various sectors. This will lead to a high demand for well-versed statisticians, analysts and researchers will only go skywards

3. Data science

a. What is Data science?

Data science, the mother of all the methods, processes and systems for extraction of actionable insights from the structured/unstructured data has made the other three fields possible. You can think of it as a combination of data interpretation, algorithmic program development and solution delivery to tackle complex data problems. Data science is similar to data-mining, where large pre-existing databases are examined to identify new information and insights. It then must have vast applications. Right! Let's see them.

B. Applications of Data science

The applications of data science overlap with those of data analytics and Big data. Simply because all these domains have been derived from the processes of data science itself. Still, just to name a few, they are;

- Dynamic/floating pricing
- Predictive analytics for markets, disease outbreaks, demographic predictions, etc.
- Bioinformatics
- Climate & weather studies
- Cloud computing
- Machine learning, Machine vision and AI
- High volume, velocity and variety data processing

You may have noticed that the above-mentioned applications are spread across various sectors and niches. Simply because Data science is the starting point of data-driven technologies. But data science is an independent domain in itself. And so, we must now see the professional roles in the field of data science.

It should be noted that data science utilizes similar technologies mentioned above (Languages, platforms, and tools). The difference lies in as to how these are utilized for a specific application or domain.

C. Professionals in Data science

Since this subject is a science in itself, professional profiles can be expected to be of similar nature. Following are the professional roles that keep Data-science as a domain boosted.

- **Data scientist:** Currently at the peak of demand in the industries, a data scientist is responsible for deriving value from the data. A data scientist is a bright statistician, programmer and algorithm designer.
- **Data architect:** A data architect performs the 'structural evaluation,' programming and maintenance requirements of an organization's database. Data architects hold practical knowledge about information systems and database management dashboards.
- **Data warehouse architect:** Similar responsibilities as that of a data architect, but focused on data warehousing solutions, structuring, and preparation of data pipelines to be used by the enterprise.
- **Data mining engineer:** A data mining engineer uses spatial and temporal analysis to improve the quality of the data and extract valuable insights from it. He/she works to improve the statistical and predictive data models.
- **Machine learning engineer:** Another crucial role in the field of data science. Machine learning engineers are responsible for developing algorithms and programs for predictive analysis through ML. They create binary, regression or multi-class classification models to output predictions.

D. Future of data-science

It can be easily inferred from the current scenario that data science holds a lot for us in its basket. [Automation will sweep the enterprises with a wave](#). Data science professionals will be [high on demand](#). New niches and applications will find a way to disrupt the know industries. All in all, a bright future lies ahead for and in the field of data science.

3. Big data

Any large dataset that can be analyzed computationally to extract patterns and useful insights can be referred to as 'Big data.' These computations are done for analysis focused on human

interactions and behavior. Here, by the word large, we mean extensive. For example, real-time data of electronic product sales online on a continental scale.

Big-data reflects the 'high volume,' fast-velocity and variety (text, numerical, visual, etc.) of the data flowing in real-time (can be historical as well!). Often the term 'Big data analysis' is used to point to the analytical processing of such large datasets. For example, Predicting a 'disease outbreak' based on the historical data, geography, climate and demography of a location.

a. How Big data is different from the other three terms?

The term Big-data is used to denote the massive structured datasets and their analysis. The other three terms, i.e., Data Analytics, Business Analytics, and Data science represent the process, niche and subjective & quantitative studies of the data respectively. Also, the term Big-data is used keeping in mind the corporates and enterprises. We will look at the summary of differences for these four terms at the end of this post. For now, let us explore a bit about the Big data.

B. Applications of Big-data

Following are the applications of Big-data in various sectors and domains.

- Big data is being explicitly used in the **healthcare industry**. From monitoring and predicting a patient to diagnosing rare medical conditions and even genetic modeling, are some to name applications for the big-data.
- Big data technologies are rooting for the **education sector** as well. Examples include adaptive learning for improving the grades to career counseling for the students best suited to their abilities.
- Big-data analysis for **insurance claims verification**. On the basis of the previous datasets of filed claims, and running them against the list of genuine and fraud ones yield crucial information for the insurance companies. They can run predictive analytics to check the genuinity of their claims and keep the fraudsters at bay.
- Big data technologies are being exploited by these sectors. **Retail/consumer, finance, web, and digital media, telecom sector, public services, customer care, etc.**

C. Technologies powering Big-data

Big-data represents high-volume, high-velocity and variety of constantly generated data. Therefore, sourcing it, structuring it, storing it and analyzing it becomes essential. **These are the technologies on which Big-data studies rely on;**

- Data sourcing through websites, online data-trails, transaction records, IoT data, etc.
- Data warehousing solutions.
- Database structuring and architecture solutions. Example, MySQL, NoSQL, MongoDB, etc.
- Analysis of the data on basis of algorithms designed for pattern recognition, insights extraction and predictive analytics.

You may have already noticed that the above-listed technologies powering Big-data are similar to the ones we discussed before. This is because the field is so closely associated with the other three terms. The only major difference here is that of the 'definition.' However, the principles, processes, and applications built are overlapping or common. You may now be wondering about the professions related to Big-data. Here is the verdict.

D. Professionals in the field of Big-data

Big-data is not a field in itself per se, rather representative of 'analysis of associated massive datasets within Data science and Data analytics.' Therefore, it can be said that the **professional roles for the Big-data field are same as the professional roles in Data-analytics, Business analytics, and Data-science.**

E. Future of Big-data

As the number of online users grows exponentially every day, the volume of the global data continues to expand. [90 percent of the data today was created in the past two years itself. The size of our digital world is a whopping 40+ Zettabytes.](#) What do these indicate? Simple, as the data grows, need to decipher it through analysis will go up. More and more organizations are continuing to engage in crunching the big-data today. And so, the demand for big-data experts will skyrocket in the upcoming years.

4. Quick comparative analysis: Data analytics vs. Business analytics vs. Data science vs. Big data

<i>Data analytics</i>	<i>Business analytics</i>	<i>Data science</i>	<i>Big data</i>
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1. Is a process to make sense of the available data. 2. Uses tools and technologies of database structures, programming languages, predictive techniques, etc. 3. Applied mostly for predictive analytics and deriving patterns from the historical data. 4. Professional roles involve research analyst, data analyst, etc.	1. Is a process listed under data-analytics , focused on business growth. 2. Uses tools and technologies similar to that of Data analytics. 3. Has applications where predictions and insights are focused on enterprise growth. 4. Professional roles are business analyst, market analyst, etc.	1. Refers to the broad subject containing the processes, systems and technology to handle, analyze and use large datasets to derive insights 2. Utilizes data mining, structuring and delivery solutions. 3. Has enabled the systems and processes for large/big data analytics. 4. Data scientist, database architecture, etc. are common roles here.	1. Represents massive datasets that have high-volume (size), velocity and variety 2. Uses data sourcing, warehousing, structuring and analytical solutions. 3. Has applications where the real-time flow volume and variety of data is heavy. Say, transactional data of Amazon. 4. All the previous listed professional roles can be listed here, as big-data is associated with all of them subjectively.
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You must now have got a clear idea about the fine lines separating the different data-driven fields. Have a critical point to add? Share with us in the comment box below!