

What is Data Analysis?

Data analysis is a process used by researchers to reduce data to a story and interpret it to derive insights. The data analysis process helps to reduce a large chunk of data into smaller fragments, which makes sense.

OR

Data analysis is defined as a process of cleaning, transforming, and modeling data to discover useful information for business decision-making. The purpose of Data Analysis is to extract useful information from data and taking the decision based upon the data analysis.

Types of data in research

- **Qualitative Data:** When the data presented has words and descriptions, then we call it Qualitative Data.
- **Quantitative data:** Any data expressed in numbers of numerical figures is called Quantitative Data. This type of data can be distinguished into categories, grouped, measured, calculated, or ranked.
- **Categorical data:** It is data presented in groups. However, an item included in the categorical data cannot belong to more than one group.

Methods used for data analysis in Qualitative Research

There are several techniques to analyze the data in qualitative research, but here are some commonly used methods,

- **Content Analysis:** It is widely accepted and the most frequently used technique for data analysis in research methodology. It can be used to analyze the information from text, images, and sometimes from the physical items. It depends on the [research questions](#) to predict when and where to use this method.
- **Narrative Analysis:** This method is used to analyze content gathered from various sources such as personal interviews, field observation, and [surveys](#). Most of the time stories, or opinions shared by people are focused on finding answers to the research questions.
- **Discourse Analysis:** Similar to narrative analysis, Discourse analysis is used to analyze the interactions with people. Discourse analysis also focuses on the lifestyle and day-to-day environment while deriving any conclusion.
- **Grounded Theory:** When you want to explain why a particular phenomenon happened, then using grounded theory for analyzing quality data is the best resort. Grounded theory is applied to study data about many similar cases occurring in different settings.



- **Thematic analysis:** This method focuses on analyzing Qualitative Data such as interview transcripts, survey questions to identify common patterns and separate the data into different groups according to similarities or themes.

Methods used for data analysis in quantitative research

The two most commonly used quantitative data analysis methods are:

Descriptive statistics

This method is used to describe the basic features of data in research. It presents the data in such a meaningful way that pattern in the data starts making sense. Nevertheless, the descriptive analysis does not go beyond making conclusions.

Inferential statistics

Inferential statistics are used to make predictions about a larger population after research and data analysis.

There are five types of data analysis:

1. Descriptive Analysis
2. Diagnostic Analysis
3. Predictive Analysis
4. Prescriptive Analysis
5. Cognitive Analysis

1. Descriptive Analysis: What has happened?

Descriptive Analysis, as the name says, describes the data. **The foundation step** simply looks at the past data and tells what has happened in the past. This analysis helps understand how the data is present and does not make any predictions or answers why something has happened.

2. Diagnostic Analysis: Why has it happened?

After identifying what has happened, the next step in the process is to find the answer to why something has happened. Diagnostic analysis helps dig further information. It separates the root cause of the problem and identifies the source of the patterns.

3. Predictive Analysis: What is likely to happen?

After detecting the root cause of the problem, one would want to know if the event is likely to



happen again? Predictive analysis is all about that. It predicts the likelihood of an event.

4. Prescriptive Analysis: How to make it happen?

The prescriptive analysis is result-oriented. It prescribes the best course of action, strategies.

5. Cognitive Analysis: Mimicking the human brain to carry out tasks

This advanced type of analysis aims to mimic a human brain to perform tasks like a human does. It learns and even generates data using the already available data and retrieves features and hidden patterns.

Text Analysis: Text analysis is arguably the most straightforward and the most direct method of data analysis.

Data Analysis Process

The **Data Analysis Process** is nothing but gathering information by using a proper application or tool which allows you to explore the data and find a pattern in it.

Data Analysis consists of the following phases:

- Data Requirement Gathering
- Data Collection
- Data Cleaning
- Data Analysis
- Data Interpretation
- Data Visualization

Data Requirement Gathering

First of all, you have to think about why do you want to do this data analysis? All you need to find out the purpose or aim of doing the Analysis of data. You have to decide which type of data analysis you wanted to do.

Data Collection

After requirement gathering, Now it's time to collect your data based on requirements. Once you collect your data, remember that the collected data must be processed or organized for Analysis.

Data Cleaning

Now whatever data is collected may not be useful or irrelevant to your aim of Analysis, hence it should be cleaned. The data which is collected may contain duplicate records, white spaces or errors. The data should be cleaned and error free.



Data Analysis

Once the data is collected, cleaned, and processed, it is ready for Analysis. During this phase, you can use [data analysis tools](#) and software which will help you to understand, interpret, and derive conclusions based on the requirements.

Data Interpretation

After analyzing your data, it's finally time to interpret your results. Then use the results of your data analysis process to decide your best course of action.

What is Data Interpretation?

Data interpretation is the process of reviewing data and arriving at relevant conclusions using various analytical methods. [Data analysis](#) assists researchers in categorizing, manipulating, and summarizing data to answer critical questions.

There are two primary techniques available to understand and interpret the data:

1. Quantitative
2. Qualitative

Quantitative Methods

The quantitative data interpretation technique is applicable for the measurable or numerical type of data. The numerical data is of two types:

Qualitative Methods

Qualitative methods are implemented to analyze the textual and the descriptive data called the categorical data.

What are the steps in interpreting data?

1. Gather The Data

The very first step in data interpretation is gathering all relevant data. This step aims to analyze the data accurately and without bias. Now is the time to recall how you conducted your research.

2. Develop Your Discoveries

This is a summary of your findings. Here, you thoroughly examine the data to identify trends, patterns, or behavior. This step's goal is to compare these deductions before drawing any conclusions.



3. Draw Conclusions

After you've developed your findings from your data sets, you can draw conclusions based on your discovered trends. Your findings should address the questions that prompted your research.

4. Give Recommendations

The interpretation procedure of data comes to a close with this stage. Every research conclusion must include a recommendation. As recommendations are a [summary](#) of your findings and conclusions, they should be brief.

Importance of Data Analysis and Interpretation

1. Informed decision-making:

Data analysis and interpretation are instrumental in making informed decisions.

2. Identification of trend and forecasting needs:

Data analysis offers insights that can predict and set trends that can positively impact an industry level.

3. Cost-efficient:

One of the most important goals for any business apart from maximum returns is to reduce costs. Data-driven informed decisions not only help in improving business metrics but also in reducing costs, which is another avenue of generating revenue. Predictive data analytics helps achieve this objective by using response modeling, uplift response modeling, churn modeling, churn uplift modeling, risk modeling, and fraud detection.

4. Clear Insights:

These processes allow organizations to get foresight in their performance and processes. It enables the companies to know how customers view them and their limitations and take actionable measures to improve their performance.

Importance of Data Interpretation

Raw data is useless unless it's interpreted. Data interpretation is important to businesses and people. The collected data helps make informed decisions.

Make better decisions

Any decision is based on the information that is available at the time. People used to think that many diseases were caused by bad blood, which was one of the four humors. So, the solution was to get rid of the bad blood. We now know that things like viruses, bacteria, and immune responses



can cause illness and can act accordingly.

In the same way, when you know how to collect and understand data well, you can make better decisions. You can confidently choose a path for your organization or even your life instead of working with assumptions.

The most important thing is to follow a transparent process to reduce mistakes and tiredness when making decisions.

Find trends and take action

Another practical use of data interpretation is to get ahead of trends before they reach their peak. Some people have made a living by researching industries, spotting trends, and then making big bets on them.

With the proper data interpretations and a little bit of work, you can catch the start of trends and use them to help your business or yourself grow.

Better resource allocation

The last importance of data interpretation we will discuss is the ability to use people, tools, money, etc., more efficiently. For example, If you know via strong data interpretation that a market is underserved, you'll go after it with more energy and win.

In the same way, you may find out that a market you thought was a good fit is actually bad. This could be because the market is too big for your products to serve, there is too much competition, or something else.

No matter what, you can move the resources you need faster and better to get better results.



What is the difference between Data Analysis and Interpretation?

Data analysis and interpretation transform the collected data into story points to drive insights. There are differences between the two processes, which follows as:

	Data Analysis	Data Interpretation
Meaning	Data analysis is the process of uncovering patterns and trends in the data.	Data interpretation is the process of assigning meaning to the data. It involves explaining those discovered patterns and trends in the data.
Chronology	Data analysis comes first, followed by data interpretation.	Data interpretation is the next proceeding step after data analysis.
Types/Methods	The five types of data analysis are Descriptive Analysis, Diagnostic Analysis, Predictive Analysis, Prescriptive Analysis, and Cognitive Analysis.	The data interpretation methods are Quantitative Methods and Qualitative Methods.



	Data Analysis	Data Interpretation
Why is it needed?	To summarize, condense data in a comprehensible and usable form for further advanced analytics and prediction.	Data interpretation is required because the numbers can not speak for themselves. It needs manual human intervention to understand what the numbers are saying.
Example	For example, the top 5 teams in terms of the winning Percentages are Real Madrid, Barcelona, Atletico Madrid, Valencia, and Athletic Bilbao.	An example of interpretation is what does it imply 95% of the population lies within the range of 136.54 to 143.45.

