

“What is the introduction to statistics?”

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The introduction to statistics is a foundational course that provides an overview of the basic concepts and methods used in statistical analysis. It covers topics such as data collection, organization, and interpretation, as well as probability, hypothesis testing, and data analysis techniques. This course aims to develop critical thinking skills and provide students with the necessary tools to make informed decisions based on data. It is an essential subject for anyone seeking to understand and utilize statistical information in various fields such as business, economics, social sciences, and more.

Statistics Introduction

Statistics gives us methods of gaining knowledge from data.

What is Statistics Used for?

Statistics is used in all kinds of science and business applications.

Statistics gives us more accurate knowledge which helps us make better decisions.

Statistics can focus on making **predictions** about what will happen in the future. It can also focus on **explaining** how different things are connected.

Note: Good statistical explanations are also useful for predictions.

Typical Steps of Statistical Methods

The typical steps are:

Gathering data
Describing and visualizing data
Making conclusions

It is important to keep all three steps in mind for any questions we want more knowledge about.

Knowing which types of data are available can tell you what kinds of questions you can answer with statistical methods.

Knowing which questions you want to answer can help guide what sort of data you need. A lot of data might be available, and knowing what to focus on is important.

How is Statistics Used?

Statistics can be used to explain things in a precise way. You can use it to understand and make conclusions about the group that you want to know more about. This group is called the **population**.

A population could be many different kinds of groups. It could be:

All of the people in a country
All the businesses in an industry
All the customers of a business
All people that play football who are older than 45

and so on - it just depends on what you want to know about.

Gathering data about the population will give you a **sample**. This is a part of the whole population. Statistical methods are then used on that sample.

The results of the statistical methods from the sample is used to make **conclusions** about the population.

Note: The word 'statistic' can also refer to specific bits of knowledge; like the average value of something.

Important Concepts in Statistics

Predictions and Explanations
Populations and Samples
Parameters and Sample Statistics
Sampling Methods
Data Types
Measurement Level
Descriptive Statistics
Random Variables
Univariate and Multivariate Statistics
Probability Calculation
Probability Distributions
Statistical Inference
Parameter Estimation
Hypothesis Testing
Correlation
Regression Analysis
Causal Inference

We will cover these topics step by step in this tutorial.

Statistics and Programming

Statistical analysis is typically done with computers. Small amounts of data can be analyzed well, without computers.

Historically, all data analysis was performed manually. It was time-consuming and prone to errors.

Nowadays, programming and software is typically used for data analysis.

In this course, we will show examples of code to do statistics with the programming languages Python and R.

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