DATA ANALYTICS SERIES

BOOK 01

DATA ANALYTICS ROADMAP

A Beginner's Guide to Skills, Tools, Careers and a Six-Month Learning Plan



BEGINNER · CAREER PATH

ANOOP GUPTA

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Data Analytics Roadmap

A Beginner's Guide to Skills, Tools, Careers and a Six-Month Learning Plan

Data Analytics Series, Book 1

Anoop Gupta

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The examples, datasets, company names and figures used in this book are illustrative sample data unless explicitly stated otherwise. They are not real company results or labour-market statistics.

Software features, function names, menus, licences and interfaces change. Always check the official documentation for the tool you are using, and verify important calculations against original records and appropriate professional guidance.

How to Use This Book

Work through the chapters in order. Each chapter explains one idea, shows a worked example with sample data, then gives practice exercises, a short project and likely interview questions.

Type the formulas, queries or code yourself rather than only reading them. When a screen or menu name does not match your version of the software, look up the current official documentation instead of guessing.

Keep a simple practice folder for your workbooks, query files and notes. The Quick Reference Cheat Sheet and Practice Datasets at the end of the book, where provided, are there for revision after you finish the chapters.

Chapter 1: Introduction to Data Analytics

In This Chapter

- Understand what data analytics is and why it matters.
- Learn how data is generated in everyday life.
- Understand the difference between data analytics, data science and business intelligence.
- Discover why businesses depend on data analysts.
- Learn how raw data becomes useful business information.
- Explore the four major types of data analytics.
- Understand practical applications of data analytics across industries.
- Perform your first simple data analysis using a sample business dataset.

1.1 What Is Data Analytics?

Every day, businesses generate enormous amounts of information.

A supermarket records every product sold. An online shopping platform records customer orders. A bank records deposits, withdrawals and transactions. A hospital records patient appointments and medical information. A manufacturing company records production quantities, machine performance and product defects.

All this information is called data.

However, collecting data is not enough. Businesses need to understand what that data means and how it can help them make better decisions.

This is where data analytics becomes important.

Data analytics is the process of collecting, organising, cleaning, examining and interpreting data to discover useful information, identify patterns, solve problems and support better decisions.

In simple words, data analytics helps answer questions using data instead of relying only on assumptions.

Consider a simple example.

A retail shop owner notices that sales have decreased compared with the previous month.

The owner might assume that: - Customers are buying less. - Product prices are too high. - A competitor has opened nearby. - Employees are not performing well.

These are possible explanations, but none of them is confirmed.

A data analyst examines the available sales information and discovers that sales of several popular products have declined because those products were frequently out of stock.

This finding gives the owner something specific to investigate and address.

The difference is important:

- Guessing identifies possible explanations.
- Data analysis investigates what the available evidence supports.
- Business decisions use those findings alongside experience and other relevant information.

Data analytics does not automatically provide perfect answers. Its value depends on the quality of the data, the methods used and the interpretation of the results.

1.2 Understanding Data Through Everyday Examples

You do not need to work for a large company to encounter data.

You already interact with data almost every day.

Example 1: Online Shopping

Imagine that you purchase a mobile phone from an online shopping platform.

The platform may record:

- Product name
- Product category
- Product price

- Purchase date
- Delivery location
- Payment method
- Customer rating
- Return status

When thousands of customers purchase products, the company can analyse this information to understand purchasing behaviour.

For example:

- Which products sell the most?
- Which locations generate the highest sales?
- Which products receive the most returns?
- Which months generate higher demand?
- How many customers purchase again?

The answers help businesses improve inventory, marketing, customer service and product selection.

Example 2: Banking

Banks maintain information about financial transactions.

A bank may analyse:

- Daily transaction volumes
- Account activity
- Loan repayment patterns
- ATM withdrawals
- Customer service complaints

This analysis can help identify unusual transactions, understand customer behaviour and improve banking operations.

Example 3: Education

An educational institution maintains student records.

These may include:

- Student attendance

- Examination marks
- Subject performance
- Assignment completion
- Course enrolment

An analyst can study this information to identify subjects where students are struggling or classes where attendance is declining.

Example 4: Manufacturing

A manufacturing company may record:

- Daily production
- Raw material consumption
- Machine downtime
- Product rejection
- Employee working hours

By analysing this information, the company can identify production problems and investigate ways to reduce waste.

The Important Lesson

Data analytics is not limited to technology companies.

It is useful wherever information is generated and decisions need to be made.

1.3 What Is Data?

Before learning data analytics, you must understand the meaning of data.

Data refers to recorded facts, observations, measurements or information.

Examples include:

Data category	Examples
Customer data	Customer name, age, location
Sales data	Product, quantity, amount
Financial data	Revenue, expenses, profit

Data category	Examples
Employee data	Employee ID, department, attendance
Marketing data	Campaign, clicks, conversions
Inventory data	Product code, stock quantity

Data can appear in several forms.

1.3.1 Structured Data

Structured data is organised according to a predefined format, usually in rows and columns.

Example:

Employee ID	Name	Department	Salary
E001	Rahul	Sales	25000
E002	Priya	HR	30000
E003	Amit	Finance	28000

This information is easy to organise and analyse using Excel, SQL and database systems.

1.3.2 Unstructured Data

Unstructured data does not follow a consistent tabular structure.

Examples include:

- Images
- Videos
- Audio recordings
- Emails
- Social media posts
- PDF documents
- Customer conversations

Analysing unstructured data may require additional techniques such as natural language processing, image analysis or specialised software.

1.3.3 Semi-Structured Data

Semi-structured data does not fit neatly into traditional rows and columns but contains labels, tags or other organisational elements.

Common examples include:

- JSON files
- XML files
- Some application logs

Example of sample JSON data:

```
{
  "customer_id": 101,
  "customer_name": "Rahul",
  "city": "Delhi",
  "purchase_amount": 2500
}
```

JSON is frequently used to exchange information between applications and web services.

1.4 What Does a Data Analyst Actually Do?

A data analyst works with data to help organisations understand their performance and make informed decisions.

The exact responsibilities depend on the organisation, industry and job role.

However, many data analyst positions involve the following activities.

1. Collecting Data

The first responsibility is obtaining relevant data.

Data may come from:

- Excel spreadsheets
- Business software
- SQL databases
- Customer relationship management systems

- Enterprise resource planning systems
- Websites and applications
- CSV files

For example, a sales analyst may receive monthly sales records from an organisation's business software.

2. Cleaning Data

Business data is not always perfect.

It may contain:

- Missing values
- Duplicate records
- Incorrect spellings
- Inconsistent date formats
- Incorrect product codes
- Invalid numerical values

A data analyst checks and corrects these problems before performing analysis.

For example:

Customer	City
Rahul	Delhi
Priya	delhi
Amit	DELHI

These records refer to the same city, but the formatting is inconsistent.

The analyst may standardise the city names to make analysis more reliable.

3. Analysing Data

After cleaning the information, the analyst examines it to answer business questions.

For example:

- What were total sales this month?
- Which product generated the most revenue?
- Which department had the highest expenses?
- Which region performed poorly?

The analyst may use Excel formulas, SQL queries or Python libraries to perform these calculations.

4. Creating Reports and Dashboards

The findings must be presented in a useful format.

A report may contain tables, calculations and explanations.

A dashboard may display:

- Total revenue
- Total orders
- Monthly sales
- Top-selling products
- Regional performance
- Profit trends

Power BI and Tableau are commonly used for interactive dashboards.

5. Communicating Insights

The analyst must explain what the results mean.

For example:

Instead of saying:

"Product A generated ₹50,000 in sales."

A more useful explanation might be:

"Product A generated the highest revenue among the five products in the sample, making it an important contributor to sales performance."

The analyst should also explain limitations and avoid making unsupported claims.

1.5 Data Analytics vs Data Science vs Business Intelligence

Beginners frequently confuse these three terms.

Although they overlap, they are not identical.

Data Analytics

Data analytics focuses on examining data to understand what happened, why it happened and what actions may be useful.

Typical activities:

- Data cleaning
- Reporting
- Trend analysis
- Business analysis
- Dashboard creation

Common tools include Excel, SQL, Python and Power BI.

Data Science

Data science is a broader field that combines programming, statistics, mathematics and domain knowledge to extract knowledge from data.

It may involve:

- Machine learning
- Predictive modelling
- Statistical modelling
- Artificial intelligence
- Advanced experimentation

A data scientist may build a model to estimate the likelihood that a customer will stop using a service.

Anoop Gupta Books

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