

Data Analytics EDA Guide PDF Page

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PART 1: Page plan

Item	Decision
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Intent (anti-cannibalisation)	EXPLORATORY DATA ANALYSIS PROCESS. Cleaning detail is on the data cleaning guide; statistics detail is on the statistics guide.
Why not thin	Explainer-style sections, FAQs and cross-links make the page useful even without a download
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PART 2: Page content (copy-paste ready)

SEO Title (39 chars):

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Meta Description (143 chars):

Download the exploratory data analysis (EDA) guide PDF from Uncodemy: steps, checks, charts, a pandas workflow and a checklist for any dataset.

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Quick Answer

This page offers Uncodemy's exploratory data analysis (EDA) guide as a PDF download. EDA is the first careful look at a dataset: checking its structure and quality, summarising each column, comparing groups and spotting patterns, outliers and relationships before any modelling or reporting. This guide gives a repeatable process with Python examples.

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What is exploratory data analysis?

Exploratory data analysis, usually shortened to EDA, is the habit of looking closely at data before drawing conclusions from it. The idea was popularised by the statistician John Tukey, who argued that analysts should explore data with simple summaries and plots to discover what it contains rather than only testing pre-set assumptions. In practice EDA answers basic but vital questions. How many rows and columns are there? What does each column mean? Which values are missing, duplicated or impossible? How are the values distributed? Which variables seem related? Skipping EDA is a major cause of wrong analysis, because errors hidden in the data flow straight into the results.

A repeatable EDA process

- 1. Understand the business question and the meaning of every column.
- 2. Inspect the shape, data types and a sample of rows.
- 3. Check data quality: missing values, duplicates and impossible values.
- 4. Summarise each numeric and categorical column on its own (univariate analysis).
- 5. Compare pairs of variables and groups (bivariate analysis).
- 6. Look for outliers and decide whether they are errors or real events.
- 7. Record findings, assumptions and next steps in a short note.

Step 1 and 2: first look at the data in pandas

These commands give the size, types, missing values and basic statistics of a table. File and column names are examples.

```
import pandas as pd

df = pd.read_csv("sales.csv")

print(df.shape)           # rows, columns
print(df.dtypes)          # data type of each column
print(df.head())          # first five rows
print(df.isna().sum())     # missing values per column
print(df.duplicated().sum()) # duplicate rows
print(df.describe())      # count, mean, std, min, quartiles, max
```

What to check during data quality review

Problem	How to detect it	Typical action
Missing values	isna().sum(), percentage per column	Fill, drop or flag, depending on the cause
Duplicates	duplicated(), key columns repeated	Remove exact duplicates, investigate partial ones
Wrong data types	Dates stored as text, numbers as strings	Convert types explicitly
Impossible values	Negative ages, future birth dates	Correct from source or mark invalid
Inconsistent labels	value_counts() shows 'Delhi', 'delhi', 'DELHI '	Standardise case and spacing
Outliers	Box plots, values far from the quartiles	Verify; keep if real, fix if an error

Univariate analysis: one column at a time

Start by understanding each variable alone. For a numeric column look at the mean, median, minimum, maximum and spread, and draw a histogram to see the shape: is it symmetric, skewed or does it have several peaks? A large gap between mean and median suggests skew or outliers. For a categorical column count how many rows fall in each category and see whether a few categories dominate. Univariate checks often reveal surprises such as a column that is almost entirely one value, which makes it nearly useless for analysis.

Univariate checks in pandas

Summaries for one numeric and one categorical column.

```
print(df["order_value"].describe())
print(df["order_value"].skew())      # skewness
print(df["region"].value_counts(normalize=True)) # share per category

df["order_value"].plot(kind="hist", bins=30)
```

Bivariate and multivariate analysis

After single columns, examine relationships. For two numeric variables use a scatter plot and a correlation coefficient. For a numeric and a categorical variable compare group statistics, for example average order value by region, with a box plot to see spread as well as the centre. For two categorical variables use a cross-tabulation. A correlation matrix gives a quick overview of linear relationships across many numeric columns, but remember that correlation does not prove causation and that a straight-line measure can miss curved relationships.

Comparing groups and checking correlation

Group averages and a correlation matrix.

```
print(df.groupby("region")["order_value"].agg(["count", "mean", "median"]))
print(pd.crosstab(df["region"], df["channel"]))
print(df[["order_value", "discount", "quantity"]].corr())
```

The same group comparison in SQL

SQL is often the quickest way to explore data that lives in a database. The orders table here has region and order_value columns for illustration.

```
SELECT region,
       COUNT(*) AS orders,
       ROUND(AVG(order_value), 2) AS avg_order_value,
       MIN(order_value) AS min_value,
       MAX(order_value) AS max_value
FROM orders
GROUP BY region
ORDER BY avg_order_value DESC;
```

Handling outliers sensibly

An outlier is a value far from the rest. Do not delete outliers automatically. First ask whether the value is an error, such as an extra zero typed by mistake, or a genuine rare event, such as a very large corporate order. Errors should be corrected or excluded with a note. Genuine extremes should usually stay, but you may report statistics that resist them, such as the median, or analyse them separately. A common rule flags values beyond 1.5 times the interquartile range from the quartiles, but it is only a prompt to investigate, not a verdict.

Common EDA mistakes

- **Jumping to charts before checking data quality.**
- **Dropping all rows with missing values** without checking how many are lost or why they are missing.
- **Treating correlation as causation.**
- **Ignoring time:** trends, seasonality and sudden breaks can hide inside overall averages.
- **Not recording what you did**, so nobody can reproduce or trust the findings.

What to deliver at the end of EDA

A good EDA ends with a short written summary: what the data contains, its quality problems and how you treated them, the most important patterns, the questions the data cannot answer and the recommended next analysis. Keep the notebook or query file so that the work can be repeated when new data arrives.

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Frequently Asked Questions

What is EDA in data analytics?

Exploratory data analysis is the process of examining a dataset with summaries and visualisations to understand its structure, quality, patterns and relationships before deeper analysis.

What are the main steps of EDA?

Understand the question and columns, inspect shape and types, check data quality, analyse single variables, compare variables and groups, investigate outliers and document the findings.

Which Python libraries are used for EDA?

Pandas for tables and summaries, NumPy for numeric work, and Matplotlib or Seaborn for charts are the most common starting libraries.

Should I always remove outliers?

No. Check whether an outlier is an error or a real rare event. Correct errors, but keep genuine values and consider robust measures such as the median.

Can EDA be done in SQL or Excel?

Yes. SQL aggregations and group-by queries and Excel pivot tables are effective for exploring data, although Python offers more flexibility for large or complex datasets.

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