# 1.2 Types of Data Analytics

## Introduction and Context

Different problems call for different types of analytics, each answering a distinct question about the data. Understanding these categories helps analysts select the right tool for a given task.

## Detailed Theory

**Descriptive analytics** summarises what has already happened using measures such as totals, averages and counts.

**Diagnostic analytics** asks *why* an event occurred by drilling into data using statistical tests or exploratory visualisations.

**Predictive analytics** forecasts future outcomes based on historical data using regression, time‑series forecasting and machine learning techniques.

**Prescriptive analytics** recommends actions based on predictive insights, evaluating possible options and optimising against objectives.

These four categories build on one another: descriptive and diagnostic methods provide a foundation for understanding the past, while predictive and prescriptive analytics help organisations anticipate and shape the future.

## Examples and Applications

* **Descriptive:** A company tracks monthly sales to identify seasonal peaks.
* **Diagnostic:** Analysts investigate why customer churn increased by looking at service response times.
* **Predictive:** An insurance firm uses past claims to predict the probability of accidents for new policy holders.
* **Prescriptive:** A delivery service uses route optimisation to minimise fuel costs while meeting delivery times.

## Summary and Reflection

Choosing the appropriate analytic approach depends on the problem at hand. Descriptive and diagnostic methods provide a foundation for understanding the past, while predictive and prescriptive analytics help organisations anticipate and shape the future.

**Reflection questions:** 1. Give an example of how predictive analytics could assist public health planning. 2. How does prescriptive analytics differ from predictive analytics?

## References