

KEY TAKEAWAYS

CHAPTER TITLE

Distributions

LECTURE TITLE

What is a Distribution?

- 1 Distribution** refers to the **arrangement or spread** of different values.
- 2 Normal distribution** features most values clustered in the middle, forming a **bell-shaped curve**.
- 3 Probability distribution** estimates the **likelihood of various outcomes** based on chance.
- 4 In a discrete distribution**, things only happen in **specific steps or groups**, like counting numbers.
- 5 Continuous distribution** deals with values occurring **anywhere within a range**, such as height or weight measurements.

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- 1 **Right-skewed distribution:** Most data on the left with a few high values extending right.
- 2 **Left-skewed distribution:** Most data on the right with a few low values extending left.
- 3 **Zero-skewed distribution:** Data evenly spread around the mean, forming a symmetrical shape.
- 4 In a **right**-skewed distribution: **Mean > Median**.
- 5 In a **left**-skewed distribution: **Median > Mean**.
- 6 In a **normal** distribution, **Mean = Median = Mode**.



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Normal Distribution

- 1 Mean:** Average value, calculated by **summing** all values and **dividing** by their count.
- 2 Standard Deviation:** Measures how far data is **spread from the mean**; lower indicates **closer to average**, higher indicate more spread out.
- 3 68-95-99.7 Rule:** In a normal distribution, 68% of data falls within **one standard deviation** from the mean, 95% within **two**, and nearly 99.7% within **three** standard deviations.

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Detect Outliers Using Normal Distribution

- 1 An **outlier** is a number/value in a set that is much **higher or lower** than the others.
- 2 Outliers can be identified using a **normal distribution** and **standard deviation**, as they typically fall far **outside** the typical range of values.

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TITLE** | Z Score

- 1 **Z-score** shows how many **standard deviations** a data point is from the **mean**.
- 2 **Formula** for z-score: $(x - \mu) / \sigma$
- 3 It is used in **comparing datasets** and **removing outliers**.
- 4 **Outliers** are typically identified when the z-score **exceeds 3 or falls below -3**.



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Standard Normal Distribution (SND)

- 1 The **SND(standard normal distribution)** is a bell-shaped curve with a **mean of 0** and a **standard deviation of 1**.
- 2 It is used in **comparing datasets, calculating probabilities**, and in **Z-tests** to assess differences between means.