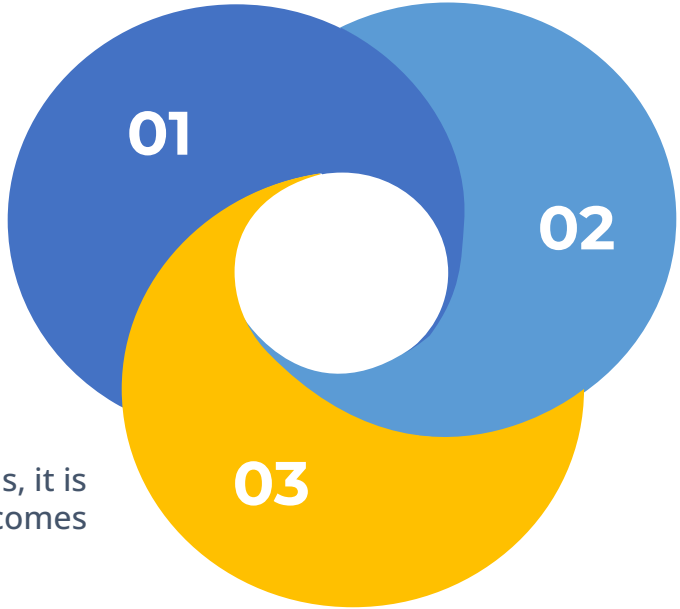
Empirical Probability

This lesson explores the concept of empirical probability and demonstrates its practical application using a real-world example.

Introduction

Empirical probability is based on actual experiments or historical data



It provides a practical way to estimate the likelihood of future events

Unlike theoretical calculations, it is grounded in real-world outcomes

Real-World Example

- Mike, the owner of an online clothing store, wants to determine which tshirt design to stock more of for the upcoming season
- He analyzes past sales data:
- Out of 1,000 t-shirt sales, 500 were 'vintage band' t-shirts
- Empirical probability of 'vintage band' t-shirt being sold: 0.5 or 50%
- Based on the empirical probability, Mike decides to increase his stock of 'vintage band' tshirts
- He expects that this design will continue to be popular among his customers

Let's consider a simple example with a jar filled with 100 colored marbles: 40 red, 30 blue, and 30 green. Suppose a child, Alex, decides to conduct an experiment to find out the empirical probability of drawing a red marble from the jar. Alex closes his eyes, picks a marble from the jar, records its color, and then puts it back. He does this 50 times.

After 50 draws, Alex finds that he has drawn a red marble 20 times. To find the empirical probability of drawing a red marble based on his experiment, Alex uses the formula for empirical probability:

$$\text{Empirical Probability of drawing a red marble} = \frac{\text{Number of times a red marble is drawn}}{\text{Total number of draws}}$$

Plugging in the numbers:

$$\text{Empirical Probability} = \frac{20}{50} = 0.4$$

Therefore, based on Alex's experiment, the empirical probability of drawing a red marble from the jar is 0.4, or 40%. This means that, according to his experiment, if Alex were to continue drawing marbles from the jar, about 40% of the time he would expect to draw a red marble.

Thank you for your time 😊