Conditional Probability

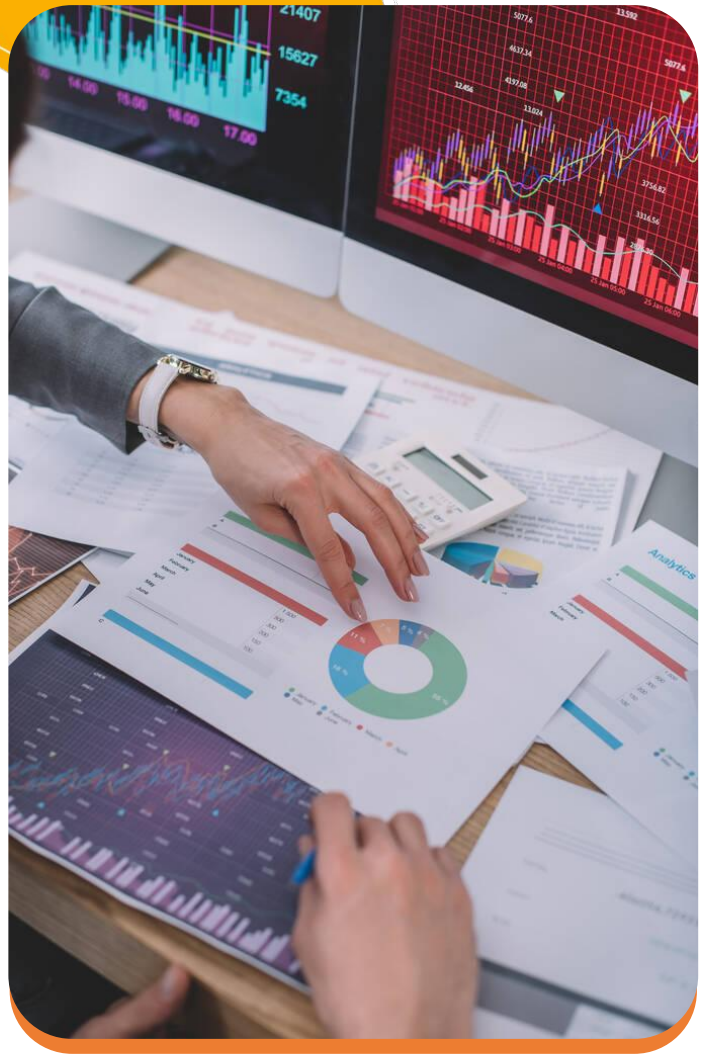
Exploring how conditional probability can be applied in real-world scenarios

Introduction to Conditional Probability

01 Conditional probability calculates the likelihood of an event given that another event has occurred

02 Commonly represented as P(A | B), meaning the probability of event A happening given that event B has happened

03 It takes into account existing information or conditions that affect the outcome



Real World Example: 'Bean There' Coffee Shop

- Lisa, the owner of 'Bean There' coffee shop, wants to extend its hours to attract more customers
- She uses conditional probability based on her customer data to make an informed decision
- Morning customers: 70%, Afternoon customers: 20%, Evening customers: 10%

Focus on Baked Goods Customers

01 Data shows that of the evening customers, 50% purchase baked goods

02 This percentage is higher than the morning and afternoon rates

03 Lisa is particularly interested in customers who buy baked goods along with coffee

Using Conditional Probability

01 Extending hours could increase overall customer numbers and attract more baked goods purchasers

02 Lisa applies conditional probability to determine the likelihood of selling more baked goods if she extends the shop hours

03 Given that a customer visits in the evening, there's a 50% chance they will buy baked goods

Let's use a simple example involving a deck of cards to explain conditional probability in easy terms. Imagine you have a standard deck of 52 playing cards, which includes 13 hearts, 13 diamonds, 13 clubs, and 13 spades.

Suppose you're playing a card game, and you want to know the probability of drawing a heart given that the card you draw is red. Since there are 26 red cards in total (13 hearts and 13 diamonds), and all 13 hearts are red, the condition that the card is red narrows down the possible favorable outcomes to just the red cards.

Here's how you would calculate it:

- **Total number of red cards**: 26 (13 hearts + 13 diamonds)
- **Number of hearts**: 13

So, the conditional probability of drawing a heart given that the card is red is:

$$P(\text{Heart}|\text{Red}) = \frac{\text{Number of hearts}}{\text{Total number of red cards}} = \frac{13}{26} = \frac{1}{2}$$

This means that if you know you're drawing a red card, there's a 50% chance that it will be a heart. This calculation uses the existing information (the card is red) to update the probability of drawing a heart.

0.5
1 - 0.5 = 0.5 or 50% which is the probability of drawing a diamond GIVEN THAT the card is red!

Thank you for your time and attention 🙂