Data Science Notes by Sarowar Ahmed

📊 **Chapter: Probability Theory**

📊 **Topic: Random Variables**

🔍 Hey there, GitHub family! Today, let's simplify an exciting concept from Probability Theory - Random Variables. Don't worry; I promise to make it as easy as pie, so everyone can understand, regardless of age or background!

🌈 What Are Random Variables?

Imagine you're tossing a coin. You don't know if it will land heads or tails, right? A Random Variable is a way to assign numbers to each

possible outcome of this uncertain event. For example, we might say 1 for heads and 0 for tails.

📊 Types of Random Variables:

▪ Discrete Random Variables: Think of rolling a dice. The outcomes are countable numbers (1 through 6).

▪ Continuous Random Variables: Imagine measuring the time it takes for a leaf to fall from a tree. The outcomes can be any value within an interval, like 2.4 seconds, 2.45 seconds, and so on.

📏 Formula:

While there's not a one-size-fits-all formula for random variables, they often relate to probability distributions. For a discrete random variable, the probability that X takes on a particular value x is denoted as P(X=x).

📢 Example:
▪ Discrete Random Variables: Number of Books Sold at a Bookstore in a Day

▪ Imagine a small bookstore. The number of books it sells in a day can be 0, 1, 2, 3, and so on. Let's say, based on past sales data, they've never sold more than 50 books in a day. So, the discrete random variable X, representing the number of books sold in a day, can take on any integer value between 0 and 50. Each of these outcomes has a specific probability associated with it.
▪ For example, the probability that exactly 10 books are sold (P(X=10)) might be 0.05 (or 5%).

▪ Continuous Random Variables: Amount of Rainfall in a Day

▪ Consider measuring the amount of rainfall in a certain location on a particular day. The amount of rain can be any non-negative number. It could be 0 mm (no rain), 5.2 mm, 10.345 mm, or any other

value within a possible range, depending on the precision of the measuring instrument.

▪ Here, the continuous random variable Y represents the amount of rainfall in a day. The probability of exactly 5.2 mm of rain, strictly speaking, is 0 due to the infinite possibilities within a continuous range. Instead, we talk about the probability of rainfall being within a certain range, such as P(5 mm≤Y≤6 mm).

🚀 Why Should You Care?

Understanding random variables is crucial for making predictions based on uncertain events. They form the foundation of statistical analysis and probability theory, helping in fields ranging from weather forecasting to financial modeling.

🤔 Have you encountered situations where understanding random variables could give insights or solutions? Maybe deciding on an investment or planning an event based on weather forecasts?

Got any questions about Random Variables!? Feel free to ask me via Linkedin! Let's keep learning together.

My LinkedIn   Date: 07/04/2024

———✕———