




Data Science Notes by Sarowar Ahmed



Chapter: Probability Theory



Topic: Poisson Distribution

 Hello, GitHub family! Today, let's journey into the realm of the Poisson Distribution, a fascinating concept in probability theory that helps us understand the occurrence of rare events. I'll guide you through this topic in a way that's clear and engaging for everyone!



What is the Poisson Distribution?

- Imagine you're monitoring the number of customer arrivals at a store in an hour. While most hours see a predictable number of arrivals, occasionally, there are unexpected spikes or lulls. The

Poisson Distribution helps us model the probability of these rare events occurring over a fixed interval of time or space.

Formula for Poisson Distribution:

The probability mass function (PMF) of the Poisson Distribution is given by:

$$P(X=k) = ((\lambda^k) * e^{(-\lambda)}) / k!$$

Where:

- λ (lambda) is the average rate of occurrence of the event over the given interval.
- k is the number of events that occur in that interval.

Examples of the Poisson Distribution:

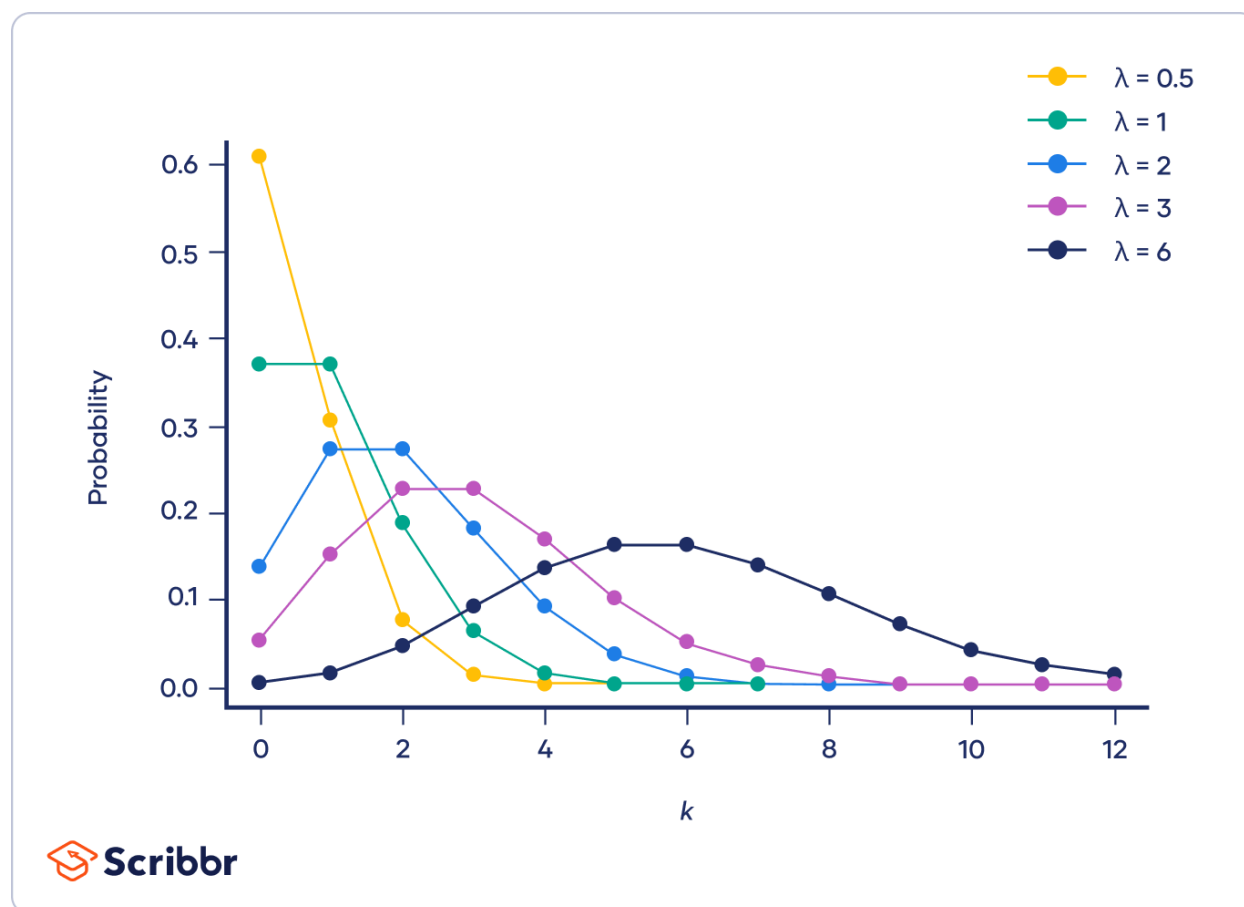
Call Center Calls:

- Suppose a call center receives an average of 5 calls per hour. The Poisson Distribution can help us calculate the probability of receiving exactly 3 calls in the next hour.

Accidents at an Intersection:

- If accidents occur at an average rate of 2 per week at an intersection, the Poisson Distribution can model the likelihood of a specific number of accidents occurring in a given week.

Visualizing the Poisson Distribution:



This visual representation helps us grasp how the probability of rare events decreases rapidly as the number of events increases.

Why Does This Matter?

- The Poisson Distribution has applications in various fields, including telecommunications, insurance, and manufacturing. It helps us predict and manage risks associated with rare events, ultimately contributing to more informed decision-making.

Got any questions about Poisson Distribution!? Feel free to ask me via LinkedIn! Let's keep learning together.

My LinkedIn

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