

**Technological Institute of Tijuana****Academic Subdirectorates****Systems and Computing Department****SEMESTER:** August - December 2021**CAREER:** Computer Systems Engineer**MATTER:** Data Mining**JOB NAME:** Unit 2 - Investigation 2 - Types of distributions**STUDENT NAME AND CONTROL NUMBER:**

Castro Cebreros Alejandro - 16211341

Márquez Millán Seashell Vanessa - 17212153

TEACHER NAME: Jose Christian Romero Hernandez**DATE OF DELIVERY:** November 1, 2021**Probability Distributions**

Probability models, which are representations of reality, can help us optimize the profit of our business taking into account the risks when making an investment, optimize the customer service system of a company creating policies to avoid the loss of customers, and even create new long-term competitive strategies according to the market. A probability distribution is one that allows the full range of outcomes likely to occur in a given experiment to be established. That is, it describes the probability that an event will take place in the future. The probability distribution is a fundamental tool for prospecting, since with it it is possible to design a scenario of future events considering the current trends of various phenomena. The most important characteristics to consider in a probability distribution are:

The probability of a specific outcome is between zero and one. The sum of the probabilities of all mutually exclusive outcomes is 1. Every probability distribution is generated by a random variable (because it can take different values) x (because the value taken is completely random), and it can be of two types:

Discrete random variable (x) It can only take values represented by whole numbers and a finite number of them. For instance: X variable that defines the number of students approved in the world history course in a group of 30 students (1, 2, 3 and so on or 30).

Continuous random variable (x) This can take both values expressed in whole and fractional numbers and an infinite number of them within the same interval. For instance: x is the variable that defines the concentration in grams of gold of some mineral samples (7.4 gr, 6.1, 1.9, 23.3, 12.7, 8.1, 9.5, 11.8, ... n)

Types of probability distributions

Scientists have always been fascinated with the phenomena and events that occur in everyday life, so they have set about building theoretical probabilistic models, through experimentation, that describe them. Some of the most used today are:

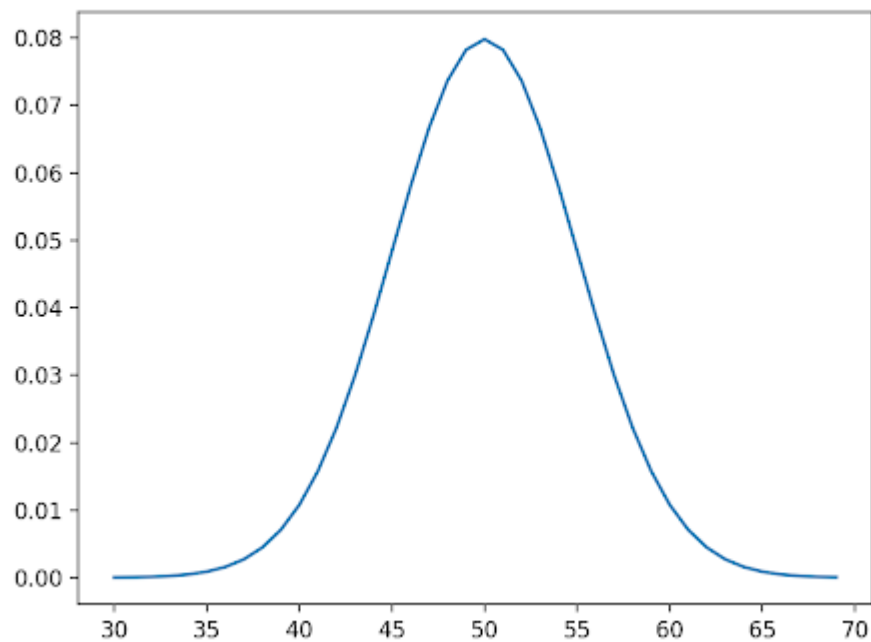
1. Binomial probability distribution: It is a discrete probability and occurs very frequently in our daily lives. It was proposed by Jakob Bernoulli (1654-1705), and is used with events that have a binary response, generally classified as "success" or "failure". Some examples where this distribution applies are:

*Whether or not a person has a disease. *If a woman is pregnant. *Whether a product is successful or not.
*Whether a flight is delayed or not. *If a coin toss is heads instead of tails.

2. Poisson probability distribution: It is named after the French mathematician Simeon Denis Poisson (1781-1840). Describes the number of times an event occurs during a specific interval, this interval can be time, distance, area or volume. The probability of occurrence is proportional to the length of the interval. Some examples where this distribution applies are:

*The number of vehicles a dealer sells per day. *Number of calls per hour a company receives. *When it is required to know the number of defects in a batch of fabric. *Number of car accidents in the year. *Number of boat arrivals at a port per day.

3. Normal probability distribution: The normal probability distribution is one of the most important in statistics and in the calculation of probabilities. It was used by Carl Friedrich Gauss (1777-1855) when writing a book on the motion of celestial bodies, for this reason it is also known as Gaussian distribution. It is important because the central limit theorem implies that this distribution is almost universal and we can find it in all fields of empirical sciences such as: biology, physics, psychology, economics, etc.



It is bell-shaped, symmetrical, and its area under the curve is 1. As mentioned previously, the application of this probability distribution is very broad. Some examples are: The effect of a medicine or drug. The change in temperature at a specific time of year. Morphological characters such as weight or height in a group of individuals.

Bibliography

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