Instituto Tecnológico de Tijuana

Ingeniería en Sistemas Computacionales

Investigación #2

Materia: Minería de Datos

Unidad: Unidad II

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Probability distribution

In probability theory and statistics, the probability distribution of a random variable is a function that assigns to each event defined on the variable the probability that said event occurs. The probability distribution is defined over the set of all events and each one of the events is the range of values of the random variable. It can also be said that it has a close relationship with the frequency distributions. In fact, a probability distribution can be understood as a theoretical frequency, since it describes how the results are expected to vary.

The probability distribution is completely specified by the distribution function, whose value at each real x is the probability that the random variable is less than or equal to x.

Types of variables
- Random variable: It is one whose value is the result of a random event. This means that they are the results that are presented at random in any event or experiment.
- Discrete random variable: It is one that only takes certain values (frequently integers) and that results mainly from the count carried out.
- Continuous random variable: It is one that generally results from the measurement and can take any value within a given interval

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.

Poisson probability distribution:
It gets its name from 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.

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 Friedich 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.
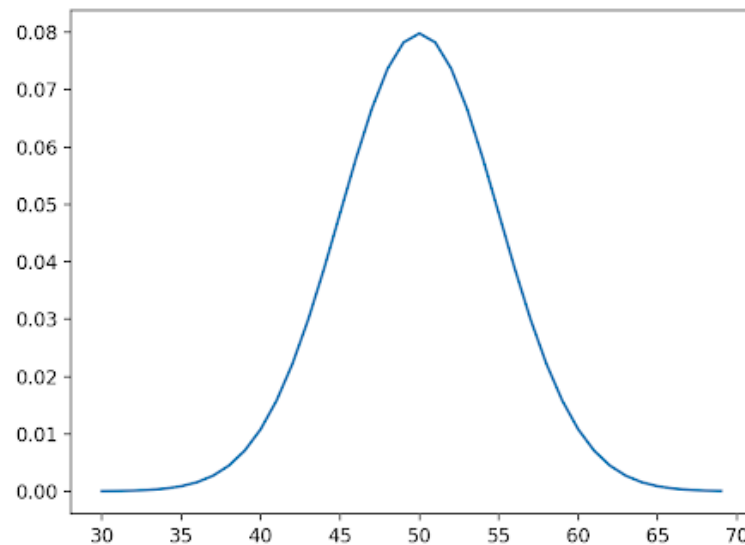
It is bell-shaped, symmetrical, and its area under the curve is 1.

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.

REFERENCES

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