1. Define the Bayesian interpretation of probability.

Answer:

Bayesian probability is an interpretation of the concept of probability, in which, instead of frequency or propensity of some phenomenon, probability is interpreted as reasonable expectation representing a state of knowledge or as quantification of a personal belief.

The Bayesian interpretation of probability can be seen as an extension of propositional logic that enables reasoning with hypotheses;[4] that is, with propositions whose truth or falsity is unknown. In the Bayesian view, a probability is assigned to a hypothesis, whereas under frequentist inference, a hypothesis is typically tested without being assigned a probability.

Bayesian probability belongs to the category of evidential probabilities; to evaluate the probability of a hypothesis, the Bayesian probabilistic specifies a prior probability. This, in turn, is then updated to a posterior probability in the light of new, relevant data (evidence). The Bayesian interpretation provides a standard set of procedures and formulae to perform this calculation.

1. Define probability of a union of two events with equation.

Answer:

Union of events: The union of events A and B, denoted by A ∪ B, consists of all outcomes that are in A or in B or in both A and B.

When two events are mutually exclusive, the probability of their union can be calculated with the addition rule.

If the events are not mutually exclusive, then we do not simply add the probabilities of the events together, but we need to subtract the probability of the intersection of the events. Given the events A and B: P(A U B) = P(A) + P(B) - P(A ∩ B).

1. What is joint probability? What is its formula?

Answer: Joint probability is the probability of two events happening together. Probabilities are combined using multiplication, therefore the joint probability of independent events is calculated as the probability of event A multiplied by the probability of event B. This can be stated formally as follows: Joint Probability: P(A and B) = P(A) \* P(B).

1. What is chain rule of probability?

Answer: The probability chain is a random process in which someone transmits the information to others in accordance with the laws of probability and then these others tell still others in a similar way. This chain may also be called random process. Most of the information communication follows this chain.

1. What is conditional probability means? What is the formula of it?

Answer: Conditional probability is defined as the likelihood of an event or outcome occurring, based on the occurrence of a previous event or outcome. Conditional probability is calculated by multiplying the probability of the preceding event by the updated probability of the succeeding, or conditional, event.

P(B|A) = P(A and B) / P(A) (or) P(B|A) = P(A∩B) / P(A).

1. What are continuous random variables?

Answer: A continuous random variable is one which takes an infinite number of possible values. Continuous random variables are usually measurements. Examples include height, weight, the amount of sugar in an orange, the time required to run a mile.

1. What are Bernoulli distributions? What is the formula of it?

Answer: A Bernoulli distribution is a discrete probability distribution for a Bernoulli trial — a random experiment that has only two outcomes (usually called a “Success” or a “Failure”). For example, the probability of getting a heads (a “success”) while flipping a coin is 0.5. The probability of “failure” is 1 – P (1 minus the probability of success, which also equals 0.5 for a coin toss). It is a special case of the binomial distribution for n = 1. In other words, it is a binomial distribution with a single trial (e.g. a single coin toss).

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1. What is Poisson distribution? What is the formula?

Answer: Poisson distribution is a probability distribution that is used to show how many times an event is likely to occur over a specified period. Poisson distributions are often used to understand independent events that occur at a constant rate within a given interval of time.

The Poisson Distribution formula is: P(x; μ) = (e-μ) (μx) / x!

1. Define covariance.

Answer: Covariance is a measure of how much two random variables vary together. It's similar to variance, but where variance tells you how a single variable varies, covariance tells you how two variables vary together.

1. Define correlation

Answer: Correlation is a statistical measure that expresses the extent to which two variables are linearly related (meaning they change together at a constant rate). It’s a common tool for describing simple relationships without making a statement about cause and effect.

1. Define sampling with replacement. Give example.

Answer: When a sampling unit is drawn from a finite population and is returned to that population, after its characteristic(s) have been recorded, before the next unit is drawn, the sampling is said to be “with replacement”. With replacement means the same item can be chosen more than once.

Example: Consider a population of potato sacks, each of which has either 12, 13, 14, 15, 16, 17, or 18 potatoes, and all the values are equally likely. Suppose that, in this population, there is exactly one sack with each number. So the whole population has seven sacks.

1. What is sampling without replacement? Give example.

Answer: In sampling without replacement, each sample unit of the population has only one chance to be selected in the sample. Without replacement means the same item cannot be selected more than once. For example, if one draws a simple random sample such that no unit occurs more than one time in the sample, the sample is drawn without replacement.

1. What is hypothesis? Give example.

Answer: A simple hypothesis predicts the relationship between two variables: the independent variable and the dependent variable. See this relationship through these examples. Drinking sugary drinks daily leads to obesity. Smoking cigarettes daily leads to lung cancer. Getting 8 hours of sleep can lead to more alert students.