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.In the Bayesian interpretation, probability measures a degree of belief. Bayes's theorem then links the degree of belief in a proposition before and after accounting for evidence. For example, suppose it is believed with 50% certainty that a coin is twice as likely to land heads than tails.

Logical, epistemic, and inductive probability. It provides us with mathematical tools to update our beliefs about random events in light of seeing new data or evidence about those events. In particular Bayesian inference interprets probability as a measure of believability or confidence that an individual may possess about the occurance of a particular event.

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P(A or B) = P(A) + P(B). The chance of any (one or more) of two or more events occurring is called the union of the events. The probability of the union of disjoint events is the sum of their individual probabilities. The probability of the union of two events depends on the probability of either event and the probability of only one of the events occuring. The probability of A[Union]B equals the sum of the probabilities of A and B minus the probability of A[Intersection]B.If both events are independent, then this probability is given by: P(A∩B)=P(A)P(B) Union: The union of two events is the probability that either A or B will occur.

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

Answer:--->A joint probability is a possibility of occurring one or more independent events simultaneously, denoted as P (A∩B) or P (A and B). One can calculate it by multiplying the probability of both outcomes = P (A)*P (B). Joint probability is a statistical measure that calculates the likelihood of two events occurring together and at the same point in time. Joint probability is the probability of event Y occurring at the same time that event X occurs.In general, the function used to describe the probability distribution of a discrete random variable is called its probability function (abbreviated as pf). The probability function of X is the function $pX:R\rightarrow[0,1]$ given by. $pX(x)=Pr(X=x)$.

4. What is chain rule of probability?

Answer:In probability theory, the chain rule (also called the general product rule) permits the calculation of any member of the joint distribution of a set of random variables using only conditional probabilities.The chain rule, or general product rule, calculates any component of the joint distribution of a set of random variables using only conditional probabilities. This probability theory is used as a foundation for backpropagation and in creating Bayesian networksThe chain rule states that the derivative of $f(g(x))$ is $f'(g(x))\cdot g'(x)$. In other words, it helps us differentiate *composite functions*. For example, $\sin(x^2)$ is a composite function because it can be constructed as $f(g(x))$ for $f(x)=\sin(x)$ and $g(x)=x^2$.

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

Answerr:--->Conditional probability is known as the possibility of an event or outcome happening, based on the existence of a previous event or outcome. It is calculated by multiplying the probability of the preceding event by the renewed probability of the succeeding, or conditional, event.If A and B are two events in a sample space S, then the conditional probability of A given B is defined as P(A|B)=P(A∩B)P(B), when P(B)>0.The formula for conditional probability is derived from the probability multiplication rule, P(A and B) = P(A)*P(B|A)

6. What are continuous random variables?

Answer:-->A continuous random variable is a random variable that has only continuous values. Continuous values are uncountable and are related to real numbers. Examples of continuous random variables. The time it takes to complete an exam for a 60 minute test Possible values = all real numbers on the interval [0,60]Discrete random variables can only take on a finite number of values. For example, the outcome of rolling a die is a discrete random variable, as it can only land on one of six possible numbers. Continuous random variables, on the other hand, can take on any value in a given interval.

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

Answer:-->Bernoulli distribution is a discrete probability distribution where the Bernoulli random variable can have only 0 or 1 as the outcome. p is the probability of success and 1 - p is the probability of failure. The mean of a Bernoulli distribution is E[X] = p and the variance, Var[X] = p(1-p).In probability and statistics, a Bernoulli process (named after Jacob Bernoulli) is a finite or infinite sequence of binary random variables, so it is a discrete-time stochastic process that takes only two values, canonically 0 and 1. The component Bernoulli variables Xi are identically distributed and independent.Theorem: If the probability of occurrence of an event(probability of success) in a single trial of a Bernoulli's experiment is p, then the probability that the event occurs exactly r times out of n independent trials is equal to nCr qn – r pr, where q = 1 – p, the probability of failure of the event

8. What is binomial distribution? What is the formula?

Answer:-->Binomial distribution is a probability distribution used in statistics that states the likelihood that a value will take one of two independent values under a given set of parameters or assumptionsBinomial probability refers to the probability of exactly x successes on n repeated trials in an experiment which has two possible outcomes (commonly called a binomial experiment). If the probability of success on an individual trial is p , then the binomial probability is nCx·px·(1−p)n−x

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

Answer:-->A Poisson distribution is a discrete probability distribution. It gives the probability of an event happening a certain number of times (k) within a given interval of time or space. The Poisson distribution has only one parameter, λ (lambda), which is the mean number of events.A probability density function that is often used as a mathematical model of the number of outcomes obtained in a suitable interval of time and space, that has its mean equal to its variance, that is used as an approximation to the binomial distribution, and that has the form f(x)=e−μμxx!Poisson's equation, ∇2Φ = σ(x), arises in many varied physical situations. Here σ(x) is the “source term”, and is often zero, either everywhere or everywhere bar some specific region (maybe only specific points). In this case, Laplace's equation, ∇2Φ=0, results.

10. Define covariance.

Answer:--.Covariance is a measure of the relationship between two random variables and to what extent, they change together. Or we can say, in other words, it defines the changes between the two variables, such that change in one variable is equal to change in another variable.Covariance is a statistical tool that is used to determine the relationship between the movements of two random variables. When two stocks tend to move together, they are seen as having a positive covariance; when they move inversely, the covariance is negative

11. Define correlation

Answer_-->Correlation is a statistical calculation that indicates that two variables are parallelly related (which means that the variables change together at a constant rate). It is a simple and popularly used tool for defining relationships without delivering a statement concerning the cause and effect.Correlation is a statistical measure that indicates the extent to which two or more variables fluctuate in relation to each other.

12. Define sampling with replacement. Give example.

Answer--->Sampling is a process in statistical analysis where researchers take a predetermined number of observations from a larger population. The method of sampling depends on the type of analysis being performed, but it may include simple random sampling or systematic sampling.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”. In the contrary case the sampling is “without replacement”.In sampling without replacement, each sample unit of the population has only one chance to be selected in the sample. 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.

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14. What is hypothesis? Give example.

Answer_--.A hypothesis is an assumption, an idea that is proposed for the sake of argument so that it can be tested to see if it might be true. In the scientific method, the hypothesis is constructed before any applicable research has been done, apart from a basic background review.Professionals typically write hypotheses as if/then statements, such as if someone eats a lot of sugar, then they will develop cavities in their teeth. These statements identify specific variables and propose results. In this example, the variable is the amount of sugar and the result is developing cavities.A hypothesis is an assumption, an idea that is proposed for the sake of argument so that it can be tested to see if it might be true. In the scientific method, the hypothesis is constructed before any applicable research has been done, apart from a basic background review