Machine learning 13

1. Provide an example of the concepts of Prior, Posterior, and Likelihood.

Ans:- You can think of posterior probability as an adjustment on prior probability: **Posterior probability = prior probability + new evidence (called likelihood)**. For example, historical data suggests that around 60% of students who start college will graduate within 6 years. This is the prior probability.

2. What role does Bayes' theorem play in the concept learning principle?

Ans:- Bayes Theorem is also used widely in machine learning, where it is **a simple, effective way to predict classes with precision and accuracy**. The Bayesian method of calculating conditional probabilities is used in machine learning applications that involve classification tasks.

3. Offer an example of how the Nave Bayes classifier is used in real life.

Ans:- It is used for Credit Scoring. It is used in medical data classification. **It can be used in real-time predictions** because Naïve Bayes Classifier is an eager learner. It is used in Text classification such as Spam filtering and Sentiment analysis.

4. Can the Nave Bayes classifier be used on continuous numeric data? If so, how can you go about doing it?

Ans:- **how do we perform classification using Naive Bayes when the data we have is continuous in nature**. If an instance in test data set has a category that was not present during training then it will assign it “Zero” probability and won't be able to make prediction. This is known as Zero frequency problem.

5. What are Bayesian Belief Networks, and how do they work? What are their applications? Are they capable of resolving a wide range of issues?

Ans:- Bayesian Belief Network is **a graphical representation of different probabilistic relationships among random variables in a particular set**. It is a classifier with no dependency on attributes i.e it is condition independent.

8. In order to prepare for the test, a student knows that there will be one question in the exam that is either form A, B, or C. The chances of getting an A, B, or C on the exam are 30 percent, 20%, and 50 percent, respectively. During the planning, the student solved 9 of 10 type A problems, 2 of 10 type B problems, and 6 of 10 type C problems.

1. What is the likelihood that the student can solve the exam problem?

Ans:- The pass rate of a test is **P = (p ÷ t) × 100**, where P is the pass rate, p is the number of students who passed the test, and t is the total number of students who passed the test.

1. Given the student's solution, what is the likelihood that the problem was of form A?

Ans:- Four perspectives on probability are commonly used: **Classical, Empirical, Subjective, and Axiomatic**.

10. Create the conditional probability table associated with the node Won Toss in the Bayesian Belief network to represent the conditional independence assumptions of the Nave Bayes classifier for the match winning prediction problem in Section 6.4.4.

Ans:- **Bayesian Belief Network**is a graphical representation of different probabilistic relationships among random variables in a particular set. It is a classifier with no dependency on attributes i.e it is condition independent. Due to its feature of joint probability, the probability in Bayesian Belief Network is derived, based on a condition — P(attribute/parent) i.e probability of an attribute, true over parent attribute.