**Assignment\_12**

1.What is prior probability? Give an example.

**Ans: Prior probability shows the likelihood of an outcome in a given dataset. For example, in the mortgage case, P(Y) is the default rate on a home mortgage, which is 2%. P(Y|X) is called the conditional probability, which provides the probability of an outcome given the evidence, that is, when the value of X is known.**

2. What is posterior probability? Give an example.

**Ans: Posterior probability is a revised probability that takes into account new available information. Ex – let there be two urns, urn A having 5 black balls and 10 red balls and urn B having 10 black balls and 5 red balls. Now, if an urn is selected at random, the probability that urn A is chosen is 0.5.**

3. What is likelihood probability? Give an example.

**Ans: Suppose we have a coin that is assumed to be fair. If we flip the coin one time, the probability that it will land on heads is 0.5.. Now suppose we flip the coin 100 times and it only lands heads 17 times. We would say that the likelihood that the coin is fair is quit low.**

4. What is Naïve Bayes classifier? Why is it named so?

**Ans: A navie bayes classifier assumes that the presence of a particular feature of a class is unrelated to the presence of any other feature, given the class variable. Basically, it’s “navie” because it makes assumptions that may or may not turn out to be correct.**

5. What is optimal Bayes classifier?

**Ans: The Bayes Optimal Classifier is a probabilistic model that makes the most probable prediction for a new example. It is described using the Bayes theorem that provide a principled way for calculating a conditional probability.**

6. Write any two features of Bayesian learning methods.

**Ans: Features – a probability distribution over observed data for each possible hypothesis. New instances can be classified by coming the predictions of multiple hypotheses, weighted by their probabilities.**

7. Define the concept of consistent learners.

**Ans: Alearner L using a hypothesis H and training data D is said to be a consistent learner if it always outputs a hypothesis with zero error on D whenever H contains such a hypothesis.**

8. Write any two strengths of Bayes classifier.

**Ans: This algorithm works quickly and can save a lot of time. Naïve Bayes is suitable for solving multi-class prediction prediction problems. If its assumptions of the independence of features holds true, it can perform better than other models and requires much less training data.**

9. Write any two weaknesses of Bayes classifier.

**Ans: Naïve Bayes assumes that all predictors are independent, rarely happening in real.**

**This algorithm faces the ‘zero-frequency problem’ where it assigns zero probability to a categorical variable whose category in the test data set wasn’t available in the training dataset.**