

Machine Learning Question Bank

Module4

1. Define Bayesian theorem? What is the relevance and features of Bayesian theorem? Explain the practical difficulties of Bayesian theorem.
2. Discuss at least five applications of Bayes learning.
3. Define MAP hypothesis. Derive the relation for h_{MAP} using Bayesian theorem.
4. Define Maximum Likelihood. Write the expression for h_{ML} .
5. Consider a medical diagnosis problem in which there are two alternative hypotheses: 1. That the patient has a particular form of cancer (+) and 2. That the patient does not (-). A patient takes a lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only 97% of the cases in which the disease is not present. Furthermore, .008 of the entire population have this cancer. Determine whether the patient has Cancer or not using MAP hypothesis.
6. Explain Brute Force Bayes Concept Learning.
7. Explain Brute Force Bayes MAP Learning Algorithm. Hence Derive the relation for $P(h/D)$ when h is consistent with D and h is not consistent with D .
8. Explain MAP hypothesis and consistent learners.
9. Explain Maximum likelihood and least squared error hypothesis. Derive the relationship for h_{ML} for learning real valued function.
10. Explain the Maximum likelihood hypothesis learning to predict probabilities and derive the equation for h_{ML} for learning to predict probabilities.
11. What is the Minimum Description Length (MDL) Principle? Obtain the equation for h_{MDL} .
12. Define Naïve Bayes classifier. Write the equation for target value output, V_{NB} by the Bayes Classifier.
13. Illustrate the application of the Bayes Classifier to a concept learning problem of Play Tennis Concept example.
14. With example explain the working of Naïve Bayes algorithm for learning and classifying text.
15. Explain Bayesian belief network and conditional independence with example.
16. Explain Brute force MAP hypothesis learner? What is minimum description length (MDL) principle?
17. Explain how Naïve Bayes algorithm is useful for learning and classifying text?
18. What are Bayesian Belief nets? Where are they used? Can it solve all types of problems?
19. Write and Explain EM Algorithm. Discuss what are Gaussian Mixtures.
20. Derive the k Means Algorithm.
21. Derive the following:
 - a. Brute Force MAP Learning Algorithm
 - b. Maximum Likelihood and Least Square Error Hypotheses
 - c. Maximum Likelihood for Predicting Probabilities
 - d. Minimum Description Length Principle

- e. Naïve Bayes Classifier
- f. EM Algorithm
- g. K Means Algorithm