

# Machine Learning Question Bank

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## Unit - 1

### SHORT QUESTIONS

- ① What is machine learning?
- ② Differentiate b/w supervised & unsupervised learning
- ③ Define concept learning?
- ④ Define Inductive Bias.
- ⑤ Differentiate b/w <sup>positive</sup> supervised & <sup>Negative</sup> unsupervised learning  
examples

### LONG QUESTIONS

- ① Explain Machine Learning. <sup>Explain</sup> ~~What are~~ some learning problems
- ② Describe the steps for designing a learning system
- ③ Discuss some issues in ML.
- ④ Explain concept learning with suitable example
- ⑤ How can you find out the hypothesis space in concept learning?
- ⑥ Explain Find-S Algorithm
- ⑦ Explain candidate elimination Algorithm
- ⑧ Explain List then eliminate algorithm
- ⑨ Explain Inductive Bias learning

## Unit - 2

### SHORT QUESTIONS

- ① Define Decision Tree.
- ② What is Information gain?
- ③ What is Entropy?
- ④ Explain Overfitting & Underfitting.
- ⑤ What is artificial neuron?
- ⑥ Define sigmoidal activation function.

Define ADALINE

## LONG QUESTIONS

- ① Explain Decision Tree Learning.
- ② Explain Issue in DT Learning. How to overcome with it.
- ③ Explain ANN with its types.
- ④ Derive the different activation function for ANN
- ⑤ Write the training algo. for Perceptron N/w
- ⑥ Train a perceptron n/w for OR function using bipolar i/p. Consider initial weight & bias as 0 & learning rate = 1 &  $\theta$  is 0
- ⑦ Explain Gradient Descent
- ⑧ Explain Delta Rule
- ⑨ Use ADALINE N/w to train AND function with bipolar i/p & target. Perform 2 epochs of training. Assume weight, bias & learning by unity.
- ⑩ Explain the architecture of backpropagation n/w.
- ⑪ Write the algorithm to train a backpropagation n/w.

⑫ Find the n/w weights when the net shown below is presented the i/p pattern (1 1 1) & the target o/p is 1. Use a learning rate of 0.1 & bipolar sigmoidal activation function. The bias is set to 1.

⑬ Design a decision tree for following dataset.

Day	Weather	Temperature	Humidity	Wind	Water	Forecast	Enjoy Sport
1	Sunny	Hot	High	Strong	Warm	Same	Yes
2	Cloudy	Hot	Normal	Strong	Cold	Same	Yes
3	Sunny	Mild	High	Weak	Cold	Change	Yes
4	Rainy	Cold	Low	Strong	Cold	Change	No
5	Cloudy	Hot	Normal	Strong	Cold	Same	Yes
6	Sunny	Mild	Normal	Weak	Warm	Same	Yes
7	Rainy	Hot	Low	Strong	Cold	Change	No
8	Rainy	Cold	Low	Weak	Warm	Change	No
9	Sunny	Hot	High	Weak	Warm	Change	No
10	Cloudy	Cold	Low	Strong	Warm	Change	No

# Unit-3

## SHORT QUESTIONS

- ① Define the term True Error & Sample Error.
- ② What is confidence intervals?
- ③ State Bayes Theorem.
- ④ Define conditional probability.

## LONG QUESTIONS

- ① How will you compare two learning algorithms?
- ② Assume you have tested three samples with 80%, 90% & 70% accuracy. Calculate true error with 80% confidence interval.
- ③ For three events A, B & C we know that
  - A & C are independent
  - B & C are independent
  - A & B are disjoint
  - $P(A \cup C) = \frac{2}{3}$ ,  $P(B \cup C) = \frac{3}{4}$ ,  $P(A \cup B \cup C) = \frac{11}{12}$ , Find probability  $P(A)$ ,  $P(B)$  &  $P(C)$ .

④ Explain Bayes Optimal Classifier

⑤ Explain Naive Bayes Classifier.

⑥ You have a document

Text	Category
"A great game"	SPORTS
"The election was over"	NONSPORTS
"Very clean match"	SPORTS
"A clean but forgettable game"	SPORTS
"It was a clean election"	NONSPORTS

Classify "A very close game" belongs to SPORT or NONSPORT

⑦ Explain Bayesian Belief Networks

⑧ Explain Expectation Maximization Algo.

⑨ Given the following statistics, what is the probability that a woman has cancer if she has a positive mammogram result?

- One percent of women over 50 have breast cancer

- Ninety percent of women who have breast cancer test positive on mammograms.
  - Eight percent of women will have false positives.
- ⑩ Determine the possibility of grass getting wet or dry due to the occurrence of different seasons. The weather has three stages: Sunny, cloudy or Rainy. There are two possibilities for the grass: wet or Dry. The sprinkler can be on or off. If it is rainy the grass gets wet but if it is sunny, we can make grass wet by putting pouring water from a sprinkler.

## Unit-4

### SHORT QUESTIONS

- ① What are laws that governs learning.
- ② How will you determine whether a concept class is "PAC learnable"?
- ③ What is the meaning of  $k$  in KNN algorithm.
- ④ Define regression.
- ⑤ Differentiate b/w linear & locally weighted regression.

### LONG QUESTIONS

- ① Explain case Based learning.
- ② Explain Radial RBFN.
- ③ Describe the concept of locally weighted regression.
- ④ Show the classification process using KNN algo. with a suitable example.
- ⑤ Explain Mistake Bound Model of learning.
- ⑥ How VC dimension overcome the drawback of PAC learning.

## Unit-5

### SHORT QUESTIONS

- ① Define genetic algorithm.
- ② Differentiate b/w crossovers & mutation.
- ③ How many types of crossovers are there.
- ④ How hypothesis are represented in GA.
- ⑤ Define the concept of general to specific Beam Search.
- ⑥ What is reinforcement learning.
- ⑦ Differentiate b/w supervised & reinforcement learning.

### LONG QUESTIONS

- ① Explain Q learning algorithm.
- ② Explain reinforcement learning with its types.
- ③ Explain FOIL algorithm.
- ④ Explain genetic algorithm in detail.
- ⑤ Describe operators in GAs.
- ⑥ Explain Genetic Programming.
- ⑦ Write the model of evolution & learning.
- ⑧ ~~explain~~ <sup>write</sup> the algo. for sequential covering.