



CBCS SCHEME

15EC834

Eighth Semester B.E. Degree Examination, June/July 2019 Machine Learning

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Describe the following problems with respect to tasks, performance and experience :
 - i) A checkers learning problem
 - ii) A handwritten recognition learning problem
 - iii) A robot driving learning problem.

(07 Marks)
- b. Write candidate elimination algorithm and illustrate with example.

(09 Marks)

OR

- 2 a. Explain the steps in designing learning systems in detail.

(06 Marks)
- b. Write FIND-S algorithm and explain by taking EnjoySport concept and training instance given below :

Example	SKY	Air Temp	Humidity	Wind	Water	Forecast	Enjoy sport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

(10 Marks)

Module-2

- 3 a. What is decision tree and discuss the use of decision tree for classification problem.

(08 Marks)
- b. Describe the ID3 algorithm for decision tree learning with example.

(08 Marks)

OR

- 4 a. Explain the concept of a perceptron with neat diagram.

(08 Marks)
- b. How a single perceptron can be used to represent the Boolean functions such as AND, and OR.

(08 Marks)

Module-3

- 5 a. Define Bayesian theorem and Maximum A Posteriori (MAP) hypothesis.

(04 Marks)
- b. Derive an equation for MAP hypothesis using Bayes theorem.

(05 Marks)
- c. Consider a medical diagnosis problem in which there are two alternative hypothesis :
 - i) That the patient has a particular form of cancer (+) and
 - ii) 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, 0.008 of the entire populations have this cancer. Determine whether the patient has cancer or not using MAP hypothesis.

(07 Marks)

OR

- 6 a. Describe Brute – Force MAP learning algorithm. (04 Marks)
 b. Discuss the Naive Bayes classifier. (04 Marks)
 c. The following table gives data set about stolen vehicles. Using Naive Bayes classifier classify the new data (RED, SUV, Domestic).

Colour	Type	Origin	Stolen
Red	Sports	Domestic	Yes
Red	Sports	Domestic	No
Red	Sports	Domestic	Yes
Yellow	Sports	Domestic	No
Yellow	Sports	Imported	Yes
Yellow	Suv	Imported	No
Yellow	Suv	Imported	Yes
Yellow	Suv	Domestic	No
Red	Suv	Imported	No
Red	Sports	Imported	Yes

(08 Marks)

Module-4

- 7 a. Discuss the K-nearest neighbor learning. (04 Marks)
 b. Discuss locally weighted regression. (04 Marks)
 c. Explain the CADET system using case based reasoning. (08 Marks)

OR

- 8 a. Define the following terms with respect to K-nearest neighbor learning.
 i) regression ii) residual iii) kernel function. (03 Marks)
 b. Explain radial basis functions. (05 Marks)
 c. Explain the FOIL algorithm. (08 Marks)

Module-5

- 9 a. What is reinforcement learning and explain the reinforcement learning problem with neat diagram. (06 Marks)
 b. Briefly discuss the FOCL algorithm with example. (10 Marks)

OR

- 10 a. Write the reinforcement problem characteristics. (06 Marks)
 b. Explain the Q-function and Q-learning algorithm assuming deterministic reward and action with example. (10 Marks)

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