CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐ **18AI61**

Sixth Semester B.E. Degree Examination, June/July 2023
Machine Learning

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1 a. List and explain the steps to design a learning system in detail. **(08 Marks)**
   b. List and explain the main types of Machine Learning. **(04 Marks)**
   c. Consider the Enjoysport concept and instance given below. Identify the general and specific hypotheses using Candidate Elimination Learning Algorithm.

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

(08 Marks)

OR

2 a. Explain the different Challenges of Machine Learning. **(10 Marks)**
   b. Consider the "Japanese Economy Car" concept and instance given below, identify the hypotheses using Candidate Elimination Learning algorithm.

Origin	Manufacturer	Color	Decade	Type	Target Value
Japan	Honda	Blue	1980	Economy	Positive
Japan	Toyota	Green	1970	Sports	Negative
Japan	Toyota	Blue	1990	Economy	Positive
USA	Chryler	Red	1980	Economy	Negative
Japan	Honda	White	1980	Economy	Positive

(10 Marks)

Module-2

3 a. Explain the different steps to get the data. **(10 Marks)**
   b. In context to prepare the data for Machine Learning Algorithm, write a note on :
      i)   Data Cleaning.
      ii) Handling text and Categorical attributes.
      iii) Feature Scaling. **(10 Marks)**

OR

4 a. Using Code Snippets, outline the concepts involved in :
      i)   Measuring accuracy using cross validation.
      ii) Confusion Matrix.
      iii) Precision and Recall. **(10 Marks)**
   b. Explain i) Multiclass Classification   ii) Multi Label Classification. **(10 Marks)**

Module-3

5 a. Explain Batch Gradient Descent. **(08 Marks)**
   b. Explain the different Regularized Linear Models. **(12 Marks)**

OR

6 a. Explain how SVM's make predictions and how their training algorithm works. **(12 Marks)**
   b. Explain Logistic Regression. **(08 Marks)**

Module-4

7 a. Explain the concept of :
      i) Bagging and Pasting   ii) Voting Classifiers. **(10 Marks)**
   b. Define Boosting. Explain the different variants of Boosting. **(10 Marks)**

OR

8 a. Write a note on :
      i) The CART Training Algorithm   ii) Entropy. **(10 Marks)**
   b. Explain i) Out of Bag Evolution   ii) Random Forests. **(10 Marks)**

Module-5

9 a. Explain Naïve Bayes Classifier with example. **(10 Marks)**
   b. Describe the concept of MDL. Obtain the equation of h_{MDL}. **(10 Marks)**

OR

10 a. Derive the EM Algorithm in detail. **(10 Marks)**
    b. Explain Bayesian Belief Network with example. **(10 Marks)**

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