USN | | | | | | | | | |

18AI61

Sixth Semester B.E. Degree Examination, Dec.2023/Jan.2024
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. What is machine learning? Explain the applications, perspectives and issues in machine learning. **(10 Marks)**

   b. Apply candidate elimination algorithm and obtain the version space considering the training examples given in table:

Eyes	Nose	Head	Footer	Hair?	Smile? (TC)
Round	Triangle	Round	Purple	Yes	Yes
Square	Square	Square	Green	Yes	No
Square	Triangle	Round	Yellow	Yes	Yes
Round	Triangle	Round	Green	No	No
Square	Square	Round	Yellow	Yes	Yes

(10 Marks)

OR

2 a. Explain the following with respect to designing a learning system:
   (i) Choosing the training experience
   (ii) Choosing the target function
   (iii) Choosing a representation for the target function **(10 Marks)**

   b. List and explain the main challenges of machine learning. **(10 Marks)**

Module-2

3 a. List and explain the steps required to prepare the data for machine learning algorithm. **(10 Marks)**

   b. With respect to fine tuning a machine learning model, explain grid search and randomized search techniques using code snippets. **(10 Marks)**

OR

4 a. Using code snippets, explain the concepts involved in measuring accuracy using cross validation and confusion matrix. **(10 Marks)**

   b. Explain the application for:
   (i) Multi-label classification
   (ii) Multiclass classification
   (iii) Multi output classification **(10 Marks)**

Module-3

5 a. With an example and code snippet, explain Gradient Descent algorithm. **(10 Marks)**

   b. Compare and contrast the features of polynomial regression and linear regression. **(10 Marks)**

OR

6 a. Derive the equations required for estimating probabilities in logistic regression. **(10 Marks)**

   b. With respect to non-linear sum classification, determine the polynomial Kernel features with code snippet. **(10 Marks)**

Module-4

7 a. With an example and code snippet, explain how to develop decision tree model. **(10 Marks)**
  b. With code snippet and equation, explain the features of CART Training, Gini Impurity and Entropy. **(10 Marks)**

OR

8 a. With an example and code snippet, explain Ensemble learning and voting classifiers. **(10 Marks)**
  b. Write notes on:
     (i) Bagging and pasting
     (ii) Boosting and stacking **(10 Marks)**

Module-5

9 a. Explain concept learning and describe maximum likelihood hypothesis with an example. **(10 Marks)**
  b. Explain Brute-Force map learning algorithm. **(10 Marks)**

OR

10 a. With an example, explain Bayes Optimal Classifier. **(10 Marks)**
   b. What is Bayesian Belief Network? Describe its working principle with an example. **(10 Marks)**

* * * * *