P P SAVANI UNIVERSITY

Seventh Semester of B. Tech. Examination

December 2021

SECE4523 Machine Learning

22.12.2021, Wednesday **Time: 09:00 a.m. To 11:30 a.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1 Answer the Following: (Any five) **[05]**

(i) Define: Classification in supervised learning

(ii) The application/applications of Artificial Intelligence is/are

A. Expert Systems
B. Gaming
C. Vision Systems

All of the above

(iii) Which of the following is NOT supervised learning?

A. Linear Regression
B. PCA
C. Decision Tree

Naïve Bayesian

(iv) When performing regression or classification, which of the following is the correct way to preprocess the data?

A. Normalize the data -> PCA -> training
B. PCA -> normalize PCA output -> training
C. Normalize the data -> PCA -> normalize PCA output -> training

None of the above

(v) What strategies can help reduce overfitting in decision trees?

I. Enforce a maximum depth for the tree
II. Enforce a minimum number of samples in leaf nodes
III. Pruning
IV. Make sure each leaf node is one pure class

A. All
B. I, II and III
C. I, III and IV

None

(vi) The available ways to solve a problem of state-space-search

A. 1
B. 2
C. 3

4

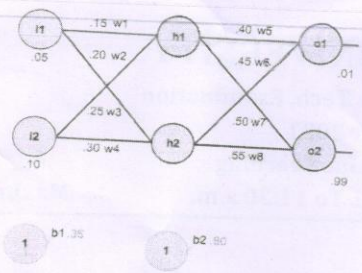
(vii) A Perceptron is

A. a single layer feed-forward neural network with pre-processing
B. an auto-associative neural network
C. a double layer auto-associative neural network

a neural network that contains feedback

Q - 2 (a) What is ML? Explain the functionality of Machine Learning comparing with AI. **[05]**

Q - 2 (b)



[05]

Herewith this diagram given inputs 0.05 and 0.10, we want the neural network to output 0.01 and 0.99.

Based on this data Calculate the Total Error after completion of the Forward Pass only.

OR

Q - 2 (a) What is Information Gain? Calculate the value of information Gain (PlayGolf, Outlook) ás per given below table. **[05]**

Outlook	Temp	Humidity	Windy	Play Golf
Rainy	Hot	High	False	No
Rainy	Hot	High	True	No
Overcast	Hot	High	False	Yes
Sunny	Mild	High	False	Yes
Sunny	Cool	Normal	False	Yes
Sunny	Cool	Normal	True	No
Overcast	Cool	Normal	True	Yes
Rainy	Mild	High	False	No
Rainy	Cool	Normal	False	Yes
Sunny	Mild	Normal	False	Yes
Rainy	Mild	Normal	True	Yes
Overcast	Mild	High	True	Yes
Overcast	Hot	Normal	False	Yes
Sunny	Mild	High	True	No

Q - 2 (b) What do you mean by Backpropagation? Explain through diagram. **[05]**

Q - 3 (a) Explain case study on Face Recognition in Machine Learning. **[05]**

Q - 3 (b) Answer the following Questions: **[05]**

1. Give Advantages of genetic algorithms
2. Give the limitations of genetic algorithms

OR

Q - 3 (a) Explain the Issues in Decision Tree Learning. How to avoid Overfitting the data, Give one method for it. **[05]**

Q - 3 (b) Describe Simple Linear Regression with suitable real application. **[05]**

Q - 4 Attempt any one. **[05]**

(i) Explain Gradient Decent and its type in ANN.

(ii) Give the procedure to design a Learning system.

SECTION – II

Q - 1 Answer the Following: (Any five) **[05]**

(i) Naïve Bayes algorithm is which type of ML algorithm?

(ii) Explain any 3 applications of classification algorithm.

(iii) What is regression line equation? (positive and negative regression)

(iv) What are vectors in the SVM?

(v) Define unsupervised learning.

(vi) What is clustering?

Q - 2 (a) Explain SVM in detail. **[05]**

Q - 2 (b) What is Regression? **[05]**

OR

Q - 2 (a) Explain how naïve bayes algorithm works? **[05]**

Q - 2 (b) Explain how text classification works? [05]

Q - 3 (a) Consider the following dataset and find frequent item sets and generate association rules for them using Apriori Algorithm. Minimum support count is 2 minimum confidence is 60% [10]

TID	items
T1	I1, I2 , I5
T2	I2,I4
T3	I2,I3
T4	I1,I2,I4
T5	I1,I3
T6	I2,I3
T7	I1,I3
T8	I1,I2,I3,I5
T9	I1,I2,I3

OR

Q - 3 (a) Apply K-Means clustering on following data {1, 2, 6, 7, 8, 10, 15, 17,20}. find 3 clusters [10]

Q - 4 Attempt any one.

(i) Explain KNN. [05]

(ii) Explain how recommendation system works?

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