

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
 TEST -3 EXAMINATION- 2023
 M.Tech-II Semester (ECE)

COURSE CODE(CREDITS): 21M1WEC233(3)

MAX. MARKS: 35

COURSE NAME: Applied Machine Learning for IoT

COURSE INSTRUCTORS: Er. Munish Sood

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q1) Construct a Kohonen self organizing map to cluster 4 given vectors $[0,0,1,1]$; $[1,0,0,0]$; $[0,1,1,0]$ and $[0,0,0,1]$. Number of clusters to be formed are 2. Assume initial learning rate of 0.5.

[7] [CO-4]

Q2) Consider an Adaptive resonance theory type 1 (ART-1) net with 5 input units and 3 cluster units. After some training the net attains the bottom-up and top-down weight matrices as shown below. Show the behavior of the net if it is presented with the training pattern $s = [0,1,1,1,1]$. Assume learning rate $L=2$ and vigilance parameter $\rho=0.8$.

[7] [CO-4]

$$B_{ij} = \begin{bmatrix} .2 & 0 & .2 \\ .5 & .8 & .2 \\ .5 & .5 & .2 \\ .5 & .8 & .2 \\ 1 & 0 & .2 \end{bmatrix} \text{ and } T_{ij} = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & 1 & 0 \\ 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

Q3) For the given dataset and a new instance = (Outlook = Sunny; Temperature = Cool; Humidity = High; Wind = Strong). Find out whether a player will go out and play Tennis or not using Naïve Bayes Classifier.

[7] [CO-5]

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

(*Outlook = sunny, Temperature = cool, Humidity = high, Wind = strong*)

Q4) Consider the following 8 data points with (x,y) representing locations. Use K-means clustering algorithm to group these into three clusters. $A_1(2,10)$, $A_2(2,5)$, $A_3(8,4)$, $B_1(5,8)$, $B_2(7,5)$, $B_3(6,4)$, $C_1(1,2)$, $C_2(4,9)$. Use Euclidean distance to compute the distances. Take initial cluster centers as A_1, B_1 and C_1 . [7] [CO-5]

Q5) Write short notes on the following

[7] [CO-1, CO-2, CO-3]

- A) Recurrent neural networks
- B) Genetic Algorithm
- C) Feed forward neural networks