Semester VIII (B.Tech.)

Er. No. 201B3.13...
Academic Year: 2023-24

Jaypee University of Engineering & Technology, Guna
End Term Examination VIII Semester-Project At Industry (2024)
18B14CI741 - Soft Computing

Maximum Duration: 2 Hours

Maximum Marks: 45

Notes:
1. This question paper has 6 questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).
4. Assume suitable numerical data for providing the examples.

		Marks	CO No.

Q1. (a) Let the fuzzy-set of variables are given: [06]   CO4
$X = \{a, b, c, d\}$
$Y = \{1, 2, 3, 4\}$
$A = \{(a, 0.0),(b, 0.8),(c, 0.6),(d, 1.0)\}$
$B = \{(1, 0.2),(2, 1.0),(3, 0.8),(4, 0.0)\}$
$C = \{(1, 0),(2, 0.4),(3, 1.0),(4, 0.8)\}$
Determine the implication relation :
(i) If x is A then y is B
(ii) If x is A then y is B else y is C

(b) Create a McCulloch-Pitts neuron model to implement NOR logic   [03]   CO2
function.

Q2. (a) Maximize the function $f(x) = x^2$ over the range of integers from   [08]   CO5
$0 \ldots 31$. Using genetic algorithm considering the following:
    (i)   Binary encoding
    (ii)   Roulette wheel selection

Q3. (a) Apply Generalized Modus Ponens (GMP) on following: [08]   CO3
P : If x is A then y is B
Let us consider two sets of variables x and y be
$X = \{x1, x2, x3\}$ and $Y = \{y1, y2\}$, respectively.
Also, let us consider the following.
$A = \{(x1, 0.4),(x2, 0.8),(x3, 0.6)\}$
$B = \{(y1, 1),(y2, 0.4)\}$
where $A' = \{(x1, 0.6),(x2, 0.9),(x3, 0.7)\}$

Q4. (a) For Back propogation neuron for a network with inputs are given [03] CO2
as $[x1, x2] = [0.3, 0.9]$, and
the weights are $[w1, w2] = [0.2, 0.3]$
with bias $= 0.75$.
Compute the output of the model using Hyperbolic tangent
function.

(b) What do you mean by hybrid systems? Explain different types of [05] CO5
hybrid systems with help of suitable examples.

Q5. (a) Let us consider two fuzzy sets A and B with universe of discourse [08] CO4
x and y respectively defined as:
A={(x1, 0.2),(x2, 0.4),(x3, 0.5)}
B={(y1, 0.5),(y2, 0.1),(y3, 0.7)}
Find the following:
    (i)   Fuzzy relation R between A and B
    (ii)   Projection of fuzzy relation R on A
    (iii)   Projection of Fuzzy relation R and B

Q6. (a) In pattern recognition for the image processing applications [05] CO3
associative memory neural networks play a major role. Explain the
associative memory using suitable examples for:
    (a) Auto-association
    (b) Hetero-association