JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

B. Tech. VI Semester (IT/BT/BI)

COURSE CODE (CREDITS): 18B11CI613/ 18B1WBI632 (3)

MAX. MARKS: 25

COURSE NAME: Data Mining

COURSE INSTRUCTORS: Dr. Aman Sharma

MAX. TIME: 1 Hour 30 Minutes

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. Solve the given test case using Naïve Bayes Classifier. **[5 Marks, CO-3]**

Test Case:

Give Birth	Can Fly	Live in Water	Have Legs	Class
yes	no	yes	no	?

Data Set:

Name	Give Birth	Can Fly	Live in Water	Have Legs	Class
human	yes	no	no	yes	mammals
python	no	no	no	no	non-mammals
salmon	no	no	yes	no	non-mammals
whale	yes	no	yes	no	mammals
frog	no	no	sometimes	yes	non-mammals
komodo	no	no	no	yes	non-mammals
bat	yes	yes	no	yes	mammals
pigeon	no	yes	no	yes	non-mammals
cat	yes	no	no	yes	mammals
leopard shark	yes	no	yes	no	non-mammals
turtle	no	no	sometimes	yes	non-mammals
penguin	no	no	sometimes	yes	non-mammals
porcupine	yes	no	no	yes	mammals
eel	no	no	yes	no	non-mammals
salamander	no	no	sometimes	yes	non-mammals
gila monster	no	no	no	yes	non-mammals
platypus	no	no	no	yes	mammals
owl	no	yes	no	yes	non-mammals
dolphin	yes	no	yes	no	mammals
eagle	no	yes	no	yes	non-mammals

Q2. In a character recognition dataset, three machine learning models achieve the following performance. Explain the following, a) which model is over-fitting the dataset b) which model is under-fitting the dataset and c) which is the better model among three? **[3 Marks, CO-3]**
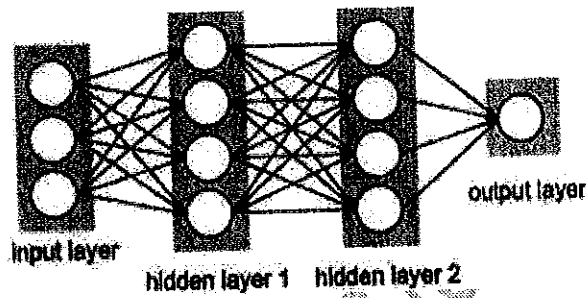
Model Name	Training accuracy	Testing accuracy
Model A	90%	80%
Model B	95%	60%
Model C	60%	50%

Q3. Explain the following: a) Gradient descent, b) Learning rate, c) Activation function, d) Reinforcement Learning.

[6 Marks, CO-4]

Q4. Briefly explain the following about Ensemble Learning: a) definition, b) functionality, c) how it achieve high accuracy comparing to smaller machine learning models, and d) possible demerits

[6 Marks, CO-2]

Q5. Let a Neural Network has 4 layers with ReLU activation functions for hidden layers and sigmoid activation function for the output layer. Present the forward propagation and back propagation processes of the above neural network with mathematical notations.

[5 Marks, CO-4]

input layer

hidden layer 1   hidden layer 2   output layer

***********************************Best of Luck***************************