Name:

Enrolment No:

UPES

End Semester Examination, December 2024

Course: Deep Learning and ANN **Semester: III**

Program: MCA **Time : 03 hrs.**

Course Code: CSAI8003P **Max. Marks: 100**

Instructions:

- Attempt all questions.
- Mention the question number prominently on your answer sheet and write legibly.
- Use of calculator is allowed.

SECTION A

(5Qx4M=20Marks)

Attempt all questions. Each question carries 4 marks.

S. No.	Question	Marks	CO
Q 1	"Neurons that fire together wire together" – Comment.	**4**	**CO2**
Q 2	Narrate the problems that Swish Activation tries to overcome.	**4**	**CO1**
Q 3	Compare and contrast a Boltzmann Machine with an MLP.	**4**	**CO2**
Q 4	Demonstrate the superiority of the Leaky ReLU activation over simple ReLU activation function.	**4**	**CO1**
Q 5	Define the following: • Precision • Recall	**4**	**CO3**

SECTION B

(4Qx10M= 40 Marks)

Attempt all questions. Each question carries 10 marks.

Q 6	Given a cost function $f(x) = 3x^2 + 2$. Apply gradient decent to calculate the value of $x^{(1)}$, and $x^{(2)}$ if $x^{(0)} = 3$, and learning rate = 0.8.	**10**	**CO2**
Q 7	Prove that function **f(x) = max(0, x)** satisfies all the necessary conditions of an activation function. Under what conditions will it become "dead".	**10**	**CO1**
Q 8	Discuss five applications of deep learning in different domains.	**10**	**CO3**

<table>
<tr><td>Q 9</td><td>Given an image matrix in the following form:

<table><tr><td>4</td><td>4</td><td>2</td><td>5</td></tr><tr><td>2</td><td>3</td><td>3</td><td>5</td></tr><tr><td>9</td><td>-1</td><td>4</td><td>5</td></tr><tr><td>2</td><td>2</td><td>6</td><td>5</td></tr></table>
A kernel of size 2x2 is given as follows:

<table><tr><td>1</td><td>0</td></tr><tr><td>1</td><td>0</td></tr></table>
Take the value of stride as 2 and calculate the resultant matrix after applying the following:
• Convolutional operation
• Max pooling
• Average pooling</td><td>10</td><td>CO2</td></tr>
<tr><td colspan="4">SECTION-C
(2Qx20M=40 Marks)
Attempt all questions. Each question carries 20 marks.</td></tr>
<tr><td>Q 10</td><td>Consider a dataset of movie reviews stored in “imdb.csv” file containing reviews in one column and their corresponding sentiment rating (0 – negative; 1– positive). Write the Python code using Tesorflow Keras to train a text sentiment classifier:
• Load the dataset
• Split into train and test samples
• Apply Embedding layer to convert text to numeric representation
• Apply sequence padding
• Define, compile and train model
• Evaluate model</td><td>20</td><td>CO2, CO3</td></tr>
<tr><td>Q 11</td><td>Create a neural network model for classification of iris flowers into three categories based on the 4 features:
• Load the dataset from a csv file
• Train test split
• Create a model
• Compile the model
• Train the model
• Evaluate the model
OR
Create a neural network model for regressing the price of a house using 8 numerical attributes. Perform the necessary steps of load, split, create, compile, and evaluate the model. Discuss any two performance metrics suitable for this task.</td><td>20</td><td>CO2, CO3</td></tr>
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