Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE MINOR - SEMESTER–VI EXAMINATION – SUMMER 2024

Subject Code:116AG01   **Date:27-05-2024**
Subject Name:Deep Learning and Neural Network
**Time:10:30 AM TO 01:00 PM**   **Total Marks:70**

Instructions:
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

Q.1 **(a)** Show the mapping of elements of ANN with the elements of biological neural network. **03**

(b) Differentiate Machine Learning and Deep learning. **04**

(c) Why activation function is used in Artificial neuron? Explain sigmoid, ReLU and tanh activation function along with plots showing their output values. **07**

Q.2 **(a)** Define : (i) Epoch (ii) Learning rates **03**

(b) Explain the role of hyper parameter tuning in neural network. **04**

(c) Explain back propagation in detail considering the following architecture where activation function at hidden layer is sigmoid. No activation function is applied at output layer. Derive equations for updating weight parameter: **07**
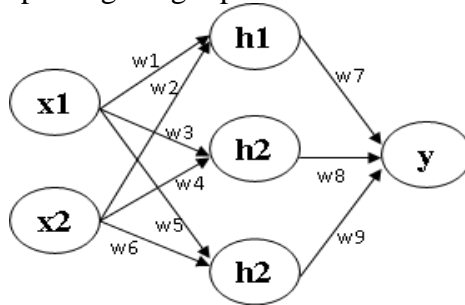
OR

(c) Calculate gradient of weight parameter w5 ($\partial y_p/\partial w5$) for the given neural network with two inputs x1=1 and x2=-1. The activation function at the output layer is : f1(x): x^3+2x^2+x+3 and activation function applied at the hidden layer is f2(x)=x^2+x+2. w1=2, w2=-3, w3=1, w4=4, w5=2 and w6=-1 **07**
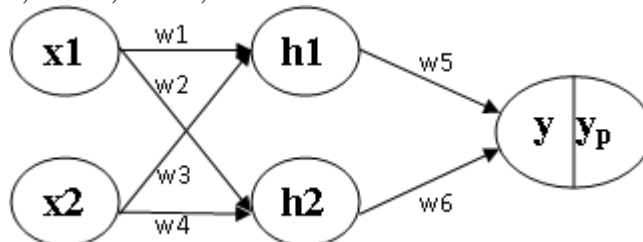
Q.3 **(a)** Describe three types of padding techniques. **03**

(b) Determine the total number of parameters required for applying convolution considering the following values of a CNN: input layer (32,32,3), conv(F=5,S=1,K=6) **04**

(c) Explain the steps to train CNN with tensorflow. **07**

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OR

Q.3	**(a)**	Describe three types of pooling methods.	**03**
	(b)	Determine the shape of output matrix after applying convolution for an image of size 19 x 19 x 3 that uses full padding of size 2, stride size 2, and 6 filters of size 5 x 5	**04**
	(c)	Explain the architecture of CNN.	**07**
Q.4	**(a)**	Describe in brief: one-hot encoding	**03**
	(b)	Explain the format of sequential function of keras	**04**
	(c)	Elaborate limitations of TensorFlow	**07**

OR

Q.4	**(a)**	Describe in brief: batch normalization	**03**
	(b)	Describe the types of tensors.	**04**
	(c)	List out four regularization techniques in deep learning. Describe any two of them.	**07**
Q.5	**(a)**	List out three applications where RNN is required rather than CNN or ANN	**03**
	(b)	Briefly describe different types of RNN based on total number of inputs-outputs	**04**
	(c)	Explain the different variants of Gradient Descent.	**07**

OR

Q.5	**(a)**	Differentiate Overfitting and Underfitting.	**03**
	(b)	Briefly explain vanishing and exploding gradient problem.	**04**
	(c)	Explain the architecture of LSTM.	**07**

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