RV College of Engineering®

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Academic Year 2023-24 (EVEN Semester)

USN	1	R	V	2	1	A	I	0	3	2

Department of Artificial Intelligence and Machine Learning

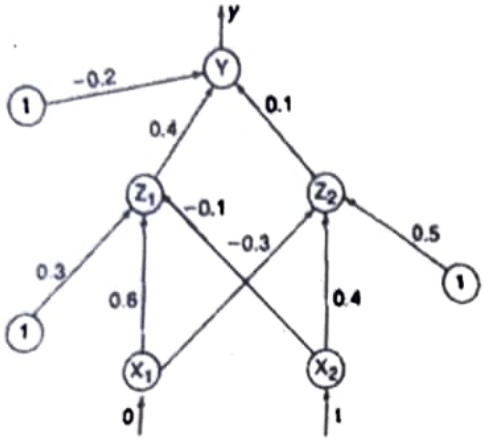
Course Code:	:	21A163	Date	:	23.07.2024
Semester	:	VI	Time	:	9.30-11.30
Max Marks	:	60	Duration	:	120 mins

Artificial Neural Networks and Deep Learning

CIE 2

Note: Answer all the Questions

SL. No	Questions	M	BT	CO
	PART – A			
1	List any two stopping criteria for backpropagation rule?	2	1	1
2	_____ deep learning algorithm is used for handling imbalanced classification tasks.	1	1	1
3	_____ layer type is typically used to extract local features in a CNN	1	1	2
4	What is the purpose of the stride parameter in a convolutional layer?	1	1	2
5	_____ layer is responsible for backpropagating the gradients and updating the network's parameters	1	2	2
6	_____ layer is responsible for down sampling of the images	1	2	2
7	Give the max pooling of considering window size as 2x2. 3 1 1 3 2 5 0 2 1 4 2 1 4 7 2 4	1	3	3
8	_____ creates additional artificial data samples based on current data to increase the training set.	1	2	2
9	The convolutional operations from the qth layer to the (q + 1)th layer is defined as _____	1	2	2
	PART – B			
1 a	Summarize the differences between batch learning and online learning on various aspects	05	2	2

	b	Elaborate any 3 methods involved in optimizing back propagation algorithm in detail	05	2	2
2	a	Justify the statement "The popularity of on-line learning for the supervised training of multilayer perceptron has been further enhanced by the development of the back-propagation algorithm " by providing the advantages of using back propagation technique.	03	4	3
	b	Consider the given network.  Apply backpropagation algorithm over the network with input pattern [0,1] and output target 1, learning rate 0.25 and binary sigmoidal activation function. (One iteration is sufficient)	07	3	3
3	a	With a neat diagram, elaborate the basic structure of a Convolutional Neural Network in detail	06	2	2
3	b	How do pre trained convolutional neural network handles object localization? With a neat diagram, elaborate the steps in detail.	04	3	3
4	A	Consider the given 6x6 matrix representation of an image. (i) Perform the convolution operation with the given filter, stride =1 and zero padding and discuss the output in detail (ii) Discuss the role of filter, stride and padding in enhancing the output Input 6x6 matrix 3 0 1 2 7 4 1 5 8 9 3 1 2 7 2 5 1 3 0 1 3 1 7 8 4 2 1 6 2 8 2 4 5 2 3 9 Filter 3x3 1 0 -1 1 0 -1 1 0 -1	10	3	3

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5	a	Diabetic retinopathy (DR) is a diabetes complication that damages the retina. Researchers have implemented deep learning neural network approach for automatic diagnosis of the disease in its different stages using different CNN architectures and confirmed VGG 16 performs better with 72% accuracy. Analyze the given case study and elaborate the architecture of VGG16 in detail and list out any 2 reasons for its better performance with respect to the given case study.	05	4	3
	b	Assuming the training data set is very limited in number, discuss the different methods to augment the data.	05	2	2

M-Marks, BT-Blooms Taxonomy Levels, CO-Course Outcomes

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	CO5	L1	L2	L3	L4	L5	L6
	Max Marks CIE	3	27	30	--	--	05	25	22	08	--	--

Course Outcomes: After completing the course, the students will be able to:-

CO1	Describe basic concepts of neural network, its applications and various learning models
CO2	Analyse different Network Architectures, learning tasks, convolutional networks, and deep learning models
CO3	Investigate and apply neural networks model and learning techniques to solve problems related to society and industry
CO4	Demonstrate a prototype application developed using any NN tools and APIs
CO5	Appraise the knowledge of Neural Networks and Deep Learning as an Individual /as a team member