JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- MAY-2023

COURSE CODE(CREDITS): 22M11CI212(3) MAX. MARKS: 25

COURSE NAME: Deep Learning Techniques

COURSE INSTRUCTORS: Dr. Abhilasha Sharma MAX. TIME: 1 Hour 30 Minutes

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Note: *All questions are compulsory. Marks are indicated against each question in square brackets.*

Q 1. a). Why do we prefer Convolutional Neural networks (CNN) over Artificial Neural networks (ANN) for image data as input? [3] [CO2]

b). What are the problems associated with the Convolution operation and how can one resolve them? [2] [CO2]

Q 2. a). An input image has been converted into a matrix of size 12 X 12 along with a filter of size 3 X 3 with a Stride of 1. Determine the size of the convoluted matrix. [3] [CO3]

b). What is Stride and what is the effect of high Stride on the feature map? Elaborate with the help of example. [2] [CO3]

Q 3. a). Explain the significance of the RELU Activation function in Convolution Neural Network. [3] [CO2]

b). Does the size of the feature map always reduce upon applying the filters? Explain why or why not. [2] [CO2]

Q 4. a). Can we use CNN to perform Dimensionality Reduction? If Yes, then explain with example which layer is responsible for dimensionality reduction particularly in CNN? [3] [CO3]

b). Explain the significance of "Parameter Sharing" and "Sparsity of connections" in CNN. [2] [CO3]

Q 5. Let us consider a Convolutional Neural Network having three different convolutional layers in its architecture as – [5] [CO3]

- Layer-1: Filter Size – 3 X 3, Number of Filters – 10, Stride – 1, Padding – 0
- Layer-2: Filter Size – 5 X 5, Number of Filters – 20, Stride – 2, Padding – 0
- Layer-3: Filter Size – 5 X5 , Number of Filters – 40, Stride – 2, Padding – 0

If we give the input a 3-D image to the network of dimension 39 X 39, then determine the dimension of the vector after passing through a fully connected layer in the architecture.