

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2021

B.Tech. VII Semester

COURSE CODE: 19B1WCI738

MAX. MARKS: 35

COURSE NAME: Introduction to Deep Learning

COURSE CREDITS: 03

MAX. TIME: 2 Hours

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q. No. 1 Let's assume the following sequence of a CNN network

- 5 Marks**
- Input image is colored image with dimensions of 39×39
 - Ten 3×3 Convolution filters are applied with stride as 1 and padding as 0.
 - Twenty 5×5 Convolution filters are applied with stride as 2 and padding as 0.
 - Forty 7×7 Convolution filters are applied with stride as 2 and padding as 0.
 - A fully connected layer by flattening the output of previous layer.
 - Final layer of single neuron with SoftMax function.

Draw the complete CNN diagram for the above said network. Also label the size of each layer in the drawn network.

Q. No. 2 Answer following questions:

- 5 Marks**
- Assume you are a machine learning practitioner in a company, and you observed that your input data is of colored images. Please provide the list of reason you will provide to your boss as justification for using CNN over normal neural network.
 - Further, also explain the process of cost calculation and gradient descent for your created CNN network.

Q. No. 3 Explain the YOLO algorithm for object detection by explaining the basic concepts of

5 Marks sliding windows, Intersection of Union (IoU), Non-Max suppression, and Anchor Boxes.

Q. No. 4 Answer following questions:

5 Marks a) Explain the basic idea behind the ResNets? In which situation ResNet are beneficial and which problem of a normal CNN they can solve?

b) Draw and explain a single block of inception network?

Q. No. 5 You are working on an automated check-out kiosk for a supermarket, and are

5 Marks building a classifier for apples, bananas, and oranges. Suppose your classifier obtains a training set error of 0.5%, and a dev set error of 7%.

a) Explain the Bias and Variance of your model.

b) What kind of problem your model has and what are the possible solutions?

Q. No. 6 Answer following questions

5 Marks a) Using the standard notations how would you denote the 3rd layer's activations when the input is the 7th example from the 8th minibatch?

b) Why is the best mini-batch size usually not 1 and not m , but instead something in-between?

Q. No. 7 Suppose the temperature in Casablanca over the first three days of January are the

5 Marks same:

Jan 1st: $\theta_1 = 10^\circ\text{C}$

Jan 2nd: $\theta_2 = 10^\circ\text{C}$

Jan 3rd: $\theta_3 = 10^\circ\text{C}$

Say you use an exponentially weighted average with $\beta = 0.5$ to track the temperature:

$v_0 = 0$ and $v_t = \beta v_{t-1} + (1 - \beta)\theta_t$.

If v_2 is the value computed after day 2 without bias correction, and $v_2^{\text{Corrected}}$ is the value you compute with bias correction. What are these values?