Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Short Answer Question

Construct the savings tour using B as the base city. The savings for including the pairs of cities CD, CE and DE are 83, 82 and 90, respectively. Compute the savings for the remaining three pairs of cities, and use them to simulate the algorithm. Enter the path representation of the tour starting from city B.

Enter a comma separated list of city names.
NO SPACES, TABS, DOTS, BRACKETS, PARENTHESIS OR UNWANTED CHARACTERS.
Answer format: B,X,Y,Z

Response Type : Alphanumeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Set

Answers Case Sensitive : No

Text Areas : PlainText

Possible Answers :

B,D,E,A,C

Deep Learning

Section Id :	64065339149
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	9
Number of Questions to be attempted :	9
Section Marks :	50

Display Number Panel :	Yes
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065383079
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 40 Question Id : 640653579340 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DEGREE LEVEL : DEEP LEARNING (COMPUTER BASED EXAM)"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?

CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

(IF IT IS NOT THE CORRECT SUBJECT, PLS CHECK THE SECTION AT THE TOP FOR THE SUBJECTS REGISTERED BY YOU)

Options :

6406531933876. YES

6406531933877. NO

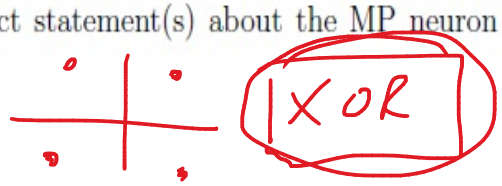
Sub-Section Number :	2
Sub-Section Id :	64065383080
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 41 Question Id : 640653579341 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider an MP neuron to implement a boolean function. A boolean function takes in 10 inputs (that is, $x_1, x_2, \cdots, x_{10}$) $x_i \in \{0,1\}$ and produces an output, that is, $y_i = \in \{0,1\}$. Assume that zero-one error metric is used to count the number of errors made by MP neuron. Choose the correct statement(s) about the MP neuron for the given configuration.



x_1	x_2
0	0
0	1
1	0
1	1

Options :

6406531933878. There exists at least one function for which MP neuron can not find a threshold such that it produces zero error.

6406531933879. One can manually find the threshold such that MP neuron produces zero classification error for all possible functions.

6406531933880. There exist at least 4 boolean functions such that MP neuron can represent them with zero classification error.

6406531933881. MP neuron must have at least one inhibitory input to implement all possible boolean functions.

Sub-Section Number : 3

Sub-Section Id : 64065383081

Question Shuffling Allowed : Yes

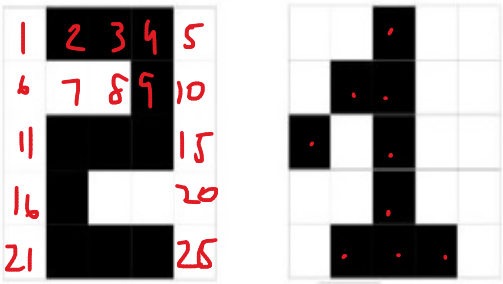
Is Section Default? : null

Question Number : 42 Question Id : 640653579342 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

Consider two binary images shown below. The white square represents 1 and the black square represents 0. Suppose we use MP neuron to classify these two images



by flattening the image of size 5×5 into a vector of size 25×1. Then, the statement that these two images are linearly separable is

Options :

6406531933882. True

6406531933883. False

6406531933884. Insufficient information

6406531933885. Not possible to decide

Sub-Section Number : 4

Sub-Section Id : 64065383082

Question Shuffling Allowed : No

Is Section Default? : null

Question Id : 640653579343 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (43 to 46)

Question Label : Comprehension

Consider the data points $\left(x_1 = \begin{bmatrix}1\\1\end{bmatrix}, x_2 = \begin{bmatrix}1\\-1\end{bmatrix}, x_3 = \begin{bmatrix}-1\\1\end{bmatrix}, x_4 = \begin{bmatrix}-1\\-1\end{bmatrix}\right)$.

Of these, the points (x_1, x_2 and x_3) belong to positive (1) class and the point x_4 belongs to negative (0) class. The perceptron uses the following decision rule

$$\hat{y} = \begin{cases} 1, & \text{if } w^T x \geq 0 \\ 0, & w^T x < 0 \end{cases}$$

Based on the above data, answer the given subquestions.

Sub questions

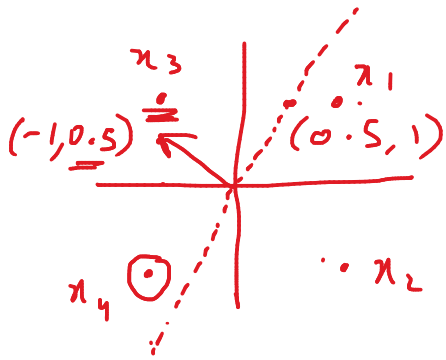
Question Number : 43 Question Id : 640653579344 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Short Answer Question

Suppose that the decision boundary passes through the origin and through the point $D = \begin{bmatrix}0.5\\1\end{bmatrix}$. The weight vector is initialized to $w = \begin{bmatrix}w_0\\w_1\end{bmatrix}$ with $w_0 = -1$. What is the value of w_1?



2

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

0.5

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

Question Number : 44 Question Id : 640653579345 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Short Answer Question

How many points were correctly classified?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

Question Number : 45 Question Id : 640653579346 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

Update the weight values using the perceptron learning algorithm by visiting the following points in order (x_4, x_3). What is the angle (in degrees) between the updated weight vector and the initial weight vector?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

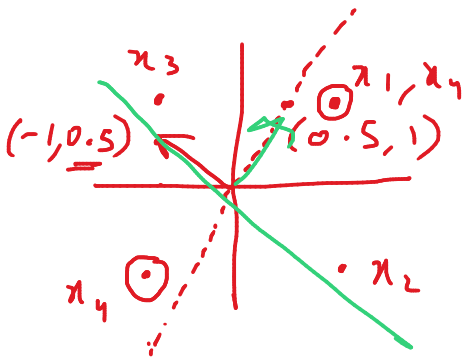
Possible Answers :

Question Number : 46 Question Id : 640653579347 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

Suppose we negate the point x_4 and denote it by x_4'. Then the statement that there exists w' such that $x^T w' \geq 0$ for the data points (x_1, x_2, x_3, x_4') is



Options :

6406531933889. True

6406531933890. False

6406531933891. Insufficient information to conclude

Sub-Section Number : 5

Sub-Section Id : 64065383083

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 47 Question Id : 640653579348 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 5

Question Label : Short Answer Question

Consider a sigmoid neuron that takes in an input vector $x = \begin{bmatrix} 1 \\ -1 \\ 1 \\ -1 \end{bmatrix}$. The weight vector θ is initialized to $\begin{bmatrix} -1 \\ 1 \\ -1 \\ 1 \end{bmatrix}$. The output from the sigmoid neuron is

$$\hat{y} = \frac{1}{1 + exp(-\theta^T x)}$$

Suppose we use the following loss function

$$L = \frac{1}{2}(y - \hat{y})^2$$

Update the weight vector once by running the Gradient Descent algorithm with $\eta = 20$. Assume the true label $y = 1$. What is the new loss value (that is, the loss computed after updating the weight vector)?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

Sub-Section Number : 6

Sub-Section Id : 640653383084

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 48 Question Id : 640653579349 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

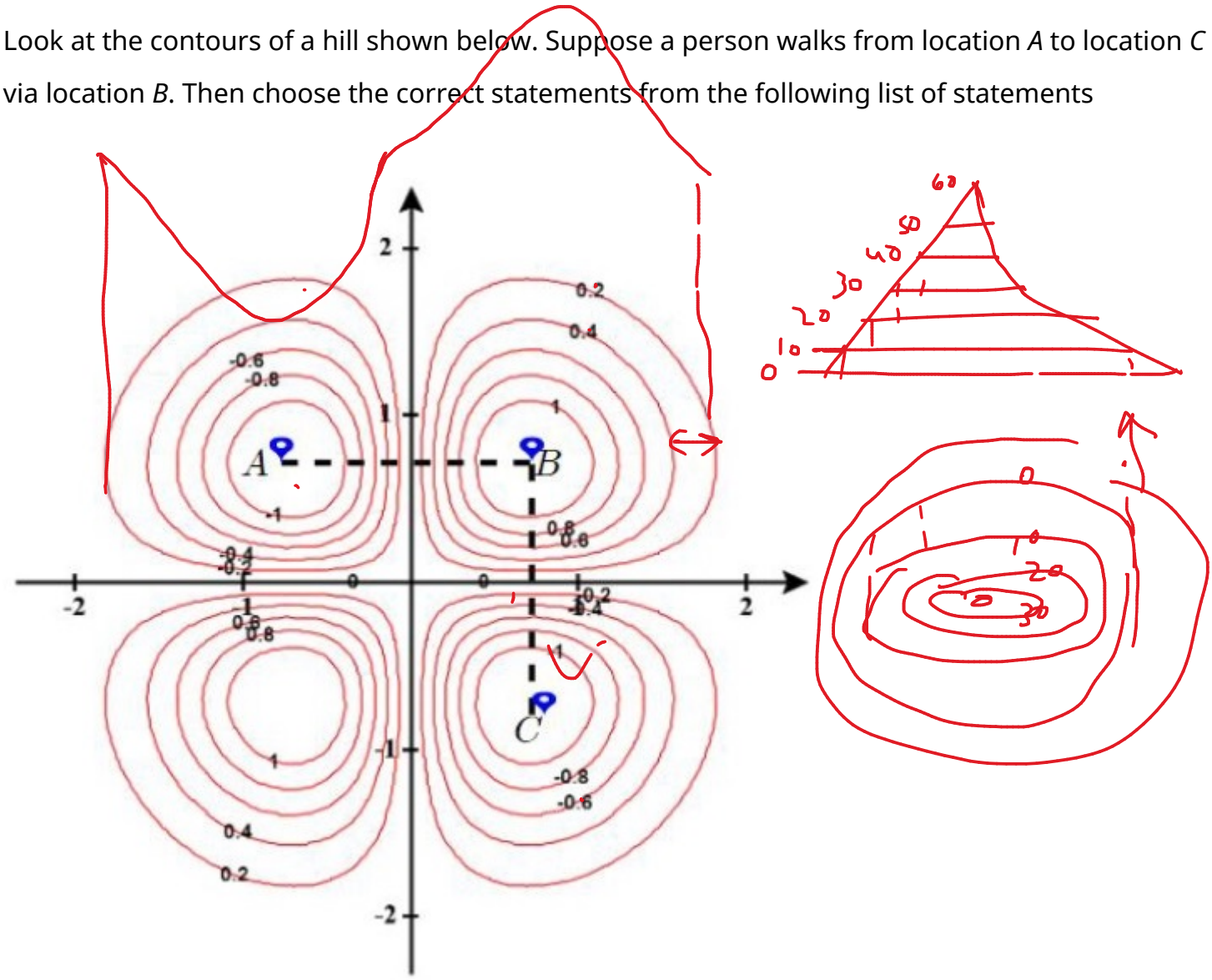
Question Label : Multiple Choice Question

Calculate $y_{t+1} = \frac{1}{1+e^{-(\theta_{t+1}^T x)}} = sig(-2.616) = 0.068$

$$\theta_{t+1}^T x = \begin{bmatrix} -0.654 \\ 0.654 \\ -0.654 \\ 0.654 \end{bmatrix} \begin{bmatrix} 1 \\ -1 \\ 1 \\ -1 \end{bmatrix} = -0.654 \times 4 = -2.616$$

$$L_{T+1} = \frac{1}{2}(0.068 - 1)^2 = 0.434$$

Look at the contours of a hill shown below. Suppose a person walks from location *A* to location *C* via location *B*. Then choose the correct statements from the following list of statements



Options :

6406531933893. The person has to do one steep ascending and one steep descending

6406531933894. The person has to do two steep ascending and two steep descending

6406531933895. The person has to do one steep ascending and two steep descending

6406531933896. The person has to do two steep ascending and one steep descending

Sub-Section Number :	7
Sub-Section Id :	64065383085
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 49 Question Id : 640653579350 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

Consider a neural network with three hidden layers and one output layer. The hidden layers contain 100 neurons each. Suppose we have a square image of size 30×30 containing either a cat (positive class) or a dog (negative class). The neural network is designed to recognize it by outputting a probability score for each class. The input image is flattened into an array of size 900. Assume that all neurons in the network have bias associated with them and use the sigmoid activation function. How many parameters are there in the network?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

Sub-Section Number : 8

Sub-Section Id : 64065383086

Question Shuffling Allowed : No

Is Section Default? : null

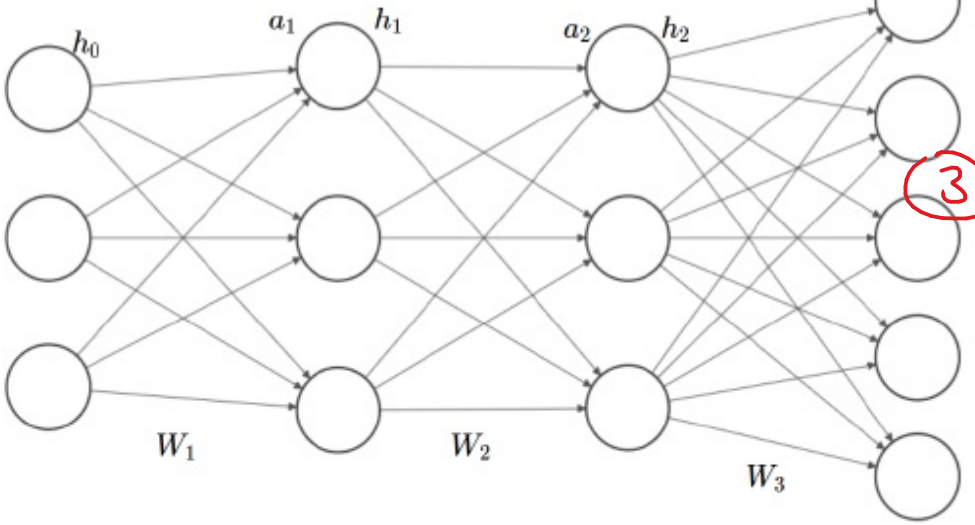
Question Id : 640653579351 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (50 to 52)

Question Label : Comprehension

Consider a neural network with two hidden layers and one output layer, as shown below. Here, a_k is a pre-activation and h_k is the output from the $k-$th layer. All the neurons in the hidden layers use a scaled sigmoid activation function that is defined below

$$\sigma(z) = \frac{2}{1+e^{-z}}$$



Use natural logarithm where required.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 50 Question Id : 640653579352 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 5

Question Label : Short Answer Question

Suppose that the neural network is used for a classification problem with 1000 classes (such that any given input belongs to exactly one class). Suppose further that the number of neurons in the second hidden layer is 3 and the number of neurons in the first hidden layer is also 3. The weights of W_3 are all initialized to 1. The input $h_0 = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$. The other weights W_1 and W_2 are initialized as follows,

$$W_1 = W_2 = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{bmatrix}$$

The true label $y = 500$ is one hot encoded as $y = [0 \;\; 0 \;\; \cdots \;\; 0 \;\; 1 \;\; 0 \;\; 0 \;\; 0 \;\; \cdots \;\; 0]^T$

Assume that the output layer uses softmax activation and the neurons in the network has no bias associated with it. Compute the cross entropy loss.

Note:If you think the given information is not sufficient to calculate the loss, then enter -1 as answer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

Question Number : 51 Question Id : 640653579353 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 5

Question Label : Short Answer Question

Assume we have only three neurons in the output layer with a softmax activation function. Suppose that the weights are initialized as follows

$$W_1 = W_2 = W_3 = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{bmatrix}$$. Moreover,

$$a_1 = \begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix} \quad a_2 = \begin{bmatrix} 3.22 \\ 2.92 \\ 3.22 \end{bmatrix} \quad a_3 = \begin{bmatrix} 3.84 \\ 3.82 \\ 3.82 \end{bmatrix} \quad y = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$

Use cross entropy loss and compute the gradient of w_{10} (that is, ∇w_{10}) of W_3. (More precisely, ∇w_{310})

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

Question Number : 52 Question Id : 640653579354 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 5

Question Label : Short Answer Question

$$h_2 = \sigma(a_2) \Rightarrow \sigma \begin{bmatrix} 3.22 \\ 2.92 \\ 3.22 \end{bmatrix}^T \text{ where } \sigma = \frac{2}{1+e^{-x}}$$

$$\Rightarrow h_2 = \begin{bmatrix} \sigma(3.22) \\ \sigma(2.92) \\ \sigma(3.22) \end{bmatrix}^T = \begin{bmatrix} 1.923 \\ 1.898 \\ 1.923 \end{bmatrix}^T$$

$$\Rightarrow \frac{\partial L}{\partial w} = \begin{bmatrix} -0.662 \\ 0.331 \\ 0.331 \end{bmatrix} \begin{bmatrix} 1.923 & 1.898 & 1.923 \end{bmatrix}$$

$$\therefore \frac{\partial L}{\partial w_{310}} = 0.331 \times 1.923$$

$$= \boxed{0.636}$$

Assume we have only three neurons in the output layer with a softmax activation function. Suppose that the weights are initialized as follows

$W_1 = W_2 = W_3 = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{bmatrix}$. Moreover,

$a_1 = \begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix}$ $a_2 = \begin{bmatrix} 3.22 \\ 2.92 \\ 3.22 \end{bmatrix}$ $a_3 = \begin{bmatrix} 3.84 \\ 3.82 \\ 3.82 \end{bmatrix}$ $y = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$

Use cross entropy loss and compute the gradient of w_{10} (that is, ∇w_{10}) of W_2. (More precisely, ∇w_{210})

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

Sub-Section Number :	9
Sub-Section Id :	64065383087
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653579355 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (53 to 54)

Question Label : Comprehension

Suppose that a team solves a 1000-class classification problem using a neural network that contains 32 layers. Assume that the training set contains exactly 32 samples per class. The team

creates batches of samples, each of size 32. The batch is created such that all the samples in a batch belongs to the same class.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 53 Question Id : 640653579356 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Short Answer Question

Suppose that the team trains the neural network with the given configuration using mini-batch Gradient Descent algorithm for 32 epochs. Then how many times do the parameters of the network get updated?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

Question Number : 54 Question Id : 640653579357 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Short Answer Question

Suppose we use SGD (Stochastic Gradient Descent) algorithm to update the parameters of the network by running it for 32 epochs. Then how many times do the parameters of the network get updated?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

Market Research

Section Id :	64065339150
Section Number :	4
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	9
Number of Questions to be attempted :	9
Section Marks :	50
Display Number Panel :	Yes
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065383088
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 55 Question Id : 640653579358 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DEGREE LEVEL : MARKET RESEARCH (COMPUTER