NPTEL Online Certification Courses

Indian Institute of Technology Kharagpur

Course Name – Introduction To Machine Learning

Assignment – Week 6 (Neural Networks)

TYPE OF QUESTION: MCQ/MSQ

Number of Question: 8 **Total Marks: 8x2 = 16**

1. In training a neural network, we notice that the loss does not increase in the first few starting epochs: What is the reason for this?

   I) The learning Rate is low.
   II) Regularization Parameter is High.
   III) Stuck at the Local Minima.
   IV) **All of these could be the reason.**

   Answer: D
   The problem can occur due to any one of the reasons above.

2. What is the sequence of the following tasks in a perceptron?

   I) Initialize the weights of the perceptron randomly.
   II) Go to the next batch of data set.
   III) If the prediction does not match the output, change the weights.
   IV) For a sample input, compute an output.

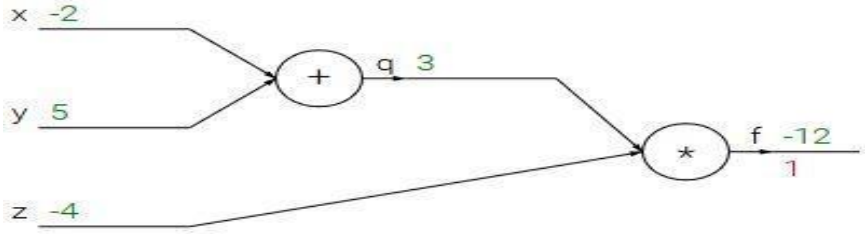
   A) I, II, III, IV
   B) IV, III, II, I
   C) III, I, II, IV
   D) I, IV, III, II

   Answer: D
   D is the correct sequence.

3. Suppose you have inputs as x, y, and z with values -2, 5, and -4 respectively. You have a neuron ‘q’ and neuron ‘f’ with functions:

   q = x + y
   f = q * z

   Graphical representation of the functions is as follows:

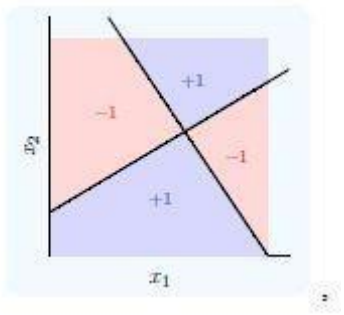


What is the gradient of F with respect to x, y, and z?

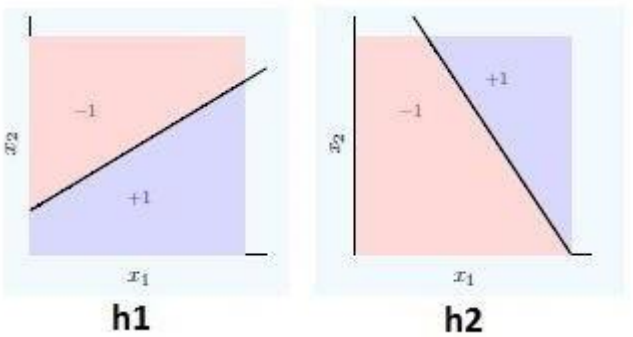
A) (-3, 4, 4)
B) (4, 4, 3)
C) (-4, -4, 3)
D) (3, -4, -4)

Answer: C
To calculate gradient, we should find out (df/dx), (df/dy) and (df/dz).

4. A neural network can be considered as multiple simple equations stacked together. Suppose we want to replicate the function for the below mentioned decision boundary.



Using two simple inputs h1 and h2,



What will be the final equation?

I) (h1 AND NOT h2) OR (NOT h1 AND h2**)**
II) (h1 OR NOT h2) AND (NOT h1 OR h2)
III) (h1 AND h2) OR (h1 OR h2)
IV) None of these

Answer: C
As you can see, combining h1 and h2 in an intelligent way can get you a complex equation.

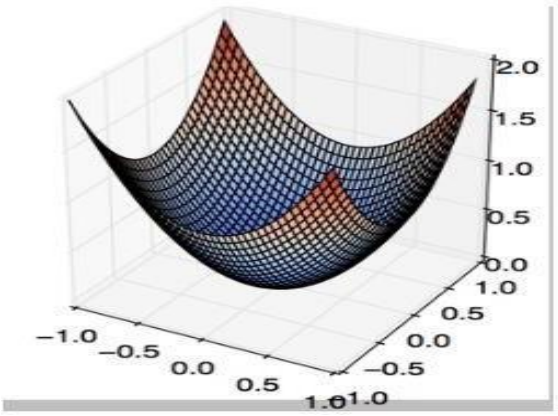
5. Which of the following is true about model capacity (where model capacity means the ability of neural network to approximate complex functions)?

   I) **As number of hidden layers increase, model capacity increases**
   II) As dropout ratio increases, model capacity increases
   III) As learning rate increases, model capacity increases
   IV) None of these.

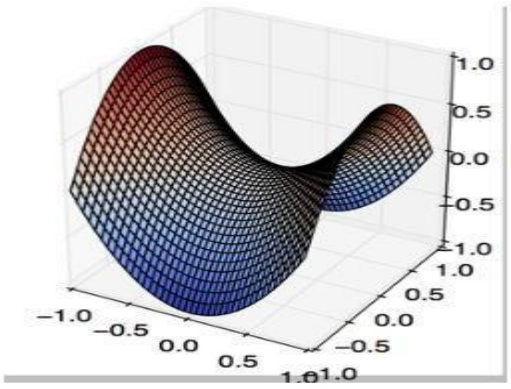
Answer: A
Option A is correct.

6. First Order Gradient descent would not work correctly (i.e. may get stuck) in which of the following graphs?

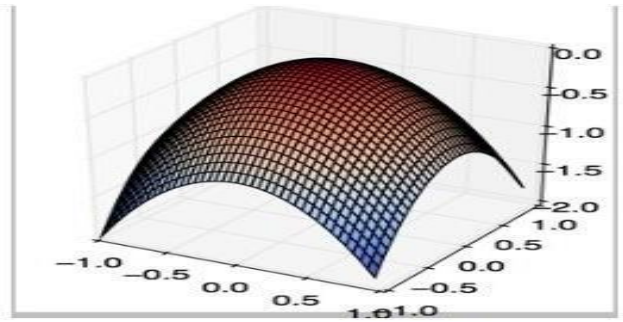
A)



B)



C)



D) None of These.

Answer: B
This is a classic example of saddle point problem of gradient descent.

7. Which of the following is true?
Single layer associative neural networks do not have the ability to

I) Perform pattern recognition
II) Find the parity of a picture
III) Determine whether two or more shapes in a picture are connected or not

A) II and III are true
B) II is true
C) All of the above
D) None of the above

Answer: A
Pattern recognition is what single layer neural networks are best at but they do not have the ability to find the parity of a picture or to determine whether two shapes are connected or not.

8. The network that involves backward links from outputs to the inputs and hidden layers is called as

A) Self-organizing Maps
B) Perceptron
C) Recurrent Neural Networks
D) Multi-Layered Perceptron

Answer: C

End