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**NPTEL (<https://swayam.gov.in/explorer?ncCode=NPTEL>) » Introduction To Machine Learning (course)**


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## Course outline

**How does an  
NPTEL  
online  
course  
work? ()**

**Week 0 ()**

**Week 1 ()**

**Week 2 ()**

**Week 3 ()**

**Week 4 ()**

**Week 5 ()**

☐ Artificial  
Neural

# Week 5: Assignment 5

The due date for submitting this assignment has passed.

**Due on 2023-08-30, 23:59 IST.**

**Assignment submitted on 2023-08-23, 08:40 IST**

1) The perceptron learning algorithm is primarily designed for:

**1 point**

- ☐ Regression tasks
- ☒ Unsupervised learning
- ☐ Clustering tasks
- ☐ Linearly separable classification tasks
- ☐ Non-linear classification tasks

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Linearly separable classification tasks*

2) The last layer of ANN is linear for \_\_\_\_\_ and softmax for \_\_\_\_\_.

**1 point**

- ☐ Regression, Regression
- ☐ Classification, Classification
- ☒ Regression, Classification
- ☐ Classification, Regression

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Regression, Classification*

3) Consider the following statement and answer True/False with corresponding reason: **1 point**

Networks I -  
Early Models  
(unit?  
unit=60&lesso  
n=61)

Artificial  
Neural  
Networks II -  
Backpropagati  
on (unit?  
unit=60&lesso  
n=62)

Artificial  
Neural  
Networks III -  
Backpropagati  
on Continued  
(unit?  
unit=60&lesso  
n=63)

Artificial  
Neural  
Networks IV -  
Training,  
Initialization  
and Validation  
(unit?  
unit=60&lesso  
n=64)

Parameter  
Estimation I -  
The Maximum  
Likelihood  
Estimate  
(unit?  
unit=60&lesso  
n=65)

Parameter  
Estimation II -  
Priors and the  
MAP estimate  
(unit?  
unit=60&lesso  
n=66)

Parameter  
Estimation III  
(unit?  
unit=60&lesso  
n=67)

Practice:  
Week 5:  
Assignment 5

The class outputs of a classification problem with a ANN cannot be treated independently.

- ☐ True. Due to cross-entropy loss function
- ☒ True. Due to softmax activation
- ☐ False. This is the case for regression with single output
- ☐ False. This is the case for regression with multiple outputs

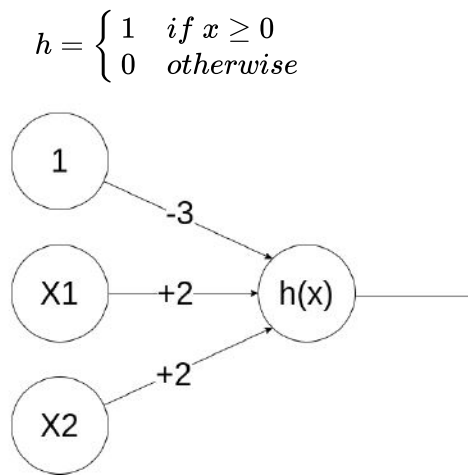
Yes, the answer is correct.

Score: 1

Accepted Answers:

*True. Due to softmax activation*

4) Given below is a simple ANN with 2 inputs  $X1, X2 \in \{0, 1\}$  and edge weights  $-3, +2, +2$  **1 point**



Which of the following logical functions does it compute?

- ☐ XOR
- ☐ NOR
- ☒ NAND
- ☐ AND

No, the answer is incorrect.

Score: 0

Accepted Answers:

*AND*

5) Using the notations used in class, evaluate the value of the neural network with a 3-1 architecture (2-dimensional input with 1 node for the bias term in both the layers). The parameters are as follows **1 point**


$$\alpha = \begin{bmatrix} 1 & 0.4 & 0.3 \\ 1 & 0.6 & 0.5 \end{bmatrix}$$

$$\beta = [0.4 \quad 0.6 \quad 0.9]$$

Using sigmoid function as the activation functions at both the layers, the output of the network for an input of (0.8, 0.7) will be (up to 4 decimal places)

- ☐ 0.7275

(Non Graded)  
(assessment?  
name=180)

 **Quiz: Week 5:  
Assignment 5**  
(assessment?  
name=213)

☐ Week 5  
Feedback  
Form :  
Introduction  
To Machine  
Learning  
(unit?  
unit=60&lesso  
n=193)

☐ Week 5:  
Solution (unit?  
unit=60&lesso  
n=215)

**Week 6 ()**

**Week 7 ()**

**Week 8 ()**

**Week 9 ()**

**Text  
Transcripts ()**

**Download  
Videos ()**

**Books ()**

**Problem  
Solving  
Session -  
July 2023 ()**

- ☐ 0.0217  
☐ 0.2958  
☐ 0.8213  
☒ 0.7291  
☐ 0.8414  
☐ 0.1760  
☐ 0.7552  
☐ 0.9442  
☐ None of these

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*0.8414*

6) If the step size in gradient descent is too large, what can happen? **1 point**

- ☐ Overfitting  
☐ The model will not converge  
☒ We can reach maxima instead of minima  
☐ None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*The model will not converge*

7) On different initializations of your neural network, you get significantly different values of loss. What could be the reason for this? **1 point**

- ☐ Overfitting  
☐ Some problem in the architecture  
☐ Incorrect activation function  
☒ Multiple local minima

Yes, the answer is correct.  
Score: 1

Accepted Answers:  
*Multiple local minima*

8) The likelihood  $L(\theta|X)$  is given by: **1 point**

- ☐  $P(\theta|X)$   
☒  $P(X|\theta)$   
☐  $P(X) \cdot P(\theta)$   
☐  $\frac{P(\theta)}{P(X)}$

Yes, the answer is correct.

Score: 1

Accepted Answers:

$P(X|\theta)$

9) Why is proper initialization of neural network weights important?

**1 point**

- ☒ To ensure faster convergence during training
- ☐ To prevent overfitting
- ☐ To increase the model's capacity
- ☐ Initialization doesn't significantly affect network performance
- ☐ To minimize the number of layers in the network

Yes, the answer is correct.

Score: 1

Accepted Answers:

*To ensure faster convergence during training*

10) Which of these are limitations of the backpropagation algorithm?

**1 point**

- ☐ It requires error function to be differentiable
- ☐ It requires activation function to be differentiable
- ☐ The  $i^{th}$  layer cannot be updated before the update of layer  $i + 1$  is complete
- ☒ All of the above
- ☐ (a) and (b) only
- ☐ None of these

Yes, the answer is correct.

Score: 1

Accepted Answers:

*All of the above*