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NPTEL (<https://swayam.gov.in/explorer?ncCode=NPTEL>) » Deep Learning - IIT Ropar (course)



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Course outline

How does an NPTEL
online course work?
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Week 0 ()

Week 1: Assignment 1

Your last recorded submission was on 2023-08-04, 09:56 IST

Due date: 2023-08-09, 23:59 IST.

- 1) The table below shows the temperature and humidity data for two cities. Is the data linearly separable?

1 point

City	Temperature (°C)	Humidity (%)
A	25	50
A	20	60
A	30	40
D	-28	45

- ☒ Yes
☐ No
☐ Cannot be determined from the given information

- 2) What is the perceptron algorithm used for?

1 point

Week 1 ()

- Biological Neuron (unit?
unit=17&lesson=18)
- From Spring to Winter
of AI (unit?
unit=17&lesson=19)
- The Deep Revival
(unit?
unit=17&lesson=20)
- From Cats to
Convolutional Neural
Networks (unit?
unit=17&lesson=21)
- Faster, higher, stronger
(unit?
unit=17&lesson=22)
- The Curious Case of
Sequences (unit?
unit=17&lesson=23)
- Beating humans at their
own games (literally)
(unit?
unit=17&lesson=24)
- The Madness (2013-)
(unit?
unit=17&lesson=25)
- (Need for) Sanity (unit?
unit=17&lesson=26)
- Motivation from
Biological Neurons

- ☐ Clustering data points
- ☐ Finding the shortest path in a graph
- ☒ Classifying data
- ☐ Solving optimization problems

3) What is the most common activation function used in perceptrons?

1 point

- ☐ Sigmoid
- ☐ ReLU
- ☐ Tanh
- ☒ Step

4) Which of the following Boolean functions cannot be implemented by a perceptron?

1 point

- ☐ AND
- ☐ OR
- ☒ XOR
- ☐ NOT

5) We are given 4 points in \mathbf{R}^2 say, $x_1 = (0, 1)$, $x_2 = (-1, -1)$, $x_3 = (2, 3)$, $x_4 = (4, -5)$. Labels of x_1, x_2, x_3, x_4 are given to be $-1, 1, -1, 1$ We initiate the perceptron algorithm with an initial weight $w_0 = (0, 0)$ on this data. What will be the value of w_0 after the algorithm converges? (Take points in sequential order from x_1 to x_4) (update happens when the value of weight changes)

1 point

- ☐ $(0, 0)$
- ☐ $(-2, -2)$
- ☒ $(-2, -3)$
- ☐ $(1, 1)$

(unit?
unit=17&lesson=27)

- McCulloch Pitts Neuron, Thresholding Logic (unit?
unit=17&lesson=28)
- Perceptrons (unit?
unit=17&lesson=29)
- Error and Error Surfaces (unit?
unit=17&lesson=30)
- Perceptron Learning Algorithm (unit?
unit=17&lesson=31)
- Proof of Convergence of Perceptron Learning Algorithm (unit?
unit=17&lesson=32)
- Lecture Material for Week 1 (unit?
unit=17&lesson=33)
- Quiz: Week 1: Assignment 1 (assessment?
name=226)
- Week 1 Feedback Form: Deep Learning - IIT Ropar (unit?
unit=17&lesson=35)

Week 2 ()

Week 3 ()

6) We are given the following data:

1 point

x_1	x_2	y_3
2	4	1
3	-1	-1
5	6	-1
2	0	1
-1	0	1
-2	-2	1

Can you classify every label correctly by training a perceptron algorithm? (assume bias to be 0 while training)

- ☒ Yes
☐ No

7) Suppose we have a boolean function that takes 5 inputs x_1, x_2, x_3, x_4, x_5 ? We have an MP neuron with parameter $\theta = 1$. For how many inputs will this MP neuron give output $y = 1$? 1 point

- ☐ 21
☒ 31
☐ 30
☐ 32

8) Which of the following best represents the meaning of term "Artificial Intelligence"?

1 point

- ☒ The ability of a machine to perform tasks that normally require human intelligence
☐ The ability of a machine to perform simple, repetitive tasks
☐ The ability of a machine to follow a set of pre-defined rules
☐ The ability of a machine to communicate with other machines

9) Which of the following statements is true about error surfaces in deep learning?

1 point

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- ☐ They are always convex functions.
- ☒ They can have multiple local minima.
- ☐ They are never continuous.
- ☐ They are always linear functions.

10) What is the output of the following MP neuron for the AND Boolean function?

1 point

$$y = \begin{cases} 1, & \text{if } x_1 + x_2 + x_3 \geq 1 \\ 0, & \text{otherwise} \end{cases}$$



$y = 1$ for $(x_1, x_2, x_3) = (0, 1, 1)$



$y = 0$ for $(x_1, x_2, x_3) = (0, 0, 1)$



$y = 1$ for $(x_1, x_2, x_3) = (1, 1, 1)$



$y = 0$ for $(x_1, x_2, x_3) = (1, 0, 0)$

You may submit any number of times before the due date. The final submission will be considered for grading.

Submit Answers